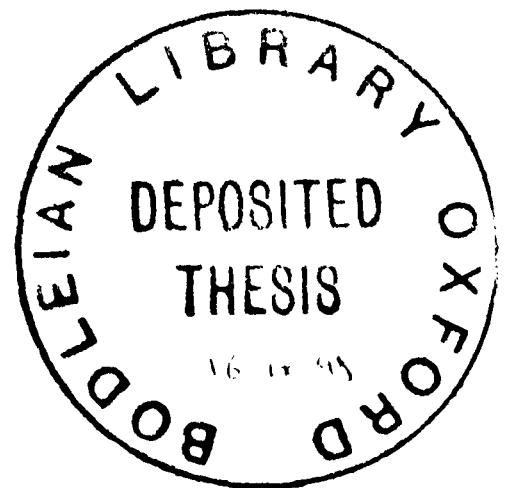


**Fertility Decline in Japan since the 1970s:
Socio-economic Factors or Attitudinal Factors?**

Thesis submitted in partial fulfilment of the requirements for the degree of D.Phil. in
Sociology in the Faculty of Social Studies at the University of Oxford.

Nobutaka Fukuda
Pembroke College

Michaelmas 1997



Sirogane mo
Kugane mo tama mo
Naniseuni
Masareru takara
Ko ni sikame ya mo
(*Man'yôshû*, V. xi)

my translation

What is the use
Of securing silver
Or gold or sapphire?
What can be more precious
Than a jewel of a child?

Abstract

This study investigates the influence of socio-economic and attitudinal factors on recent changes in marriage and fertility in Japan. Using macro- and micro-data (collected especially for this research), the study examines the validity of three main theories: (1) the New Home Economics theory; (2) Easterlin's theory; and (3) the ideational (or attitudinal) theory in determining Japanese marriage and fertility behaviour.

The findings of this study show that socio-economic factors exert a substantial effect on Japanese marriage and fertility behaviour. More specifically, an increase in women's earning capacity raised their marriage age, lowered the level of their fertility, and lengthened their birth intervals. This evidence is in agreement with the New Home Economics theory. On the other hand, relative economic status also affected Japanese marriage and fertility behaviour. An improvement in the economic situation of young adults encouraged them to marry earlier, and to have more children. These findings support Easterlin's theory. However, comparing the two theories, the longitudinal trend of marriage and fertility pattern in Japan is better explained by the New Home Economics theory than Easterlin's theory. The level of women's wages had a relatively stronger impact on these patterns than their relative economic status.

The findings also reveal that attitudinal factors play a significant role in determining Japanese marriage and fertility behaviour. As women became less committed to traditional norms and values, they married later, had fewer children and lengthened their birth intervals. Likewise, the reinforcement of women's individualistic attitudes raised their marriage age, lowered the level of their fertility, and delayed their entry to parenthood. This evidence indicates that marriage and fertility pattern in Japan cannot be due entirely to socio-economic factors. Comparing socio-economic and

attitudinal factors, the former had a greater influence on marriage and fertility behaviour than the latter. We conclude from the findings of this study that Japanese marriage and fertility behaviour are affected both by socio-economic and attitudinal (ideational) factors, but the influence of the latter is secondary.

Table of contents

Introduction	1
Chapter 1 Explanations of Fertility Decline in Industrialised Countries	
Introduction	3
1.1 Theories of Fertility Behaviour	5
1.2 Socio-economic Factors versus Ideational Factors	12
1.3 The State of Knowledge about Japanese Fertility	19
1.4 Strategy of the Study	23
1.5 Survey Method and Result	30
1.6 Structure of the Thesis	32
Chapter 2 Japanese Fertility Behaviour: An International Comparison	
Introduction	33
2.1 Trends and Patterns of Fertility in Industrialised Countries	38
2.2 Patterns of Birth Order in Industrialised Countries	47
2.3 A Comparison of Proximate Factors Affecting Fertility	53
2.4 A Comparison of Socio-economic Factors Affecting Fertility	64
2.5 A Compression of Values and Attitudes Affecting Fertility	74
Conclusion	80
Chapter 3 Analysis of Marriage Behaviour	
Introduction	83
3.1 The Importance of Marriage to Fertility	84
3.2 Theories of Marriage Behaviour: Are we <i>Homo oeconomicus</i> or <i>Homo sociologicus</i> ?	88
3.3 Recent Socio-economic and Attitudinal Changes in Japan	92
3.4 Analytical Framework of Marriage Behaviour	99
3.5 Differences in Age at Marriage	107
3.6 Analytical Method of Age at Marriage	115
3.7 Results of the Multi-variate Analysis of Age at Marriage	117
3.8 Tempo Aspect versus Quantum Aspect of Marriage Pattern	128
3.9 Differences in Nuptiality Probability of Marrying	129
3.10 Analytical Method of Nuptiality Probability	137
3.11 Results of the Analysis of Nuptiality Probability	139
Conclusion	150
Chapter 4 Analysis of the Number of Children	
Introduction	153
4.1 Fertility Trends in Japan	154
4.2 Social Changes and Fertility Decline: Its Theoretical Implication	159
4.3 Analytical Framework	165
4.4 Differences in the Achieved Number of Children	171
4.5 Analytical Method of the Number of Children	180
4.6 Results of the Analysis of the Realised Number of Children	183
4.7 The Relation between the Achieved and the Desired Number of Children	195
4.8 Differences in the Intended Number of Children	197
4.9 Results of the Analysis of the Intended Number of Children	205
Conclusion	212
Chapter 5 Analysis of the Timing of Births	
Introduction	214
5.1 The Trend of the Timing of Births after Marriage in Japan	215
5.2 Causes of Changes in Birth Intervals in Japan: Some Implications	222
5.3 Analytical Framework of Birth Intervals	230
5.4 Differences of the First Birth Interval: From Marriage to the First Birth	237
5.5 Results of the Analysis of the First Birth Interval	244
5.6 The Importance of the Second Birth Timing	253
5.7 Differences of the Second Birth Interval: From the First Birth to the Second Birth	255
5.8 Results of the Analysis of the Second Birth Interval	261
Conclusion	272

Chapter 6 Time-series Analysis of Marriage and Fertility	
Introduction	275
6.1 Two Competing Theories of the Post-war Demographic Swings: Counter-cyclical or Pro-cyclical?	276
6.2 The Japanese Post-war Demographic Trend and its Explanations	285
6.3 Analytical Framework of Changes in Marriage and Fertility	297
6.4 Bivariate Analysis of Nuptiality and Fertility	307
6.5 Multi-variate Analysis of Marriage and Fertility	310
6.6 Results of the Time-series Analysis of Marriage and Fertility	315
6.7 Stability of the Effects of Socio-Economic Factors	327
6.8 Results of the Analysis of Marriage and Fertility for Two Periods	329
6.9 Influence of Attitudes on Demographic Pattern	332
6.10 Attitudinal Changes in Japan	333
6.11 Constructing a Series of Attitudinal Variables	339
6.12 Influence of Attitudinal Factors on Marriage and Fertility Pattern	342
Conclusion	349
Chapter 7 Conclusions: What Determines Demographic Behaviour in Japan?	
Introduction	352
7.1 Theoretical Considerations (Chapter 1)	352
7.2 Japanese Demographic Behaviour From a Comparative View (Chapter 2)	354
7.3 Determinants of Marriage Behaviour (Chapter 3)	356
7.4 Determinants of the Number of Children (Chapter 4)	357
7.5 Determinants of the timing of Birth (Chapter 5)	359
7.6 Post-war Change in Marriage and Fertility Pattern (Chapter 6)	360
7.8 The Determinants of Demographic Behaviour in Japan	362
Appendices	
A.1: Total Fertility Rates in Industrialised Countries, 1945-1994	366
A.2: Demographic and Socio-economic Developments in Japan, 1950-1993	370
A.3: List of Official Sources	386
A.4: Response Bias in the Survey	389
A.5: Questionnaire Form Translated from Japanese	394
Bibliography	403

List of tables

Table 2.1:	Proportions of Women Ever-married, Selected Industrialized Countries around 1990	57
Table 2.2:	Changes of Female SMAM and TFR, Selected Industrialized Countries around 1970 and 1990	59
Table 2.3:	Contraceptive Usage, Selected Industrialized Countries in the 1980s	61
Table 2.4:	Induced Abortion Rates, Selected Industrialized Countries in the 1980s	64
Table 2.5:	Enrollment Rates in Tertiary Education by Sex, Selected Industrialized Countries around 1990	67
Table 2.6:	Hourly Wages in Manufacturing by Sex, Selected Industrialized Countries in 1990	70
Table 2.7:	Female Labour Participation Rates by Age Group, Selected Industrialized Countries around 1990	74
Table 2.8:	Aggregated Responses to Selected Questions in the World Values Survey, Selected Industrialized Countries	80
Table 3.1:	Female Age at Marriage according to Socio-economic Variables	109
Table 3.2:	Relationship between Female Age at Marriage and Attitudinal Variables	111
Table 3.3:	Female Mean Age at Marriage according to Natal Variables	114
Table 3.4:	Female Mean Age at Marriage according to Other Specific Variables	115
Table 3.5:	The Result of MCA of the First Model	120
Table 3.6:	The Result of MCA of the Second Model	123
Table 3.7:	The Result of MCA of the Third Model	126
Table 3.8:	The Result of MCA of the Fourth Model	128
Table 3.9:	Female Proportions Marrying up to Age 34 according to Socio-economic Variables	131
Table 3.10:	Relationship between Female Proportions Marrying up to Age 34 and Attitudinal Variables	133
Table 3.11:	Female Proportions Marrying up to Age 34 according to Natal Variables	136
Table 3.12:	Female Proportions Marrying up to Age 34, by Inheritance Type	137
Table 3.13:	The Result of Cox Regression of the First Model	142
Table 3.14:	The Result of Cox Regression of the Second Model	146
Table 3.15:	The Result of Cox Regression of the Third Model	148
Table 3.16:	The Result of Cox Regression of the Fourth Model	150
Table 4.1:	The Achieved Number of Children according to Socio-economic Variables	173
Table 4.2:	The Achieved Number of Children according to Residential Variables	175
Table 4.3:	Relationship Between the Achieved Number of Children and Attitudinal Factors	177
Table 4.4:	The Relationship between the Achieved Number of Children, the Marriage Type and the Number of Wife's Siblings	180
Table 4.5:	The Result of Logistic Regression of the First Model (the Achieved Number of Children)	187
Table 4.6:	The result of Logistic Regression of the Second Model (the Achieved Number of Children)	190
Table 4.7:	The result of Logistic Regression of the Third Model (the Achieved Number of Children)	193
Table 4.8:	The result of Logistic Regression of the Fourth Model (the Achieved Number of Children)	195
Table 4.9:	The Intended Number of Children according to Socio-economic Variables	198
Table 4.10:	The Intended Number of Children of Residential Variables	200
Table 4.11:	Relationship Between the Intended Number of Children and Attitudinal Factors	201
Table 4.12:	The Relationship between the Intended Number of Children, the Marriage Type and the Number of Wife's Siblings	204
Table 4.13:	The Result of Logistic Regression of the First Model	

	(the Intended Number of Children)	206
Table 4.14:	The result of Logistic Regression of the Second Model (the Intended Number of Children)	208
Table 4.15:	The result of Logistic Regression of the Third Model (the Intended Number of Children)	210
Table 4.16:	The result of Logistic Regression of the Forth Model (the Intended Number of Children)	212
Table 5.1:	Decomposition of TMFR into Quantum and Tempo Effect in Japan, 1967-1981	219
Table 5.2:	The First Birth Interval according to Socio-economic Variables	239
Table 5.3:	Relationship Between Attitudinal Factors and the First Birth Interval	240
Table 5.4:	The First Birth Interval according to Residential Variables	242
Table 5.5:	Relationship between the First Birth Interval, Demographic Variable, and Marriage Type	243
Table 5.6:	The result of Cox Regression of the First Model (the First Birth Interval)	248
Table 5.7:	The result of Cox Regression of the Second Model (the First Birth Interval)	251
Table 5.8:	The result of Cox Regression of the Third Model (the First Birth Interval)	253
Table 5.9:	The Second Birth Interval according to Socio-economic Variables	256
Table 5.10:	Relationship Between Attitudinal Factors and the Second Birth Interval	258
Table 5.11:	The Second Birth Interval according to Residential Variables	260
Table 5.12:	Relationship between the First Birth Interval, Demographic Variable, and Marriage Type	261
Table 5.13:	The result of Cox Regression of the First Model (the Second Birth Interval)	266
Table 5.14:	The result of Cox Regression of the Second Model (the Second Birth Interval)	269
Table 5.15:	The result of Cox Regression of the Third Model (the Second Birth Interval)	272
Table 6.1:	Japanese Demographic Trends, 1920-1990	286
Table 6.2:	The Percentage of Couples Practicing Contraception in 1950, 1952 and 1955	289
Table 6.3:	The Average of Monthly Starting Salary for New School Graduates, 1970-1985	292
Table 6.4:	The Number of Children Ever-born in Agricultural Households, 1962	296
Table 6.5:	Correlation between a Dependent and an Independent Variable for the Period 1955-1993	310
Table 6.6:	Results of the Regression of Female Mean Age at First Marriage for the Period 1955-1993	318
Table 6.7:	Result of the Regression of the Total Female Marriage Rate for the Period 1955-1993	321
Table 6.8:	Result of the Regression of the Total Fertility Rate for the Period 1955-1993	324
Table 6.9:	Result of the Regression of the Mean Age of Childbearing for the Period 1955-1993	327
Table 6.10:	Results of the Regression Analysis of Female Mean Age at First Marriage and the Total Female Marriage Rate for the Period 1955-1973 and 1974-1993	330
Table 6.11:	Results of the Regression Analysis of the Total Fertility Rate and the Mean Age of Childbearing for the Period 1955-1973 and 1974-1993	332
Table 6.12:	Result of the Regression Analysis of Female Mean Age at First Marriage for the Period 1963-1993 and 1969-1993	343
Table 6.13:	Result of the Regression Analysis of the Total Female Marriage Rate for the Period 1963-1993 and 1969-1993	345
Table 6.14:	Result of the Regression Analysis of the Total Fertility Rate for the Period 1963-1993 and 1969-1993	347
Table 6.15:	Result of the Regression Analysis of the Mean Age of Childbearing	

List of graphs

Graph 2.1:	Gross Domestic Product per Head, Selected Industrialized Countries in 1995	37
Graph 2.2:	The Percentage of Working Population, Selected Industrialized Countries	38
Graph 2.3:	Trends of the Total Fertility Rates in Selected Industrialized Countries, from 1960 to 1994	40
Graph 2.4:	The Percentages of Age-specific Fertility Rates, Selected Industrialized Countries around 1970	44
Graph 2.5:	The Percentages of Age-specific Fertility Rates, Selected Industrialized Countries around 1990	46
Graph 2.6:	Distribution of Birth Order, Selected Industrialized Countries around 1970	51
Graph 2.7:	Distribution of Birth Order, Selected Industrialized Countries around 1990	52
Graph 3.1:	Total Fertility Rate and Mean Age at Marriage in Japan since the Second World War	84
Graph 3.2:	The Percentage of Never-married persons in Japan, by Age-group, 1950-1990	87
Graph 3.3:	The Labour Participation Rate of Women Aged 20 to 54	94
Graph 3.4:	The Percentage of Men and Women Going to Junior Colleges and Universities	95
Graph 4.1:	The Achieved and Desired Numbers of Children	156
Graph 4.2:	Period Parity Progression Ratios (per 1,000) and TFR in Japan, 1951-1990	159
Graph 4.3:	Difficulty in Rearing Children (Multiple Choice Question)	163
Graph 4.4:	Benefits of Having Children (Multiple Choice Question)	164
Graph 5.1:	TFR and Mean Age at Birth in Japan since 1960	216
Graph 5.2:	Distribution of Birth Intervals in Japan, by Marriage Cohort	222
Graph 5.3:	Female Labour Force Participation Rate in Japan after the Second World War (for All Women)	224
Graph 5.4:	Female Labour Force Participation Rate in Japan (for Married Women)	225
Graph 5.5:	Percentage of Working Married Woman in 1992, by Educational Level	226
Graph 5.6:	Women's Attitudes to Work after Marriage	229
Graph 6.1:	Percentage of Pupils Going to a Cram School	293
Graph 6.2:	Indexes of Urban Residential Land Prices	301
Graph 6.3:	Changes in Attitudes to a Way of Life in Japan	334
Graph 6.4:	Changes in Attitudes towards Caring for Aged Parents	336
Graph 6.5:	Changes in the Ideal Number of Children	337
Graph 6.6:	The Trend of Four Demographic Indicators	339

List of figures

Figure 3.1:	Analytical Framework of Marriage Behaviour	107
Figure 4.1:	Analytical Framework of the Level of Fertility	171
Figure 5.1:	Analytical Framework of Birth Intervals	237
Figure 6.1:	Analytical Framework of Longitudinal Change in Marriage and Fertility	307

Introduction

In *The Communist Manifesto* (1848), Karl Marx and Friedrich Engels stated, "A spectre is haunting Europe--the spectre of Communism." This spectre has now been exorcised in European countries. Nowadays, the economy is run on a market system in all these countries. Instead, another spectre is haunting industrialised countries--the spectre of anti-natalism. After the end of the Baby Boom, a considerable decline in fertility has been seen in these countries. Indeed, the total fertility rate in most of these countries has been below the replacement level. Japan is not an exception. The Japanese total fertility rate fell from 2.13 in 1970 to 1.43 in 1995, a reduction of 32.9%.

It is well known that low fertility is an important issue for the future of Japanese society. In particular, the shortage of a younger population will cause serious problems in Japan. For instance, the Economic Planning Agency (1992) points out four negative impacts that the shortage of a younger population will have on Japanese society: (1) a decline in demand for children's goods; (2) a shortage of work force; (3) a decrease in the savings rate; and (4) the breakdown of social security systems for the aged. These problems undoubtedly cast a shadow on the future well-being of the Japanese. In fact, the current demographic situation in Japan has been causing grave concern. According to the second public opinion survey on population in 1995 (*Kôsei Shô Jinkô Mondai Kenkyû Jo*, 1996), 42.3% of the respondents thought of the present low fertility rate as undesirable. In addition, 81.1% of the respondents felt that measures were necessary to increase the Japanese fertility rate.

In Western industrialised countries, the causes of the recent fertility decline have been studied from various aspects (Preston, 1986). In particular, a strong interest has attached to the relation between fertility

behaviour and socio-economic and ideational changes. For example, the importance of economic factors has been emphasised by Gary Becker (1981), Jacob Mincer (1984) and Richard Easterlin (1980). On the other hand, Ron Lesthaeghe (e.g., 1983) develops an argument about the influence of values and attitudes on the fertility change in European countries.

The causes of fertility decline have not sufficiently been examined in Japan, although the seriousness of the present fertility level is widely perceived. Interest has focused on considering the relation between the Japanese low fertility and socio-economic changes. For instance, in the governmental white paper (Economic Planning Agency, 1992), while much mention is made of the relation between the low fertility rate of Japanese married women and their socio-economic situation (e.g., a rise in women's wages and an increase in the female enrolment rate in universities), little attention is paid to the influence of ideational factors on fertility behaviour. Admittedly, the level of women's wages and education have risen in Japan over the past few decades. However, it is doubtful whether the recent fertility pattern in Japan is entirely attributable to economic factors. People's attitudes have considerably changed in Japan. For example, according to an opinion survey conducted by the Japan Broadcasting Corporation, the percentage of people who thought that women should devote themselves to housework after marriage fell from 35% in 1973 to 18% in 1993. In contrast, the percentage of people who thought that women should continue to work after having a child increased from 20% to 37% during the same period (NHK Yoron Chôsa Bu, 1991; Hashimoto & Takahashi, 1994). Considering socio-economic and attitudinal factors in Japan is clearly necessary for a complete understanding of the country's recent demographic changes. We will, in this thesis, examine the influence of these two factors on Japanese marriage and fertility behaviour.

Chapter 1

Explanations of Fertility Decline in Industrialised Countries

Introduction

The primary objective of this study is to examine determinants of reproductive behaviour in contemporary Japan. In recent decades, Western industrialised countries have shared demographic phenomena such as the postponement of marriage, and an increase in consensual unions. In particular, the birth rates of these countries have drastically declined since the end of the Baby Boom, and almost all of them are below the level of replacement fertility.

Japan, in common with other industrialised countries, has suffered a serious decline in fertility. Japan, unlike other industrialised countries, did not experience the Baby Boom either in the 1950s or in the 1960s, and its total fertility rate (TFR) remained stable at around 2.0 from the latter half of the 1950s to the end of the 1960s. However, the Japanese TFR began to decline in 1973, reaching 1.50 in 1994 (see Chapter 2 and 6). Given current mortality, the Japanese TFR is far below the replacement level of fertility (about 2.1 births per woman). In fact, when the TFR reached 1.57 in 1989, public concern about Japan's low birth rate was raised and the media coined the word '1.57 shock'.

It is still debatable whether or not these changes in fertility behaviour and living arrangements may represent the onset of a new demographic stage. Certain demographers claim that industrialised countries have entered a different demographic stage: the 'Second Demographic Transition' (Lesthaeghe, 1983; van de Kaa, 1987). In contrast, R. L. Cliquet (1991) contends that the recent demographic changes in industrialised countries can be regarded as the continuation of a process that has been going on for the past several decades, and rejects the

concept of a 'Second Demographic Transition'. Apart from the validity of the concept of a 'Second Demographic Transition', it is certain that all industrialised countries have come to share the below-replacement fertility rate.

The social and economic consequences resulted from the recent scarcity of births in industrialised countries will undoubtedly be far-reaching and profound. The ageing of a population is a vital issue in industrialised countries. Since fertility is the principal determinant of age composition, the continuation of the low fertility rate will produce a population with relatively fewer young people and relatively more old people in the absence of massive immigration. Such an unbalanced population structure will undoubtedly jeopardise governmental welfare systems in these countries, especially their pension programmes. Furthermore, due to progress in medical knowledge and improvements in hygiene and nutrition standards, life expectancy in these countries is expanding to an unprecedented high level (McKeown, 1976; Preston, 1976). Consequently, the social burden of an aged dependent population is becoming heavier without a considerable increase of the birth rate. Therefore, the current low birth rate is a serious issue for the future of these countries, and its determinants have to be scientifically analysed and explained in an appropriate societal context. Understanding determinants of demographic behaviour is necessary for all industrialised countries, but little is known as to what factors have brought about the recent demographic patterns of Japan.

Within the Western intellectual context, several theories have already been proposed, and empirical studies carried out in order to elucidate the causes of these phenomena. In these studies presented by social scientists, two explanations are particularly influential: a socio-economic and an attitudinal (or ideational) explanation.

Generally speaking, the socio-economic explanation holds that

changes in objective factors such as wages and incomes determine the demographic patterns and trends of industrialised countries. On the other hand, the attitudinal explanation stresses that not only objective conditions but also subjective factors such as human ideas and attitudes toward the family and reproduction are key factors in determining contemporary demographic circumstances. Lesthaeghe (1983), for example, argues that 'traditional' economists' decision-making theory, especially that of the New Home Economics, is necessary but insufficient to explain the recent Western demographic situation. As we will discuss later, he strongly contends that, in order to fully understand the recent demographic phenomena, ideational changes such as the reinforcement of individualism in Western countries should be taken into consideration.

As we shall show in the following chapters, certain aspects of the socio-economic and attitudinal situation in Japan are similar to those in Western countries. The questions then arise: do the ideational factors presented by certain Western demographers have any power to explain demographic behaviour in contemporary Japan? Or are Japan's recent demographic patterns exclusively attributable to the changes in objective socio-economic conditions?

This introductory chapter will first outline the main theories of fertility determinants. Subsequently, the chapter will provide some considerations on the validity of the theories. Finally, we will set out our research strategy and the structure of the thesis.

1.1 Theories of Fertility Behaviour

Studies of fertility, especially those of fertility decline, have been at the centre of demographic studies. Since Notestein (1953) formulated the demographic transition theory¹ (which had, prior to Notestein's own

¹ For a discussion of the institutional context of the demographic transition theory, see Szreter (1993).

formulation, been outlined by Thompson (1929) and Davis (1945)) demographers have concentrated their research interest on fertility patterns and its determinants. Hence, studies on fertility behaviour are numerous, and it is not our intention to provide an exhaustive review of them. Instead, in this section, we will present some of the main theories that have been proposed for the last couple of decades in order to explain the reproductive behaviour of industrialised countries. A main difference in the theories lies in their ways of grasping the decision-making processes of fertility behaviour, leading to different accounts of fertility patterns. In short, each theory has developed on the basis of its own behavioural model of fertility. In what follows, we will present these theories with particular emphasis on this point.

(1) New Home Economics Theory

The New Home Economics theory was initially articulated by Becker (1960), and has been developed by his colleagues (Becker, 1976, 1981; Becker & Lewis, 1973; Butz & Ward, 1979; Schultz, 1974b; Willis, 1973). Although this theory is formulated by several authors in various terms, the heart of this theoretical framework lies in an application of the Hicks-Allen consumption theory to fertility behaviour. In other words, this theory presumes that human fertility behaviour is the same as human behaviour in the consumption of market goods. Therefore, it follows that the demand for children, like that for markets goods, is determined mainly by income, wages, and prices.

The New Home Economics theory is formulated on the basis of two assumptions. The first assumption is that, in industrialised countries, children are no longer of any productive or economic utility to their parents, and can be regarded as only consumption goods bringing non-material satisfaction to their parents. In other words, children are identical to goods

such as a television set and a private car in terms of producing satisfaction. Thus, this theory does not distinguish between the acquisition of children and the purchase of automobiles, although Blake (1968) harshly criticises the notion of children as consumer goods. Secondly, the theory assumes that a household (or a couple) spends time and money, and consumes goods and services (including childbearing and child-care). In this process, a household (or a couple) behaves in such a rational way as to maximise its utility in a fixed preference ordering.

Based on these two assumptions, the New Home Economics theory holds that fertility behaviour is decided by the function of a budget constraint line and an indifference utility curve. More specifically, the theory predicts that an increase in household income will, *ceteris paribus*, increase the demand for children. This is because the more income a household (or a couple) has, the more goods it can afford to buy. This relationship clearly finds its analogy in the consumption theory in which the level of household income determines the consumption level of market goods.

At the same time, however, the theory recognises that a higher income does not always lead to an increase in the demand for children. First, the 'substitute effects' may outweigh the 'income effect'. Becker and Lewis (1973) formulate this phenomenon as the interaction between quantity and quality of children. In consumption behaviour, it is likely that, instead of increasing the demand for inferior goods, a rise in the level of income will create an increase in the demand for superior goods. In the case of fertility behaviour, parents having a higher income might not want more children. Instead, they may spend more money per child in order to enhance the quality of their children--just as an increase in income may allow consumers to shift from an economy car to a luxury car. Due to this exchange between quantity and quality, a rise in income does not

necessarily lead to an increase in the number of children a couple have. Thus, there may be no difference in the number of children between couples earning a high income and those earning a low income.

In the second place, the rearing of children entails opportunity cost (Butz & Ward, 1979; Mincer, 1963). The pleasure of having (consuming) children, even when they are regarded as consumer goods, necessitates a great deal of time being spent on caring for them. Bearing a child and caring for an infant are, in most cases, highly time-intensive activities on the part of mother (assuming a traditional gender role). In particular, since working and childbearing are alternatives for most women for at least a few years, they must give up their gainful occupation during this period. As a result, women are forced to abandon any earnings that could be obtained in the absence of a child. It therefore follows that a rise in female income, which signifies a rise in her opportunity costs, increases the price of (having) children. This rise will reduce demand for children and result in a lower birth rate.

(2) Easterlin Theory

The Easterlin theory of fertility also assumes that, like other decisions on consumption and production, parental decisions on having children are rationally made from a viewpoint of satisfaction-yielding goods. Hence, like the New Home Economics theory, the Easterlin theory accepts that the price of having children relative to other goods is one of the determinants of reproductive behaviour. However, this model challenges the postulate of the New Home Economics that individual utility functions are stable and fixed. Rather, the theory assumes that individual utility is dynamic and affected by economic circumstances (Easterlin, 1961, 1973, 1976, 1980). More specifically, it is claimed that the utility of an individual is influenced by the relative economic status of young adults who enter the age of

childbearing, and that a change in utility has a major impact upon fertility patterns.

According to the Easterlin theory, the concept of intergenerational economic status therefore plays an important role in determining individual utility, and the status is an index of relative affluence which is defined as a ratio between the earning potential of a young couple and the level of their material aspirations shaped by their natal household (Easterlin, 1980). The numerator of this ratio is generally determined by the job opportunities or wage rates of young adults in the labour market. On the other hand, its denominator depends on their own experiences as a child in their parental home.

In the theory, it is presumed that young adults who grew up in a cohort with high living standards have similar high material expectations in their adulthood, whereas those who grew up in a cohort with low living standards have similar low material expectations as well. Hence, when the present earning potential of young adults is high relative to their material aspirations, their relative economic status is better. In contrast, when the current potential of young adults is low relative to their aspirations, their relative economic status is worse.

Based on these assumptions, the theory explains fertility behaviour, depending on the intergenerational relative economic status. When the relative economic status of young adults is better, they will feel less economic pressure and therefore will marry earlier and have more children. In contrast, if their relative economic status is worse, they will feel increasing economic stress, marry later, and have fewer children.

(3) Ideational (or Attitudinal) Theory

The ideational theory places much emphasis on the influence of psychological factors on reproductive behaviour. The New Home

Economics theory regards individual preference, or utility function, as constant. Accordingly, the change of fertility behaviour is seen as a consequence of changes in prices and incomes under the assumption that individual preference for children does not change. Although the Easterlin theory holds that individual preference for having children is changeable, the fluctuation of preference is simply formulated as a function of economic circumstances in one's childhood and adulthood.

In contrast to these theories, the ideational theory assumes that attitude and preference, beyond the simple rational economic calculation, play a more independent and influential role in reproductive behaviour. Therefore, the effect of attitudinal factors on demographic behaviour is of great significance in the ideational theory.

Demographers have never ignored the importance of ideational or attitudinal factors to demographic behaviour. For instance, Notestein (1953) refers to the relation between demographic patterns and the change of norms and values associated with the process of modernisation. Similarly, Hawthorn (1970) emphasises the importance of normative factors as determinants of fertility. However, it is during the last decade that the relation between ideational factors and demographic behaviour in industrialised countries has attracted attention (van de Kaa, 1996). The reason for this is that the recent fertility decline in several European industrialised countries has gone hand in hand with a rise in extra-marital births and consensual unions. As mentioned earlier, economic theories of fertility hold that reproductive behaviour is determined by economic factors. However, from a purely economic perspective, it may be difficult to provide a satisfactory account of the demographic phenomena in these countries. For example, based on the New Home Economics theory, a rise in the cost of having children should, in theory, lead to a decline not only in the overall fertility rate, but in extra-marital births as well. However, the

number of extra-marital births has been increasing in Western countries. Owing to this theoretical insufficiency, demographers have recently turned their attention to the relation between ideational factors and demographic behaviour in industrialised countries.

According to the ideational theory, individuals neither have fixed preferences nor shape their preferences by the comparison of economic circumstances. Rather, the theory assumes that the formation of preference is affected by cultural and ideational factors. Hence, if values and ideas change in society, the pattern of individual preference will also be transformed, and this will consequently lead to different fertility behaviour. In other words, the difference between these approaches is derived from whether the individual is regarded as a simple economic rational actor *-homo oeconomicus-* or whether his or her action is influenced by moral or value factors *-homo sociologicus-*.

The proponents of the ideational theory, in various terms, describe the features of values and attitudes causing the low fertility in contemporary industrialised countries. For instance, these features are expressed as the spread of secular individualism (Lesthaeghe, 1983, 1991, 1995; Lesthaeghe & Meekers, 1986; Lesthaeghe & Surkyn, 1988), the advent of adult (or couple)-oriented society (Ariès, 1980), the increase of progressiveness (van de Kaa, 1980, 1987), or a move from fundamentalism to pragmatism (Simons, 1982, 1986b). For the sake of simplification, we will here summarise from two points the features of attitudinal changes that are maintained by the ideational theory.

The first point is that the influence of traditional norms and values regulating individual demographic behaviour in the past, especially religious values, has been gradually diminishing in the Western industrialised countries. Owing to this change, ideological pluralism has spread and people have tolerated more diversity in demographic behaviour. This attitudinal

change allows people to enjoy much freedom of choice in demographic behaviour. As a result, cohabitation, divorce and voluntary childlessness, which were socially undesirable in the past, have been more legitimized and accepted in society (Lesthaeghe & Meekers, 1986; van de Kaa, 1987). Secondly, a strong commitment to individualism has manifested itself in these industrialised societies, kindling a preoccupation with the pursuit of own self-welfare and goals, or the aspiration of self-fulfilment, in a social sphere rather than the welfare of other members in a domestic sphere, especially children's welfare. This trend allows individuals to put much weight on individual goal-attainment in the social sphere and to choose more self-reliant and independent lifestyles. As a result, people dislike sacrificing their own well-being for their children's well-being; this is reflected in their reluctance to have children (Preston, 1986).

1.2 Socio-economic Factors versus Ideational Factors

Obviously, a fundamental difference between the three main theories lies in their way of treating the influence of social norms and values on demographic behaviour. Since the New Home Economics theory presumes that individuals behave in a manner based only on economic calculation, comparing the necessary costs and expected benefits of their actions according to a stable and fixed preference for having children. Hence, any demographic phenomenon is thought of as a consequence of changes in objective factors such as price and income. For example, Becker (1976) points out that economists take tastes as given and work out the consequences of changes in prices, income and other objective variables under the assumption that taste does not change. On the other hand, although Easterlin's theory takes account of the change of motivation in a slightly more flexible way, variations in preference are formulated as a mere comparison of economic circumstances between one's childhood and

adulthood. These two economic theories, in short, rest on the assumption that economic factors are the most critical forces of demographic behaviour, and social norms and values are mere residual factors. These theories may, in this sense, be expressed as economic determinism. In contrast, the ideational theory tends to put much weight on the independent influence of ideas and attitudes on demographic behaviour, following the conventional line of sociological reasoning. This traditional contrast of the frameworks in demography is succinctly described by Duesenberry's famous comment: 'economics is all about how people make choices; sociology is all about how they don't have any choices to make' (Duesenberry, 1960). We may, therefore, say that the validity of the frameworks depends on whether the decision-making of fertility behaviour is within rational economic calculation or it goes beyond the calculation.

On the theoretical side, the economic framework seems appropriate to the demographic analysis of contemporary industrialised countries to some degree. The reason is that children in contemporary industrialised countries are no longer economic contributors to the family. As Leibenstein (1974, 1975) points out, children may have several sorts of utility at a less developed stage of society. For instance, after entering the labour force, children may have provided help either on the family farm or workshop, or earned an income to add to the common fund of the household (=work or income utility). In addition to this, a child may have been a potential source of security and help for parents in their old age (=security utility). At this stage, wealth in the form of money and economic resources formerly seems to have flowed from children to parents (Caldwell, 1982).

However, these two forms of utility hardly exist in highly developed society. Hence, children in contemporary industrialised countries may be viewed as consumer goods bringing non-material satisfaction to their parents. This transformation of children's roles in the family corresponds to

the process of the modernisation of society. As orthodox sociological theories argue, this transformation is one of the most distinctive features in the social development from an agrarian society to an industrialised urban society. In this process, the family changed from a production and consumption unit to a consumption unit (Levy, 1966; Moore, 1974; Smelser, 1959). Families in contemporary industrialised countries are more consumption-oriented than ever, and the economic contribution of children to their family is negligible. Instead, the activities of a household are mainly directed to gaining satisfaction from consuming goods and services. This situation provides grounds for the view that children are satisfaction-yielding goods in industrialised countries. Therefore, we cannot rule out the possibility that a couple's decision on having children is made from the viewpoint of consuming goods and services (or is affected by economic cost-benefit calculations).

Taking this situation into account, it seems that economic factors such as wage and income influence, to some extent, the patterns of fertility. The application of the economic framework to reproductive behaviour is, therefore, likely to shed light on some aspects of demographic behaviour in industrialised countries.

However, on the empirical side, the degree to which economic factors govern human reproductive behaviour is debatable (Murphy, 1992). The historical evidence of the previous fertility transition in Europe reveals that socio-economic factors do not explain the movements of fertility to a satisfactory degree (Lesthaeghe & Wilson, 1986). Rather, the findings of the European Fertility Project, which dealt with the previous demographic transition in Europe, show that the decline of fertility occurred under strikingly diverse socio-economic conditions, and cultural settings had a strong influence on the onset and spread of fertility decline (Coale & Watkins, 1986; Knodel & van de Walle, 1979). For instance, in the case of

Belgium, two different linguistic regions in similar socio-economic conditions, i.e. French-speaking Wallonia and Flemish-speaking Flanders, underwent a different movement of fertility in the course of the fertility transition (Lesthaeghe, 1977). Furthermore, the studies of Britain and Germany suggests that variables indicating the level of secularisation played an important role in the decline of fertility (Knodel, 1974; Teitelbaum, 1984).

Because the European Fertility Project was not designed well enough to examine the effect of culture on reproductive behaviour (Alther, 1992), the manner in which cultural factors affected the previous fertility decline in Europe was not clear. In spite of this drawback, the findings of the project suggest that cultural factors transmit social values and ideas, which, in turn, facilitate the acceptance of fertility regulation in a particular society or ethnic group (Watkins, 1989).

In addition to the historical evidence, studies on fertility change in less developed countries also indicate that socio-economic factors do not much account for the variations of fertility in the countries. Based on the comparative analyses of the demographic data obtained from the World Fertility Survey, Cleland and Wilson (1987) observe that the onset and spread of fertility decline in these countries were more closely associated with parents' cultural factors, such their new ideas on children, than with economic factors such as men's real wages and women's employment. Based on this evidence, Cleland and Wilson conclude that changes in attitudes and values such as the acceptance and spread of birth control are crucial factors to fertility decline in developing countries.

This relation between ideational factors and fertility decline in less developed countries is probably due to the diffusion of new Western ideas, which is termed 'Westernization' by Caldwell (1982). More specifically, developing countries transform their traditional political and economic structure into a modern structure in the course of social development. This

process, at the same time, accompanies the massive flow of new knowledge and ideas from the industrialised to the less developed world. The concept and method of fertility control is probably included in this flow. It is therefore thought that, as Western knowledge and ideas spread in less developed countries, their levels of fertility decline.

Admittedly the societal situation of the less developed countries and the past Europe may be different from that of contemporary industrialised countries, but nevertheless these findings lead us to the question whether reproductive behaviour is perfectly governed by economic factors. In fact, several demographers have emphasised the influence of ideational factors on demographic behaviour and criticised the narrow framework of human attitudes proposed by the economic theories, especially that by the New Home Economics (Blake, 1968; Hawthorn, 1970; Pollak & Watkins, 1993).

Obviously, human behaviour does not take place in a social vacuum. From a sociological point of view, humans are, unlike objects of natural science, regarded as beings who confer meanings and purposes on what they do. Such meanings and purposes are determined and approved by social norms and values. These norms and values are reflected in individual attitudes, which, in turn, channel human behaviour into a given direction (Berger, Berger, & Luckmann, 1967; Berger & Berger, 1975; Giddens, 1976, 1989). This implies that, if society experiences a certain transformation of human behaviour, this transformation can be, to a large degree, regarded as the consequence of the ideas and attitudes held by the members of that society. Taking these points into consideration, it is reasonable to think ideational factors are related to a recent fertility decline in industrialised countries.

Furthermore, there are good grounds to suppose that the degree of individualism and diversity in demographic behaviour is on the increase in industrialised countries. Firstly, the control of demographic behaviour has

shifted from the community to the individual. As is argued by Wrigley (1987), the major aspects of pre-industrial demographic behaviour were greatly regulated by social customs and institutional control, and an individual family-building process was under the strong influence of the local community². In other words, individual demographic behaviour was dominated by the 'collective consciousness' of the local community (Durkheim, 1976). For instance, the number of children a couple had was determined by conventional practices such as infanticide, periods of abstinence from sexual intercourse and breastfeeding. Hence, people were far less permissive in the diversity of behaviour.

This is probably due to the fact that fewer socio-economic resources were threatened by behaviour that deviated from social norms, consequently putting the population's existence at risk (Inglehart, 1990; Wrigley, 1987). Hence individual demographic behaviour had to conform to social customs. In other words, through a tight control to demographic behaviour, the community made it possible to allocate its resources in an optimal way, and to secure its continuing existence.

In contrast, such influence of the local community is extremely weak in contemporary industrialised societies. Aside from the intervention of a state through a welfare policy, the family in these countries is a private unit that is hardly subject to interference from the outer world. Some studies on social history show this historical process of the privatisation of the family in European countries (Ariès, 1962; Flandrin, 1979; Mitterauer & Sieder, 1982; Shorter, 1975; Stone, 1979). In industrialised societies, the pre-industrial demographic regulation mechanism which was upheld by the community control tends to give way to the principle of individual free choice. In fact, the regional diversity of fertility and nuptiality patterns has declined within European countries. This implies that the local community

² In the case of England, Macfarlane suggests that society was individualistic and social control was weak in the pre-industrial era (Macfarlane, 1978).

no longer has strong control over demographic behaviour (Watkins, 1991). This tendency relaxes the constraint of traditional norms, and expands the extent of satisfying individual needs. Thanks to a high productive capacity and economic security, demographic behaviour no longer needs to be regulated by social customs and institutional control, which develops a more tolerant attitude to various types of demographic behaviour consequently. Thus, it is likely that, in industrialised societies, the reinforcement of a permissive attitude and the expansion of individual choice brings about the increase of non-traditional patterns such as voluntary childlessness.

Secondly, as is argued by Inglehart (1977, 1990), the structure of human needs changes, owing to the unprecedented level of prosperity attained by economic growth and the emergence of the welfare state in industrialised countries. More specifically, in parallel with the enhancement of prosperity, human desires tend to shift from material needs to personal self-fulfilment.

As is well known, human desires and needs evolve hand in hand with economic development (Maslow, 1954). In an earlier stage of economic development, the desire to satisfy material needs (lower order needs) have the highest value, because sustenance for existence is relatively scarce. However, as a society develops economically, the individual priority of needs shifts to personal self-fulfilment (higher order needs), because people do not have to worry about the scarcity of sustenance. Following this developmental schema of human needs, we can think that the recent economic prosperity of industrialised countries has reached the stage to prevail individualism and self-fulfilment.

In light of societal conditions peculiar to contemporary industrialised countries, the framework of the ideational theory is relevant in the analysis of recent reproductive patterns. More specifically, real income per capita is now at least double the highest level attained before the Second World War

in almost all industrialised countries. In addition, welfare programmes have reduced the economic insecurity previously felt by many peoples. As has been discussed so far, this high economic and physical prosperity obviously expands the freedom of choice and strengthens commitment to self-fulfilment in industrialised countries. This change encourages permissive and individualistic attitudes proposed by the ideational theory. Hence, there are good grounds for thinking that not only economic factors but also ideational factors are necessary for clarifying the demographic patterns of these countries.

1.3 The State of Knowledge about Japanese Fertility

As was argued in the previous section, both socio-economic and attitudinal factors are very likely to be related to the fertility decline of contemporary industrialised countries. Then, the consideration of either of the two factors is undoubtedly insufficient, and the best way to examine the demographic behaviour of industrialised countries is to carry out an empirical analysis taking account of the two factors. More specifically, it is desirable to employ an integrated model including socio-economic and attitudinal variables. In the case of European countries, some studies have already been carried out along these lines. To take a good example, Lesthaeghe (1991, 1995) investigates the effect of socio-economic and attitudinal variables on European fertility patterns by using a single LISREL³ model. This method of analysis is a simultaneous equation model with unobserved structural variables. More specifically, Lesthaeghe employs the model including latent variables regarding socio-economic and attitudinal changes, and examines the relative influence of these factors on the fertility changes of European countries. Based on the results of this analysis, Lesthaeghe suggests that recent demographic changes in European countries are

³ For further details of LISREL model, see Bollen (1989).

attributable not only to socio-economic but also to attitudinal factors.

However, studies of this type have hardly been carried out concerning recent demographic changes in Japan, and the major interest of studies has unfortunately been limited to the relation between socio-economic factors and the recent fertility decline. In particular, preceding studies have devoted their efforts to test the applicability of the New Home Economics and the Easterlin model to the recent Japanese fertility patterns. In contrast, little attention has been paid to the relation between attitudinal factors and Japanese fertility behaviour; only a few studies have investigated the effect of attitudinal factors on fertility patterns. In this section, we will briefly report the results of preceding studies on the Japanese fertility decline.

To begin with, in terms of the connection between fertility and female wages, Osawa (1993) finds out that women's market wages had a negative effect on the TFR from 1960 to 1980, and men's wages had a positive effect on it. Osawa (1988) also observes, in the cross-sectional analysis based on micro-data, that the wife's wage rate had an increasing effect on the number of children ever born, but the husband's income did not have a significant effect on it. Similarly, by using prefectural data, Ogura and Dekle (1992) show that the female hourly wage rate and the female enrolment rate of universities significantly reduced the Japanese TFR since 1970, although their results may suffer from the 'ecological fallacy'⁴. Furthermore, by employing the Butz-Ward model, which is one of the most elaborated models of the New Home Economics theory, Ogawa and Mason (1986) discovered that female wages were negatively, and male wages were positively, related to the TFR for 1966-1984. Likewise, Otani (1993) also applies the Butz-Ward model to the Japanese TFR for the period from 1968 to 1986, and finds a similar negative relation between female wages and the

⁴ For further details of ecological fallacy, see Langbein (1978) and Robinson (1950).

TFR. These results, especially those concerning female wages, support the New Home Economics theory. However, Ohbuchi (1982) obtains contradictory results with respect to the relationship between wages and the TFR for 1948-1980. His results, yielded by the Butz-Ward model, reveals that men's wages were negatively associated to the TFR, and women's wages were positively related to it. Moreover, Ohbuchi, in the same article, examines Easterlin's model as well. He finds that, although the relative cohort size did not properly trace the movement of TFR from 1954 to 1980, the relative economic incomes of Easterlin's and Wachter's type accounted for the movement to a considerable degree. The evidence is favourable to the Easterlin theory. Ohbuchi concludes from these results that fertility decline in Japan is due to the deterioration of relative economic conditions in young adults.

Indeed, it is not deniable that these contradictory findings are derived from the fact that different types of data were employed by each study. For example, Osawa (1993) deals with the TFR from 1960 to 1980, whereas Ohbuchi (1982) analyses the TFR for the period 1948-1980. In addition, each study employs a different monetary unit, on which the estimated parameters of the Butz-Ward model is heavily dependent (Krämer & Neusser, 1984). The arbitrary choice of the monetary unit may have lead to the different regression results of the studies. Even if these technical problems are taken into consideration, these inconsistent results call into question the validity of explaining the changes of Japanese fertility patterns with only socio-economic factors.

Inspired by the studies of European scholars, the effect of attitudinal factors on reproductive patterns has recently been investigated with reference to Japan (Retherford, Ogawa, & Sakamoto, 1996; Tsuya & Mason, 1995). These studies attempted to examine fertility decline in Japan since the 1970s along arguments concerning the spread of

Inglehart's post-materialist values and of Lesthaeghe's individualism, but they do not discover evidence to link the fertility decline to the attitudinal changes. Thus, these studies conclude that Japan's resumption of fertility decline since the 1970s has been caused by socio-economic changes, not by attitudinal changes. However, these studies are insufficient to draw a definite conclusion, because the methods of their analyses are too simple. To be concrete, by the graphical comparison between the longitudinal change of the fertility rates and that of the attitudes which were obtained from the results of the national opinion surveys, the studies show that the Japanese fertility rate drastically declined from the early 1970s, whereas the attitudinal variables changed slightly in the 1970s. Based on this observation, it is interpreted that attitudinal factors have no relation to the Japanese fertility decline. However, it is inappropriate to reach such a conclusion from the simple graphical comparison. Even if the extent of change is small, the results of the national opinion surveys presented in the studies show that the attitudes of Japanese people have longitudinally changed with a secular trend from the early 1970s. It is, therefore, impossible to judge whether or not attitudinal factors are related to the recent fertility decline only by a simple graphical comparison. In fact, Atoh (1993, 1997) and Ogawa & Retherford (1993) suggest that Japanese fertility decline from the 1970s is, to some extent, attributable to attitudinal factors, although they do not empirically test the effect of these factors on Japanese fertility decline.

In conclusion, although several studies so far have attempted to clarify the causes of recent fertility change in Japan, they cannot arrive at a definite conclusion concerning what factor has brought about the change. As we shall discuss the following chapters, socio-economic conditions in Japan such as female wages have shifted into the direction supporting the economic approaches of demographic behaviour. On the other hand, Japan

has similarities with European countries in terms of attitudinal changes such as the spread of individualism. This tempts us to think that human ideas and attitudes play an important role in the changes of Japanese reproductive behaviour. However, it is debatable whether marriage and fertility patterns in Japan are affected by attitudinal factors. Confucian-informed group-norms may ward off the influence of individualistic attitudes on demographic behaviour. Furthermore, the levels of personal faith are very low in Japan, indicating a profoundly secular society (see Chapter 2). These characteristics bring the cross-cultural validity of the ideational (attitudinal) theory into question. Therefore, comprehensive research including both factors is necessary to examine the underlying causes of demographic patterns in contemporary Japan sufficiently.

1.4 Strategy of the Study

In doing social scientific research, one needs to delineate the scope of research explicitly. This holds true of demographic studies. Human reproductive behaviour is a complex phenomenon involving many factors, and is made up of several components. Therefore, determinants of fertility behaviour can be investigated from various aspects by several analytical methods. However, it is, in reality, impossible to deal with all factors influencing reproduction patterns in a single empirical research, and the types of available data constrain the range of methods used in a research. Hence, it is necessary to specify what approach a researcher adopts, and to clarify the limitations of that approach. In this section, we will discuss strategies of this research.

(a) Quantum and Tempo Aspect of Fertility

Although the level of fertility such as the total fertility rate is usually employed as an indicator of fertility change, this indicator does not always

reflect variations in fertility in industrialised countries. Demography has traditionally paid much attention to the quantum aspect of fertility such as the completed family size and the total fertility rate, and investigated the determinants of these indicators. However, a research interest in the timing of births has increased in recent years. For instance, Ryder (1980b) points out that the timing of births has changed more profoundly than the level of fertility in the post-war US. The emphasis on birth timing does not, of course, deny the importance of the quantum aspect of fertility. However, it is worth noting that, in industrialised countries reaching a quite low level of fertility, the analysis of the level of fertility alone does not sufficiently reveal the features of reproductive behaviour at the same time. Owing to the development and diffusion of contraceptive methods, it is possible for couples in industrialised countries to control the length of interval from a birth to another. Thus, if a change in the timing of fertility occurs, it will not accurately be reflected in the level of fertility (Ní Bhrolcháin, 1992). As we will discuss in Chapters 4 and 5, a change in the tempo of cohort fertility is not sufficiently captured by conventional period measures of fertility quantum, such as the total fertility rate. In fact, some studies based on the New Home Economics theory show that the levels of female education and wages play an important role in determining the timing of births in Western industrialised countries (Cigno & Ermisch, 1989; De Cooman, Ermisch, & Joshi, 1987; Happel, Hill, & Low, 1984; Heckman & Walker, 1990; Hoem & Hoem, 1989; Ward & Butz, 1980). These results taken into account, it is plausible to think that socio-economic and ideational factors may affect not only the level of fertility but also the timing of births in the case of Japan. Therefore, this study examines both the quantum aspect and the tempo aspect of reproductive behaviour.

(b) Nuptiality and Fertility

If fertility is hardly controlled within marriage, age at marriage will be strongly linked to the number of children a married woman has, since the number of children greatly depends on the length of exposure to the risk of pregnancy. On the other hand, if effective contraception is practised widely, the number of children will be more independent of age at marriage. Thus, age at marriage should, in theory, have almost no relation to the level of fertility in most of the industrialised countries. None the less, even in a society where fertility control is carried out extensively and effectively, the correlation between female age at marriage and the level of fertility is still observed. This association between nuptiality and fertility is thought to be derived from motivation factors linking marriage behaviour and family size preference (Bumpass, 1969; Bumpass & Mburugu, 1977; Busfield, 1972). More specifically, a strong preference for a larger family size drives women to marry early, whereas a weak motivation for having children deters women from entering married status. As a result, marriage patterns are still one of the important factors determining fertility patterns.

In addition to this, the reproductive pattern peculiar to Japanese people makes the investigation of nuptiality behaviour more important. As is well known, extra-marital births have been extremely rare in Japan during the post-war period. Only 1.0% of the total births have occurred out of wedlock since 1960 (Kôseishô Jinkô Mondai Kenkyû Jo, 1995). If a considerable number of births occur out of wedlock, marriage patterns will have a relatively weak link to fertility patterns. By contrast, as in the case in Japan, where the number of extra-marital births is extremely low, the changes of marriage patterns will have a strong impact on fertility patterns. In particular, the delay of female marriage will result in a lower birth rate by the compression of period exposed to the risk of conception within marriage.

These important features of nuptiality for fertility naturally lead us

into the investigation of Japanese marriage patterns. Hence, we will, in this study, examine marriage behaviour as well as reproductive behaviour.

(c) Contraception

In thinking of the recent fertility decline of industrialised countries, the spread of efficient contraceptive methods such as the pill and sterilisation may play an important role in the decline. From a technological viewpoint, these new methods are much more effective than other contraceptive methods. Thus, it seems likely that the diffusion of effective contraceptive methods drastically reduces unintended births, which will consequently result in the overall decline of fertility. Indeed, Westoff and Ryder (1977) argues that the spread of the contraceptive pill contributed to the fertility decline of the U.S. through the reduction of unwanted higher order births. Similarly, by analysing a change in the use of the pill and the sterilisation, Murphy (1993a, 1993b) claims that the longitudinal trend of British fertility is traced by the movement of the contraceptive pill and the sterilisation.

However, it is unlikely that such changes of contraceptive methods have caused the decline of fertility in Japan. As we will discuss in the next chapter, the pill and sterilisation are much less popular in Japan than in other Western industrialised countries. A dominant contraception method has been the use of condoms over the last three decades, and the percentage of couples using condoms has stabilised at approximately 65% since 1961. In contrast, the percentage of pill and IUD users have fluctuated at around 0.6% and 3.7% respectively. Likewise, sterilisation has been resorted to by only 7% of the couples during the same period (Mainichi Shimbunsha Jinkômondai Chôsakai, 1992).

This evidence excludes the possibility that the diffusion of effective contraceptive methods has contributed to the fertility decline of Japan. Therefore, this study does not deal with the effect of contraceptive methods

on Japanese fertility pattern.

(d) Macro Approach and Micro Approach

When we attempt to clarify determinants of demographic behaviour, we often investigate the relation between individual socio-economic and psychological attributes and demographic patterns. It is certain that demographic behaviour mainly depends on individual choices that he or she makes. Hence, the time at which people decide to marry is accounted for by their attitudes and socio-economic attributes. Likewise, the number of children a couple want to have is determined by their attitudinal and socio-economic variables. Owing to this characteristic of demographic behaviour, demographic studies generally tend to take a micro-approach on the basis of survey data. The World Fertility Survey is a typical case where reproductive behaviour is analysed on an individual basis.

While a micro-approach using survey data is necessary, it is not sufficient to the full understanding for demographic behaviour; a micro-approach is difficult in the investigation of demographic patterns from a longitudinal perspective (Ryder, 1980c). Truly, by applying statistical methods to survey data, a micro-analysis can clearly examine the effect of explanatory variables on a demographic variable defined as a dependent variable. Based on this examination, we can decide what variable plays a significant role in determining demographic behaviour. However, results obtained in this manner capture only the temporary relation between explanatory variables and a dependent variable. Therefore, this relation is specific to the time of observation, and there is no guarantee that significant factors at the time of the survey are still significant at the different period of time. Furthermore, through a micro-analysis based on a single survey data, it is almost impossible to examine to what extent a longitudinal change in one variable affects a longitudinal change in another

variable. These drawbacks will, in part, be removed by repeating a survey with the same format in a constant interval. Nevertheless, much time is needed to repeat an identical survey in a constant interval. Moreover, by a survey, we cannot collect information on individuals in the preceding period of time before we began to survey. Under these constraints, the best way to investigate the longitudinal changes of demographic behaviour is to carry out a macro-analysis using aggregated data on a year-by-year basis.

Taking these points into consideration, we will carry out both micro-analyses using survey data collected for this study, and macro-analyses using aggregated time-series data.

(e) One-decision model or Sequential model

When examining the process of fertility decision-making process, we can consider two types of model: a one-decision model and a sequential decision model. The one-decision model presumes that a couple decide their lifelong fertility plan at a specific time, and set forth to accomplish that goal without being swayed from it by changing circumstances surrounding them. According to this model, a husband and wife enter marriage with fertility preferences which either are the same initially, or are negotiated into a fertility plan before or early in marriage. It therefore follows that the number of children a couple want to have is relatively invariant throughout their married life. On the other hand, the sequential decision model assumes that the fertility decisions of a couple are constantly under reconsideration in response to conditions of childbearing, changing in socio-economic prospects, the developing character of their marriage, and other factors. Specifically, this model holds that, after each birth, a couple make a decision to have another birth, postpone another birth, or stop reproduction, depending on the constantly changing conditions surrounding them. Hence, in this model, a couple's fertility plan is regarded as relatively changeable

through their married life.

Theoretically, it is quite difficult to decide which is the superior of the two models. Truly, an intervening event between one birth and another may change a couple's initial fertility plan. To take an example, the deterioration of the economic situation after the first birth may make a couple give up having an additional child or postpone the next birth. In such a case, fertility behaviour will be regarded as the process of reconsideration in response to changing circumstances, which means that a sequential decision model is appropriate as an analytical framework. However, it can also be imagined that intervening events between births do not affect a couple's initial fertility plan. For instance, the deterioration of the economic situation after the first birth will not lead to giving up an additional child when a couple think that the situation is not so critical to change their initial fertility plan. A one-decision model is a relevant framework for this case.

In short, it is said that whether or not a couple change their initial fertility plan depends on the extent of changes in circumstances. As Leibenstein (1981) points out, only if changes in circumstances become extremely disadvantageous to a couple, will they change their initial fertility decision, because there is great inertia in the decision of a couple. Otherwise they cling to their initial fertility plan. In fact, empirical evidence shows that a couple's initial fertility plan is hardly affected by the changes of economic circumstances between births (Udry, 1983).

In addition, when it comes to collecting survey data suitable to a sequential decision model, it is necessary to take account of a practical problem. If we attempt to examine whether or not intervening events between births change a couple's initial fertility plan, we need to ask respondents many questions to obtain detailed information on circumstances between one birth and another. This process imposes a

heavy psychological burden on respondents. In a mail survey, which was carried out for this study, each respondent had to take pains to answer a considerable number of questions included in a questionnaire. As a result of the psychological burden involved in answering such questions, it is very likely that the response rate may critically decline in this type of mail survey. Hence, it is quite difficult to collect data for an analysis using a sequential decision model with a mail survey

Taking these points into consideration, we will, in this study, carry out fertility analyses based on a one-decision model for our survey data, although we recognise the importance of examining the validity of a sequential decision model.

1.5 Survey Method and Result

As mentioned in Section 1.4, we collected a survey data especially for this research. The major purpose of this study is to examine whether or not attitudinal factors argued in the European demographic context hold true for Japanese fertility behaviour. Hence, in a questionnaire of the survey, we included questions⁵ adopted in the EuroBarometer Survey and the World Values Survey⁶. However, we did not ask about a respondent's attitudes, for they cannot be regarded as an appropriate index for the degree of commitment to traditional values in Japan. In fact, God commands an insignificant position in the consciousness of Japanese people (see Section 2.5). Instead, we adopted the questions on Confucian ethics as an index for a respondent's attitudes to traditional values.⁷

The survey was conducted from June 1 to July 15 in 1995. The subjects of this survey were 3,900 unmarried and married women between

⁵ For further details of the questionnaire of the survey, see Appendix A.5.

⁶ For further details of these surveys, see Abramson & Inglehart (1995) and Ester, Halman & de Moor (1994).

⁷ For a further discussion of the choice of questions about a respondent's attitudes, see Section 3.4.

the ages of 20 and 49 (as of January 1, 1995) drawn from the whole nation.

The selection of respondents was carried out by a stratified two-stage sampling. Groups of wards, cities, towns and villages were used as primary sampling units. Individual respondents were then chosen from each of the selected districts. More specifically, wards, cities, towns and villages were first stratified according to population size and regionality (Tôhoku, Kantô, Chûbu, etc.).⁸ Secondly, administrative districts were randomly chosen from each stratum with the probability of selection being proportionate to the size of population. In this process, the number of primary sampling units in each stratum was allocated in proportion to the population size of each stratum. The total number of selected administrative districts was 150. Finally, from the Jûmin Kihon Daichô (the Basic Registers) in each selected district, twenty-six respondents between the ages of 20 and 49 were chosen by means of random sampling. 3,900 subjects were selected through the whole sampling process.

Information concerning respondents was retrieved by conducting a mail survey. A targeted respondent received a questionnaire, filled it out, and returned it through the post. All questionnaires were posted on June 1, and all those returned by July 15 were recorded. During this period, prompting letters were sent to respondents in order to enhance the response rate of the survey.

The total number of returned questionnaires was 1,421. Out of them, twenty-five unreadable and incomplete questionnaires were excluded. As a result, 1,396 questionnaires were recorded as valid responses, and the final response rate reached 35.8%. Since the response rate for mail surveys is, on the average, around 30% in Japan (Nishihira, 1985), the response rate for this survey is satisfactory.

⁸ This stratification is based on the governmental official data as of March 31, 1994.

1.6 Structure of the Thesis

Having presented the various matters related to this study, it will be useful to outline briefly the chapters which will follow. Chapter 2 attempts to establish a comparative view between Japan and other industrialised countries in terms of demographic, socio-economic and attitudinal aspects. In particular, the discussion will focus on clarifying similarities and dissimilarities of these aspects among the countries. Chapter 3 will explore the determinants of marriage behaviour. As mentioned earlier, since marriage is one of the important proximate determinants of fertility in Japan, the chapter will examine to what extent socio-economic and attitudinal factors determine recent marriage behaviour, by using the micro-level survey data collected for this study. Chapter 4 will be devoted to the examination of the quantum aspect of fertility. More specifically, the chapter attempts to investigate, in a comprehensive way, the influence of socio-economic and attitudinal factors on the level of fertility by employing the survey data. Chapter 5 explores the determinants of the timing of births through the survey data. Chapter 6 is an examination of longitudinal changes of nuptiality and fertility patterns for the period from the 1950's to the 1990's. By focusing on the longitudinal changes of Japanese marriage and fertility patterns, this chapter will examine the long-term relationship between demographic behaviour, and socio-economic and attitudinal factors by using macro-data. In Chapter 7, we will bring together the major findings in the preceding chapters and present our conclusions about the determinants of recent Japanese marriage and fertility behaviour.

Chapter 2

Japanese Fertility Behaviour: An International Comparison

Introduction

This chapter attempts to examine Japanese fertility behaviour from an international comparative perspective. Japan has been an intriguing field for social scientists as it is the first non-Western country to succeed in industrialisation. Triggered by this special situation, many social scientists in various disciplines have studied differences and similarities in the socio-economic and cultural aspects of Western countries and Japan, and have attempted to explore the causes of Japanese success in industrialisation. For example, Robert Bellah (1957) points out that, during the Tokugawa period, a functional equivalent to the Protestant ethic in European society had already appeared in Japan, and that this facilitated the development of capitalism in Japan. More specifically, Bellah suggests that popular Japanese moral values in the Tokugawa era, especially those promulgated by Ishida Shingaku, stressed the importance of diligence and frugality, paving the way for social and cultural conditions favourable to economic development after the Meiji Restoration. However, it is debatable whether the causes of rapid economic development in Japan are entirely attributable to ideational factors, since the Japanese government took the initiative to catch up with Western countries. In fact, since the Meiji Restoration, Japanese government bureaucrats have played a key role in tuning the economy to the changing international markets by exercising their official authority and guidance (*gyôsei shidô*).

Comparing fertility decline as experienced in post-war Japan and the West has been a central topic of demography, and has yielded some perceptive insights into Japanese demographic behaviour (Davis, 1963; Taeuber, 1960). Even in the case of contemporary Japan, a comparative

perspective is still important in considering the demographic patterns of Japan. As we will examine later in detail, the total fertility rate shows that both Japan and the Western industrialised countries have reached the level of below-replacement fertility. Thus, a very low birth rate is one of the most pervasive demographic characteristics among industrialised countries. Japan shares this and other similarities with the other industrialised countries. However, some differences are, at the same time, observed in the reproductive behaviour of Japanese couples. For instance, the most prevalent contraceptive in Japan method is the condom, with the rhythm method in second place. The use of the contraceptive pill and sterilisation, which are widespread in other countries, is relatively rare in Japan. Despite the prevalence of these less effective contraceptive methods, Japan has recently shown the same low level of fertility as other industrialised countries.

Such differences and similarities will naturally lead us to the investigation of Japanese demographic trends and patterns from an international comparative perspective. Owing to continuous efforts toward modernisation over several decades, the social fabric of Japan has become considerably westernised. As a result of this, contemporary Japan shares certain socio-economic and technological aspects with Western industrialised countries: Japan's income per capita, its productivity in the manufacture of goods and its enrolment rate in tertiary education reach high levels, its mass communication systems are advanced, and so on. Japan is undoubtedly an industrialised country.

In the previous chapter, we discussed the relation between socio-economic and technological factors, and recent demographic developments in Western industrialised countries. The influence of economic factors has been pointed out by Becker (1960) and his colleagues, and the effect of the technological innovation of contraception on fertility has been emphasised

by Westoff and Ryder (1977). These factors probably have some effect on the recent demographic patterns of industrialised countries, and the consideration of the factors is indispensable for the full understanding of the demographic phenomena of these countries.

Specific socio-economic structures require given patterns of human behaviour. People respond to surrounding socio-economic circumstances, and change their behaviour strategically in a way suitable for them. For instance, under the demographic regime in seventeenth-century England, a rise in real wages, which was stimulated by an accelerating economy, encouraged an earlier marriage and increased the marriage rate. In contrast, deteriorating economic conditions raised the proportion of people remaining single (Wrigley & Schofield, 1989). Socio-economic factors are driving forces in human behaviour, and demographic movement in a region or a country falls under their influence as well.

However, it is likewise clear that human demographic behaviour is not completely governed by socio-economic factors. Norms and values direct human demographic behaviour in a manner that is desirable to a given society. Indeed, marriage and procreation are emphasised by certain religious sects as duties which transcend economic cost-benefit calculations, and preserve their society from decline. The comparative studies of Lesthaeghe (1991, 1995) in this sense provide good evidence that ideational factors, such as individual autonomy and individuals' right to choose, are tightly articulated to the leads and lags of the post-war demographic developments in Western Europe.

Lesthaeghe's approach has led to a more profound understanding of recent European demographic patterns. One of his most important findings reveals that the historical dominance of Protestantism substantially explains the variations found in demographic patterns across European countries. This would imply that certain cultural factors in these countries

are sources in the shaping of their demographic patterns. As such, the influence that socio-economic and ideational factors have on human demographic behaviour in a given country will considerably depend on its cultural backgrounds.

Lesthaeghe does not extend his studies beyond the parameters of Western Europe. As such, the demographic patterns of non-Western industrialised countries would appear to require examination in the light of his findings. East Asian countries, such as Japan, where the influence of Confucianism predominates, differ significantly on a cultural level from their Judaeo-Christian Western counterparts. To take an example, Confucianism as practised in East Asia with its regard for family and social groupings as a moral virtue, tends to retard the development of individualism. As such, the enormous value placed on conforming to group norms in East Asian countries may be seen as a result of Confucianism.¹

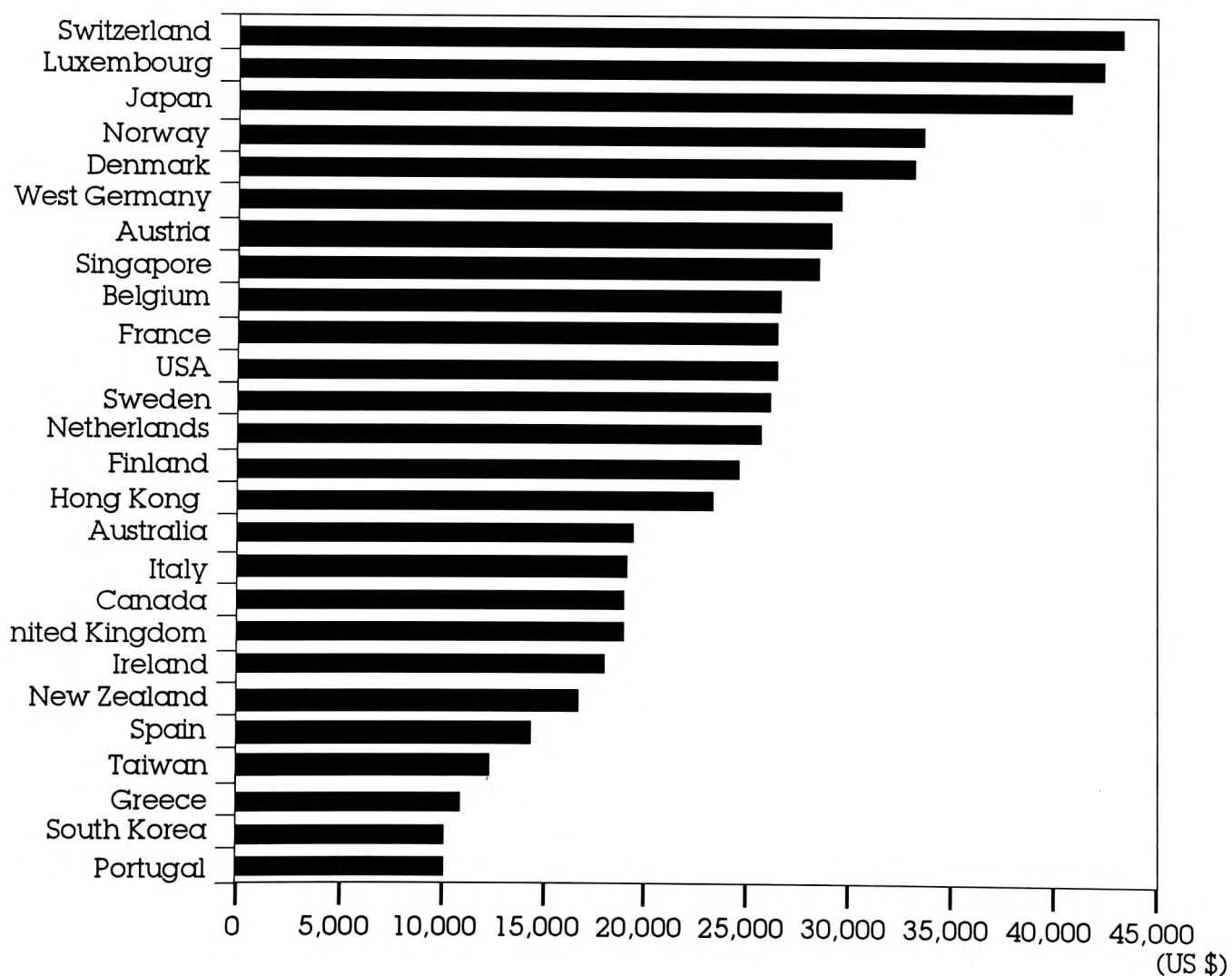
As is the case in Western European countries, the manner in which socio-economic and ideational factors shape demographic patterns is complicated by the cultural backgrounds of each country. It is likely that, despite being an industrialised country, these factors affect Japanese demographic behaviour in a way that creates different patterns from those seen in its Western counterparts. In other words, Japanese demographic responses to socio-economic and ideational factors may considerably depend on cultural factors. Hence, Japanese demographic patterns need to be investigated as aspects of Asian society as well as industrialised society.

This chapter will explore recent Japanese demographic patterns in the light of a broader comparative view. In what follows, we will, first of all, attempt an international comparison between Japan and other industrialised countries in terms of the patterns and trends of reproductive behaviour. Subsequently, the influences of some fertility determinants will

¹ For further details of the influence of Confucianism on human behaviour, see Murakami, Kumon, & Sato (1979).

be examined. More specifically, we will consider the relation between fertility patterns and socio-economic, contraceptive and ideational factors, dealing not only with Western industrialised countries but also with the four Asian Dragon countries (Hong Kong, Singapore, South Korea and Taiwan). Over the past few decades, these Asian countries, known as the Newly Industrialising Countries (=NICS), have undergone rapid economic development, and attained near parity to earlier-established industrialised countries in economic terms, such as GNP per capita², taking their place as recognised as industrialised countries (see Graphs 2.1 and 2.2). Including these newly Asian industrialised countries in our comparison will serve to clarify recent Japanese demographic patterns within a wider societal context, particularly due to the fact that these countries share a common cultural inheritance.

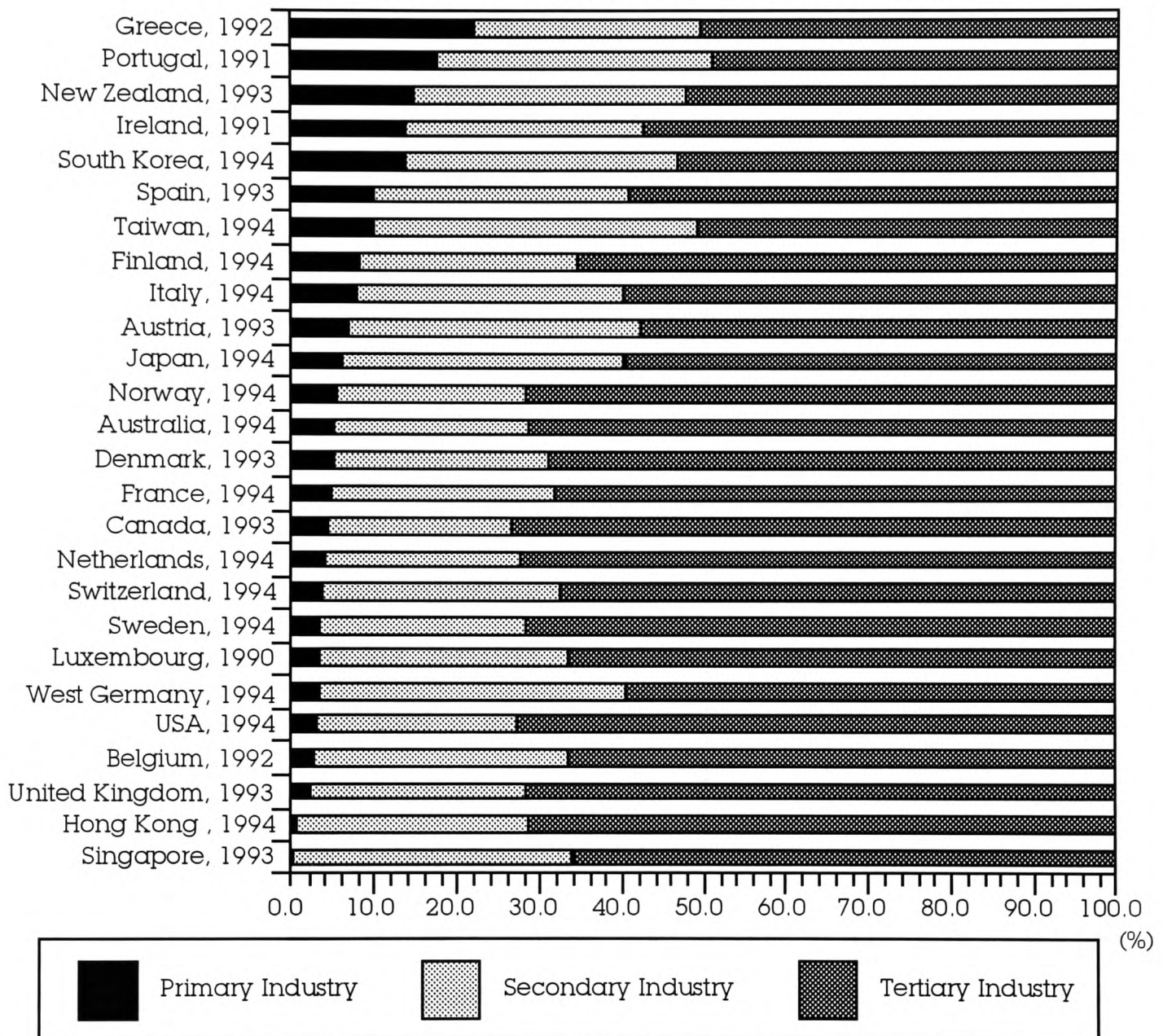
Graph 2.1: Gross Domestic Product per Head, Selected Industrialized Countries in 1995



² For further details of the socio-economic developments of these Dragon countries, see Vogel (1990).

Source: Organisation for Economic Co-operation and Development (various years). National Accounts.
 Census and Statistics Department, Hong Kong (various issues). Hong Kong Monthly Digest of Statistics.
 Bank of Korea (1996). Principal Economic Indicators.
 Ministry of Trade and Industry, Singapore (various issues). Economic Survey of Singapore.
 Council for Economic Planning and Development, Taiwan (1996). Industry of Free China.

Graph 2.2: The Percentage of Working Population, Selected Industrialized Countries



Source: International Labour Office (various years). Yearbook of Labour Statistics.
 Directorate-General of Budget, Accounting and Statistics Executive Yuan (various years).
 Social Indicators in Taiwan Area of the Republic of China.

2.1 Trends and Patterns of Fertility in Industrialised Countries

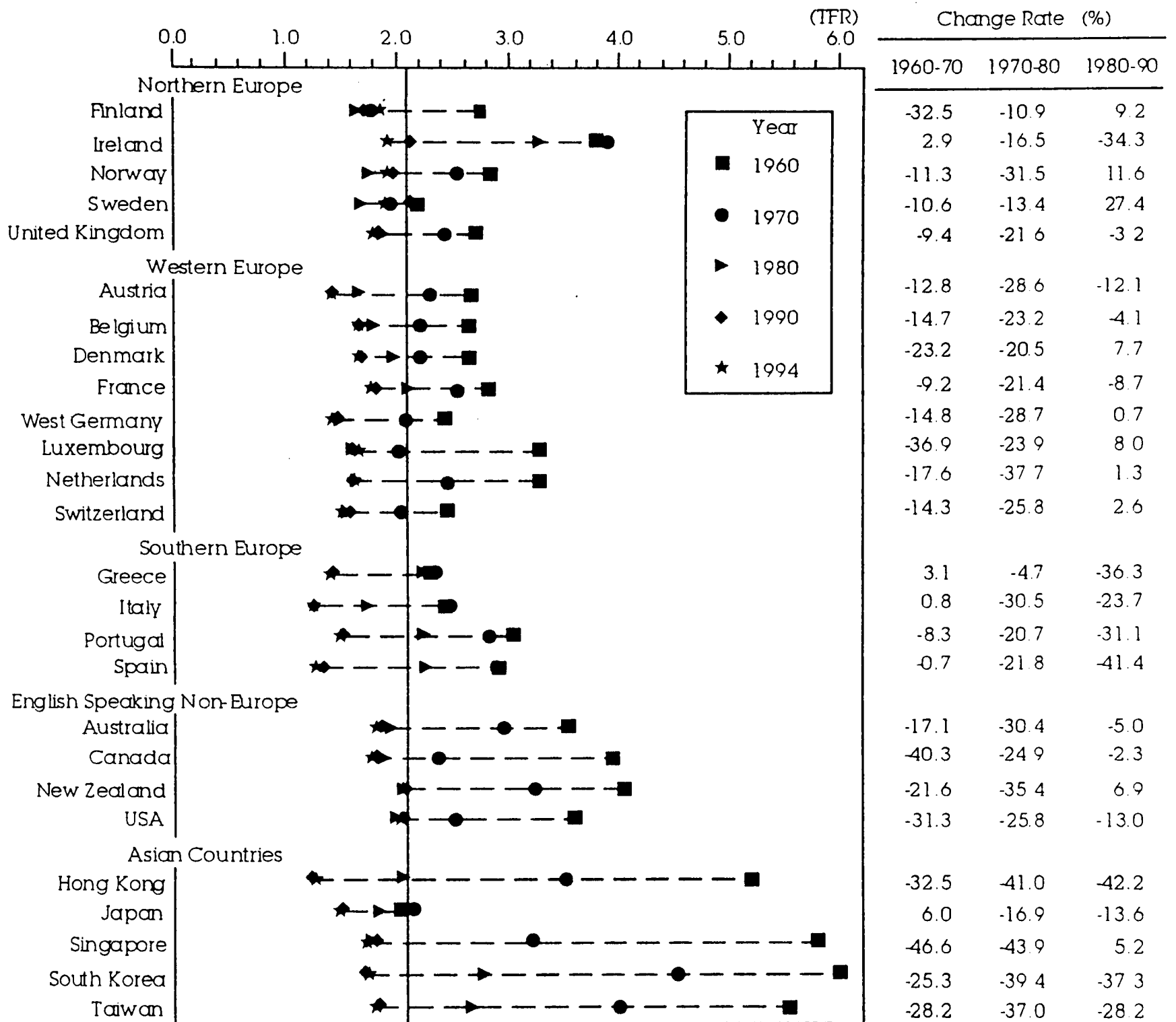
In this section, we will examine trends and patterns of fertility in industrialised countries in an international context. Graph 2.3 displays the trends of the total fertility rates in industrialised countries since 1960. All industrialised countries save Ireland reached a very low fertility rate in 1990, which is one of the common demographic characters among the

countries. However, as far as the degree of fertility decline from 1960-90 is concerned, Japan shows a different picture from the other countries. The total fertility rate (TFR) of Japan fell from 2.01 in 1960 to 1.53 in 1990, with a reduction of 24%. On the other hand, the Western industrialised countries, by and large, underwent a greater extent of fertility decline during the same period. For example, the Australian TFR in 1990, which was quite close to the Japanese TFR for the same year, declined from 2.65 to 1.45 from 1960-1990, with a reduction of 45.3%. This is partly because most Western countries experienced the 'Baby Boom' in the 1950s and 1960s, and their levels of fertility were relatively higher in the 1960s. Indeed, Greece, which had experienced a minor 'Baby Boom', showed a considerably low TFR in 1990. However, the degree of fertility decline until 1990 was milder in Greece than that in other Western countries (Coleman, 1996). By contrast, Japan did not experience a temporary upsurge of fertility, and continuously reduced its fertility rate throughout the post-war period. Hence, Japan already had a lower birth rate in 1960 than that of many Western industrialised countries.

As for the four Asian countries (Hong Kong, Singapore South Korea and Taiwan), their fertility rates fell most drastically among the industrialised countries, experiencing more than a 65% reduction in TFR from 1960-90. One should bear in mind, however, that these Asian NICS had a high level of fertility in the 1960s. Their TFRs stood at more than five in 1960, but they reached less than two in 1990 without exception. In particular, these countries reached the below-replacement level of fertility between the second half of the 1970s and the first half of the 1980s. Interestingly, Japan also experienced a rapid fertility decline after the end of the Second World War. The TFR of Japan declined from 4.51 in 1947 to 2.04 in 1957, with a reduction of approximately 55%. This evidence suggests that Asian countries tend to reduce their birth rate over a short

period.

Graph 2.3: Trends of the Total Fertility Rates in Selected Industrialized Countries, from 1960 to 1994



Source: Council of Europe (1993). Recent demographic development in Europe and North America, 1992.
 United Nations (various years). Demographic Yearbook.
 ESCAP (various year). Statistical Yearbook for Asia and the Pacific.
 Census and Statistics Department, Hong Kong (various years). Hong Kong Annual Digest of Statistics.
 Registrar-General of Births and Deaths, Republic of Singapore (various years). Report on Registration of Births and Deaths.
 The Ministry of Interior, Republic of China (various years). Taiwan-Fukien Demographic Fact Book.
 National Statistics Office, Republic of Korea (various years). Annual Report on the Vital Statistics.
 New Zealand Census and Statistics Department (1993). Vital statistics.
 Australian Bureau of Statistics (1993). Australian demographic statistics.

For the sake of capturing the differences and similarities of reproductive patterns, it is necessary to investigate the tempo aspect as well as the quantum aspect of fertility. Thanks to the development and the

diffusion of contraceptive methods, fertility schedule is decided with much flexibility in many countries. Accordingly, not only the total number of children but also the timing and spacing of births can, to a considerable extent, depend on a couple's own choice. Since several contraceptive methods are easily and cheaply available in many industrialised countries, the timing of fertility is particularly important in understanding the recent demographic development of these countries (Ní Bhrolcháin, 1986, 1987; Ryder, 1980).

In order to examine this point, Graphs 2.4 and 2.5 present age-specific fertility rates (=ASFR) in industrialised countries circa 1970 and 1990 respectively. First of all, the distribution of age-specific fertility rates in these countries changed its shape over this period. The centre of its distribution shifted on to a later stage of reproductive period from 1970 to 1990. In terms of the percentage of TFR below age 20, the mean value of all the countries was 6.63 % in 1970, but it fell to 4.81 % in 1990. In contrast, the mean value of TFR over age 30 rose from 32.03 % to 35.79 % during the same period.

Despite the similarity in the overall trend of ASFR, the Japanese figures show a slightly different demographic picture with respect to the shape of age-specific fertility distribution. The percentage of TFR below age 20 stood at 1.07 for Japan in 1970, whereas the figure for the same category was, on average, 7.50 for the Western countries. The Asian countries, on the whole, yielded a lower percentage of TFR below age 20 in 1970 than the Western countries. Nevertheless, the Japanese figure in this category was quite low. In contrast, the Japanese percentage of TFR from age 20 to 29 was the highest (=72.99 points) from among the countries in 1970, while the concentration of births in Japan occurred among women in their twenties. Hence, Japanese women tend to give birth to children over a compressed period of time when compared to those in other industrialised

countries.

Interestingly, this concentration of age-specific fertility distribution became slightly diffuse in 1990, and the Japanese pattern become similar to that of the Western countries in its shape of the distribution. As a result, in 1990 the compressed fertility pattern appeared more clearly in South Korea and Taiwan than in Japan. In concrete terms, the percentage of TFR between age 20 and 29 in South Korea jumped from 56.38 in 1970 to 81.56 in 1990. Likewise the Taiwanese figure rose from 66.38 to 71.75 during the same period.

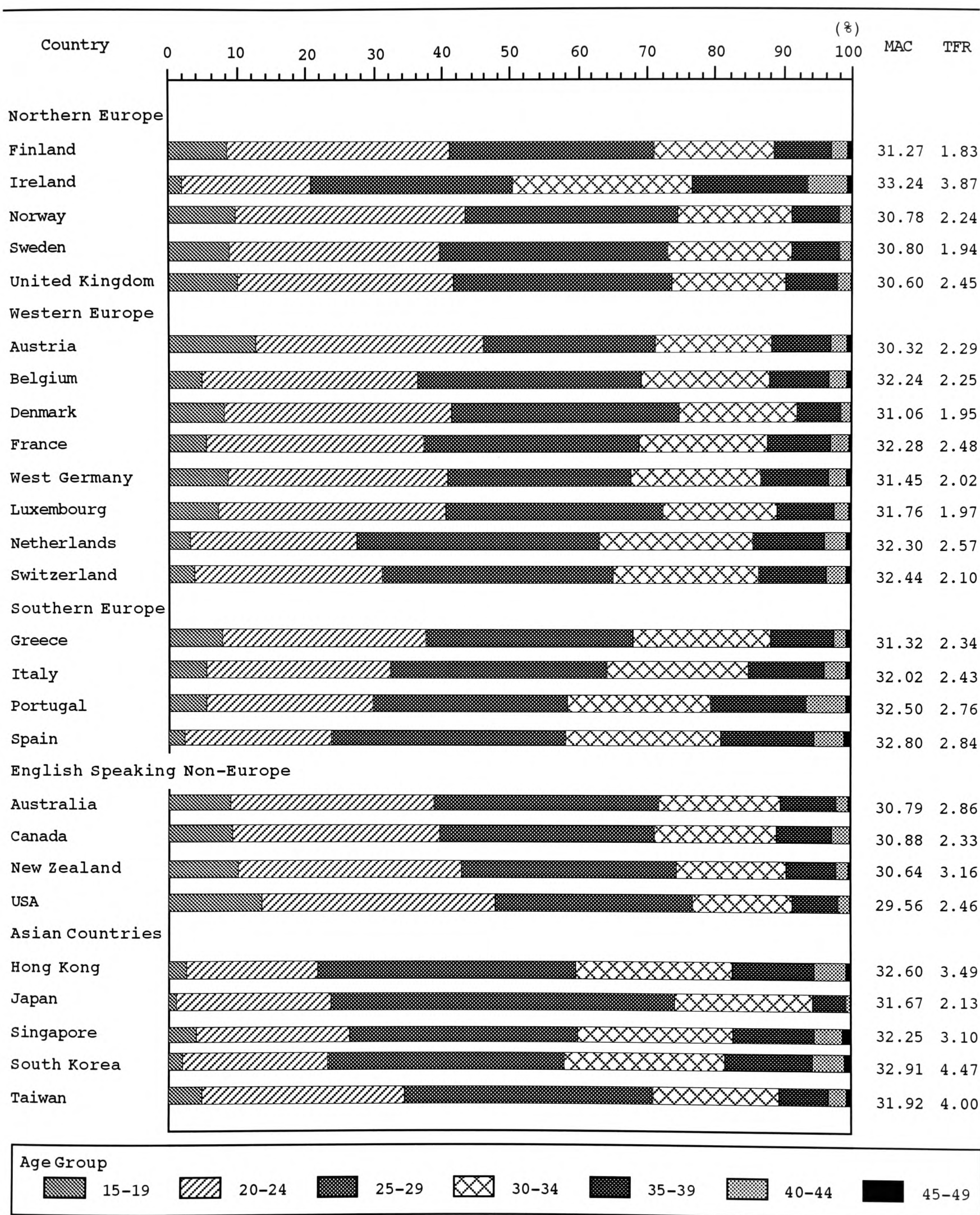
As far as the coefficient of variation shows, the distribution of the age-specific fertility rates did not converge from 1970 to 1990. Although the coefficient of variation for the percentage of TFR over age 30 fell from 21.6 in 1970 to 20.4 in 1990, that of the TFR below age 20 conversely rose from 51.6 to 66.0 during the same period. In addition, there was a rise in the coefficient of variation for the percentage for TFR from age 20 to 29, from 8.3 to 11.2. Nevertheless, these changes in the coefficient of variation are negligible between 1970 and 1990, which suggests that an inter-country difference in the age-specific fertility pattern remained almost unchanged from 1970-90. In fact, the mean of TFRs was almost equal for the NICS and the Western countries in 1990, but the mean of the TFRs from age 20 to 29 was 64.96% for the former and 59.54% for the latter. In other words, each country has entered a stage of low fertility, keeping its own particular pattern of the age-specific fertility rate to a considerable degree.

As for the mean age of childbearing, this did not reveal a clear change between 1970 and 1990. In terms of the mean age of childbearing, the average of all countries stood at 31.63 in 1970 and 31.34 in 1990. Similarly, the average for the Western countries was 31.51 in 1970 and 31.29 in 1990, while that of the NICS was 32.42 and 31.57 respectively. However, these figures must be taken with some reservations, since the mean age of

childbearing does not always mirror the real pattern of childbearing age when each cohort shows a rapid change in the timing of births. In fact, mean age at first birth has increased in all Western countries since the early 1970s (Coleman, 1996).

Finally, the level of TFR itself was more weakly connected to age-specific fertility rates in 1990 than in 1970. To take an example, the correlation coefficient between the TFR and the percentage of the TFR over age 30 was as much as 0.584 in 1970, while its value fell to -0.019 in 1990. It therefore follows that a high fertility at a relatively later stage of the reproductive period was connected to a large TFR in 1970, but such a connection between the overall birth rate and the age-specific fertility pattern disappeared in 1990. Similarly, the correlation between the TFR and the percentage of TFR below age 20 reached -0.451 in 1970, which implies that a high fertility rate between the ages of 15-19 brought about a high TFR in 1970. However, the correlation between the two was 0.252 in 1990. These findings mean that a given pattern of age-specific fertility rates did not always produce the corresponding level of TFR in 1990. For instance, both Japan and Belgium showed a TFR of approximately 1.5 in 1990. However the percentage of TFR over the age of 30 was 38.28 in Japan and 30.18 in Belgium, the former being considerably larger than the latter.

Graph 2.4: The Percentages of Age-specific Fertility Rates, Selected Industrialized Countries around 1970



	Age Group							%TFR <20	%TFR 20-29	%TFR ≥30	MAC	TF
	15-19	20-24	25-29	30-34	35-39	40-44	45-49 (%)					
Mean (only Western countries)	7.50	29.91	31.40	18.88	9.33	2.76	0.22	7.50	61.18	31.42	31.51	2.
Mean (only NICS)	2.94	23.10	38.89	21.46	9.81	3.31	0.50	2.94	58.55	38.00	32.42	3.
Mean (all countries)	6.63	28.60	32.84	19.38	9.42	2.86	0.27	6.63	61.34	32.03	31.63	2.
Coefficient of Variation Correlation with TFR								51.6 -0.451	8.3 -0.489	21.6 0.584	2.9 0.476	26

MAC: Mean Age of Childbearing

Coefficient of Variation = Standard Deviation / Mean × 100

Source: Council of Europe (1995). Recent demographic development in Europe, 1995.

United Nations (various years). Demographic Yearbook.

ESCAP (various year). Statistical Yearbook for Asia and the Pacific.

Census and Statistics Department, Hong Kong (various years). Hong Kong Annual Digest of Statistics.

Registrar-General of Births and Deaths, Republic of Singapore (various years). Report on Registration of Births and Deaths.

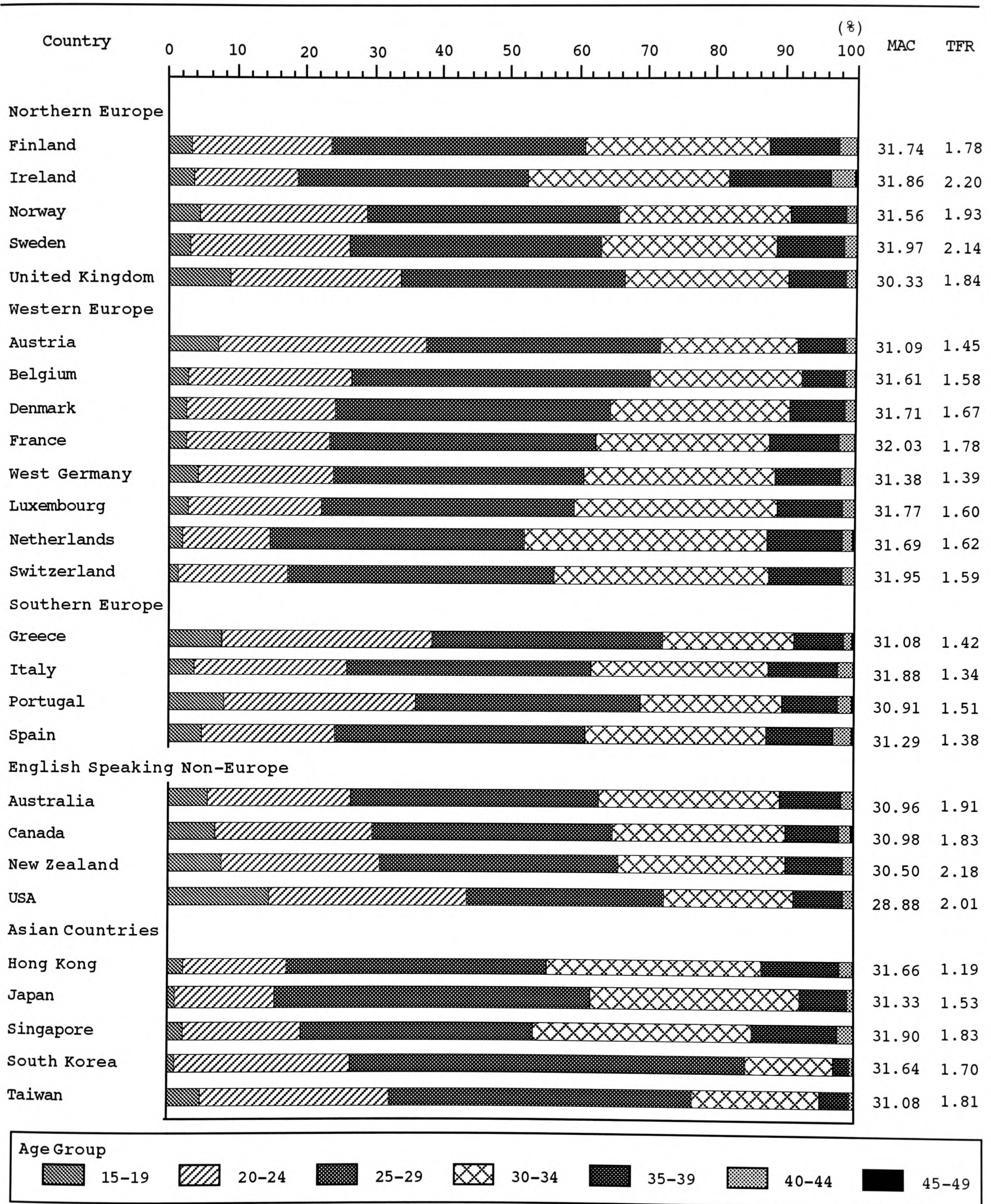
The Ministry of Interior, Republic of China (various years). Taiwan-Fukien Demographic Fact Book.

National Statistics Office, Republic of Korea (various years). Annual Report on the Vital Statistics.

New Zealand Census and Statistics Department (1996). Vital statistics.

Australian Bureau of Statistics (1996). Australian demographic statistics.

Graph 2.5: The Percentages of Age-specific Fertility Rates, Selected Industrialized Countries around 1990



	Age Group							%TFR <20	%TFR 20-29	%TFR ≥30	MAC	TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49 (%)					
Mean (only Western countries)	5.22	22.25	36.16	25.34	9.17	1.65	0.21	5.22	58.45	36.33	31.29	1.72
Mean (only NICS)	2.69	19.90	44.13	24.98	7.44	1.11	0.06	2.69	64.96	32.35	31.57	1.63
Mean (all countries)	4.81	21.80	37.69	25.27	8.84	1.55	0.18	4.81	59.54	35.79	31.34	1.70
Coefficient of Variation Correlation with TFR								66.0	11.2	20.4	2.1	15.7
								0.252	-0.095	-0.019	-0.228	

MAC: Mean Age of Childbearing

Coefficient of Variation = Standard Deviation / Mean × 100

Source: Council of Europe (1995). Recent demographic development in Europe, 1995.

United Nations (various years). Demographic Yearbook.

ESCAP (various year). Statistical Yearbook for Asia and the Pacific.

Census and Statistics Department, Hong Kong (various years). Hong Kong Annual Digest of Statistics.

Registrar-General of Births and Deaths, Republic of Singapore (various years). Report on Registration of Births and Deaths.

The Ministry of Interior, Republic of China (various years). Taiwan-Fukien Demographic Fact Book.

National Statistics Office, Republic of Korea (various years). Annual Report on the Vital Statistics.

New Zealand Census and Statistics Department (1996). Vital statistics.

Australian Bureau of Statistics (1996). Australian demographic statistics.

2.2 Patterns of Birth Order in Industrialised Countries

Since fertility measures of age-period type such as the age-specific fertility rate easily provide annual information on reproduction, these indexes are often used for demographic analyses. In spite of the convenience of this, as long as we employ these measures only, it seems impossible to capture features of fertility patterns perfectly (Ní Bhrolcháin, 1992). This is because measures of this sort do not reflect any influence of the individuals' past reproductive history. A couple's preference for family size is affected by the number of children they already have (Hajnal, 1947; Ryder, 1980). However, fertility measures of age-period type do not accurately bring the influence of this factor to light. Admittedly, it may be possible to regard the age-specific fertility rate as the general birth history of a woman. We can thereby imagine that women give birth to children along the life-cycle schedule shown in this measure. However, because this index is constructed on the basis of a synthetic cohort, there is no guarantee that the fertility behaviour of an actual cohort follows that of a synthetic cohort. In particular, when a rapid change of birth timing happens in a birth cohort,

the age-specific fertility rate shows a critically distorted picture of reproductive pattern.

The parity progression ratio is, in contrast, a reproductive measure which takes women's previous births into consideration. More specifically, the influence of women's previous birth experiences appears in the parity progression ratio that signifies the probability of movement from a parity to its next parity. Hence, this index can show an actual fertility behaviour in comparison with the fertility measure of age-period type based on a synthetic cohort.

However, because the conventional parity progression ratio is usually calculated on the basis of a real birth cohort or a marriage cohort, this ratio cannot be immediately applied to the fertility pattern of a current cohort. In order to remedy this drawback, an attempt has recently been made to compute a period parity progression ratio on an annual basis (Feeney, 1986, 1987, 1991; Lutz, 1989; Murphy & Berrington, 1993; Ní Bhrolcháin, 1986). Unfortunately, because a set of detailed data regarding fertility behaviour is necessary to estimate this ratio, we can hardly use it for an international comparison. We shall therefore investigate the distribution of birth order in the place of the parity progression rate in this section.

Graphs 2.6 and 2.7 display percentages by birth order circa 1970 and 1990 respectively. To begin with, a salient decline was found from 1970 to 1990 with respect to the percentage of the fourth and higher order births. The average of these percentages for all the countries fell from 15.7 in 1970 to 6.4 in 1990, showing about a nine point reduction. In particular, the Asian NICS yielded a sharp decline in the percentage of fourth and more births, and the percentage of 1990 was a ninth as many as that of 1970. In terms of the percentage of first and second births, their averages, on the whole, rose by more than five points from 1970 to 1990. In contrast, the

mean of the percentage of third births almost levelled off during the same period. Because these percentages are based on a period measure, they do not always mirror the birth history of a single cohort accurately. Nevertheless, since the TFRs of the industrialised countries declined during this period, it follows that a reduction in the percentage of higher order births was parallel to the decline of TFR. It is therefore inferred that the weakening of the intention of having four or more children considerably contributed to the recent low level of fertility in the industrialised countries.

Furthermore, the coefficient of variation declined markedly for first and second births in the period 1970-90; that of third births conversely increased during the same period. In concrete terms, the coefficient of variation for first births fell from 14.2 in 1970 to 9.8 in 1990, and that for second births likewise declined from 15.4 to 6.8. In contrast, the coefficient of variation of third births rose by 50 % from 10.3 to 20.9. As a result of this, a variation in the percentage of birth order among the countries was small for first and second births in 1990, but, conversely, it was large for third births. Hence, a difference in the proportion of third births is a remarkable feature that characterises reproductive behaviour in industrialised countries.

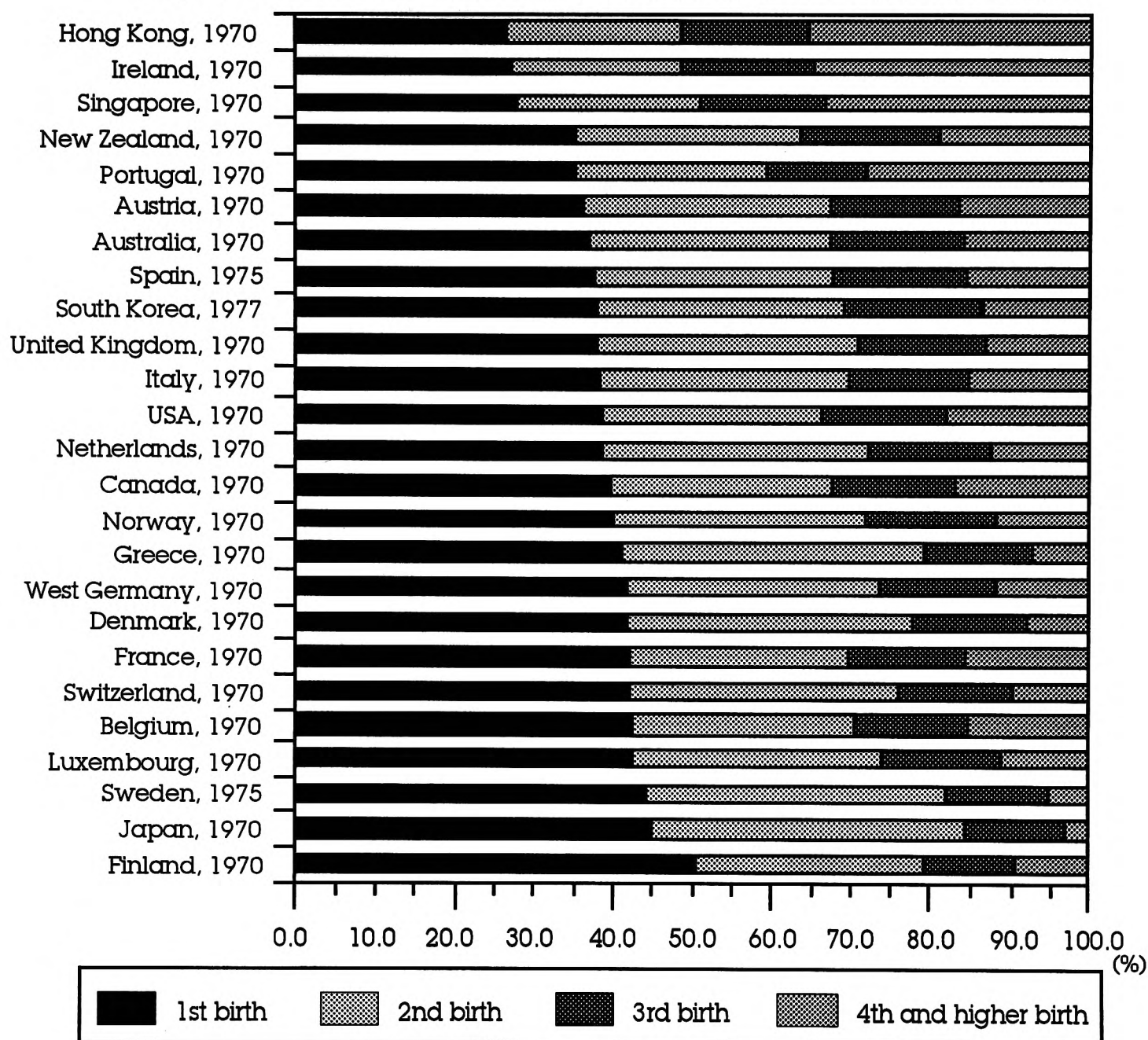
Although the above features provide the general picture of birth order in the industrialised countries, we can observe some features peculiar to Japan regarding the pattern of birth order. First, the cumulative percentage from the first up to the second birth was remarkably larger for Japan than for the other countries. The Japanese cumulative percentage reached as much as 84.4 in 1970. This figure was greater by 14 points than the average of the Western countries, and by about 18 points than that of the NICS. However, the Japanese figure in 1990 stood at 81.1%, which was higher by 2.5 points than the mean of the Western countries. Therefore the probability of having more than three children is low for

Japanese women, and the majority of Japanese women tend to end childbearing at the second birth, which suggests that their fertility behaviour is quite homogeneous. Interestingly, in 1990, a similar homogeneous pattern was observed in the other Asian countries as well. For instance, the Korean cumulative percentage up to the second birth rose from 69.6 in 1970 to 92.6 in 1990. Furthermore, the cumulative percentage up to the second birth, on average, reached fully 82.7 for the NICS in 1990. Hence, Asian countries tend to show homogeneous reproductive behaviour after reaching a low level of fertility.

Also, compared with the other industrialised countries, Japan already had an extremely low proportion of fourth and higher births in 1970, and did not undergo a sharp reduction in 1990. The Japanese figure for fourth and higher births stood at 2.9% in 1970. This figure was smaller by about 13 points than the mean of the Western countries, and by 24 points than that of the NICS. Even in 1990, the proportion of this birth order was only 3.1% for Japan, whereas the mean of the Western countries (=7.1%) was more than twice the Japanese figure. As mentioned earlier, since this distribution of birth order is based on a period measure, it may not mirror the actual birth history of Japanese women. In fact, according to an estimate of Japanese period parity progression ratios, the percentage of parity progression to higher order births declined between 1970-90 (Ogawa & Retherford, 1993). Specifically, the parity progression ratio from the third to the fourth birth fell from 19.8% in 1970 to 14.2% in 1990, and the ratio from the fourth to the fifth birth fell from 28.1% to 18.1%. In contrast, the ratio from marriage to the first birth remained 90%, and the ratio from the first to the second birth remained stable at about 85%. Assuming these estimated figures are accurate, we can say that the percentage of fourth and higher births in Graphs 2.6 and 2.7 is distorted by a change in the timing of fertility and that the recent fertility decline of Japan is mainly due

to a reduction in higher order births. Nevertheless, the proportion of second births remained considerably stable, which shows that Japanese couples have been holding the strong two-child norm.

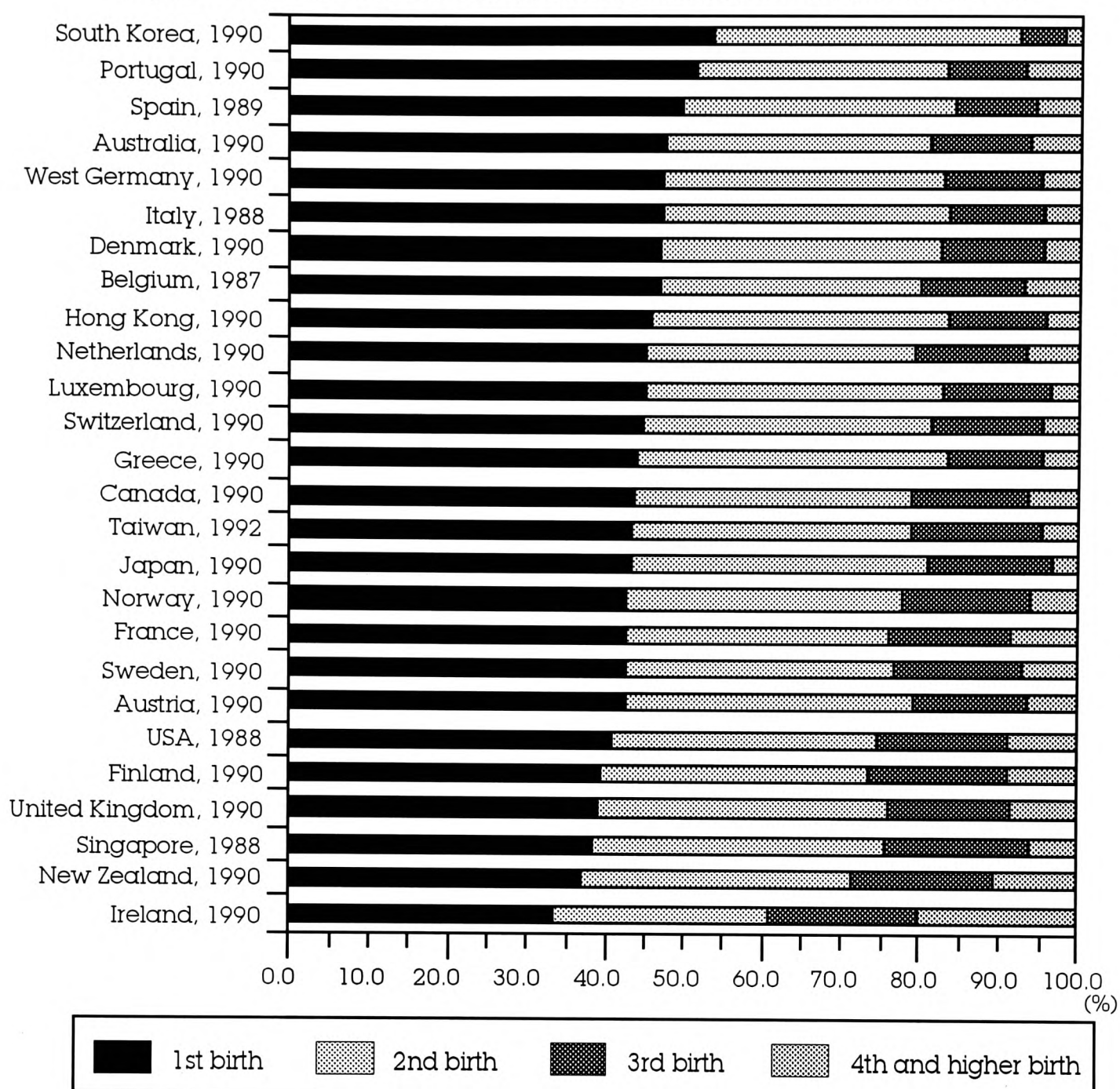
Graph 2.6: Distribution of Birth Order, Selected Industrialized Countries around 1970



	1st birth	2nd birth	3rd birth	4th and higher birth
Mean (Western countries)	39.8 %	30.6 %	15.0 %	14.6 %
Mean (NICS)	30.9 %	25.6 %	16.3 %	27.2 %
Mean (all countries)	38.9 %	30.3 %	15.1 %	15.7 %
Coefficient of Variation	14.2	15.4	10.3	55.2
		To 2nd birth	To 3rd birth	
Mean of Cumulative Percentage (Western countries)		70.4 %	74.7 %	
Mean of Cumulative Percentage (NICS)		56.5 %	72.8 %	
Mean of Cumulative Percentage (all countries)		60.6 %	84.3 %	

Source: Council of Europe (1993). Recent demographic development in Europe and North America, 1992. United Nations (various years). Demographic Yearbook.

Graph 2.7: Distribution of Birth Order, Selected Industrialized Countries around 1990



	1st birth	2nd birth	3rd birth	4th and higher birth
Mean (Western countries)	44.0 %	34.6 %	14.3 %	7.1 %
Mean (NICS)	45.5 %	37.2 %	13.3 %	3.7 %
Mean (all countries)	44.2 %	35.1	14.1 %	6.4 %
Coefficient of Variation	9.8	6.8	20.9	53.8
		To 2nd birth	To 3rd birth	
Mean of Cumulative Percentage (Western countries)		78.6 %	92.8 %	
Mean of Cumulative Percentage (NICS)		82.7 %	96.0 %	
Mean of Cumulative Percentage (all countries)		79.3 %	93.5 %	

Source: Council of Europe (1993). Recent demographic development in Europe and North America, 1992. Census and Statistics Department, Hong Kong (1993). Hong Kong Annual Digest of Statistics. Registrar-General of Births and Deaths, Republic of Singapore (1988). Report on Registration of Births and Deaths. The Ministry of Interior, Republic of China (1995). Taiwan-Fukien Demographic Fact Book. National Statistics Office, Republic of Korea (1993). Annual Report on the Vital Statistics. New Zealand Census and Statistics Department (1993). Vital statistics. Australian Bureau of Statistics (1993). Australian demographic statistics.

2.3 A Comparison of Proximate Factors Affecting Fertility

Variations in reproductive patterns are more directly seen as the results of biological and behavioural factors which are called the proximate determinants of fertility (Bongaarts & Potter, 1983). The concept of these determinants was first formulated in a pioneering work by Davis and Blake (1956), who propose a set of eleven proximate determinants of fertility, and contend that socio-economic and cultural factors exert an influence on fertility through these intermediate variables. Bongaarts (1978) developed this analytical framework into a form that permitted the effect of each determinant on fertility to be estimated numerically. Base on this estimation, he showed that the bulk of variation in fertility is accounted for by four principal proximate determinants: the proportion of women married, contraceptive use, induced abortion, and the duration of the period of non-susceptibility to conception following a birth.

The most important innovation introduced by Bongaarts is that these four proximate determinants are formulated in a quantitative way. Although the proximate determinants of Davis and Black shed light on the importance of biological and behavioural aspects linking socio-economic and cultural factors to fertility, the contribution of each determinant to the level of fertility is not definitely measurable. By contrast, Bongaarts presents a set of equations to estimate the values of the four proximate determinants, so that we can examine the effect of each determinant on fertility in a quantitative way.³

Fertility is only determined by the proximate determinants in a limited technical sense. The proximate determinants are themselves acted upon by socio-economic and cultural factors that fundamentally govern human reproductive behaviour. For instance, the age at which women

³ For further details of the method of the estimation, see Bongaarts & Potter (1983).

marry is affected by their socio-economic and cultural circumstances. Nevertheless, observed variations in fertility levels of populations tend to be immediately linked with a change in the behavioural pattern of these proximate determinants. To take an example, even if fertility control is practiced extensively in a population, there is still a tendency for an earlier marriage to result in a larger family size. This association between age at marriage and family size is thought to be derived from motivational factors linking marriage behaviour and family size preference underlying human demographic behaviour (Bumpass, 1969; Bumpass & Mburugu, 1977; Busfield, 1972). More specifically, a strong preference for a larger family size drives people to marry earlier, whereas a weak motivation for having children deters women from entering into marriage. In addition, even though not all births are unplanned, the reduction of unplanned births caused by the spread of effective contraceptive methods will, to an extent, contribute to the decline of fertility (Westoff & Ryder, 1977). In fact, the longitudinal trend of British fertility is at least superficially traced by the movement of using the contraceptive pill and the sterilisation (Murphy, 1993a, 1993b). Likewise, it is pointed out that the recent low birth rates in Asian NICS are related to the diffusion of contraception and abortion initiated by governmental family planning programmes (Chan, 1976; Donaldson, Nichols, & Choe, 1982; Fawcett & Khoo, 1980; Sun, Lin, & Freedman, 1978). Thus, the relation between the proximate determinants and fertility patterns is worth examining when making an international comparison. With these points in mind, this section will investigate the connection between fertility patterns and some of the proximate determinants.

Table 2.1 displays proportions of women ever-married in industrialised countries around 1990. First, compared with the Western countries, the five Asian countries shows a greater percentage of women

ever-married in the age groups after the latter half of twenties. The percentages of these age groups for the Asian countries were, on average, higher by approximately three or four percent than those for the Western countries. In terms of this Asian feature, Japan is not exceptional and its percentages of age groups after 25-29 were, without exception, larger than the mean of the Western countries. In particular, the proportion of women ever-married in the 45-49 age group stood at over 95%, being about 2 points greater than the Western average.

One of the most salient contrasts between European and Asian nuptiality is the prevalence of lifelong abstention from marriage. Although celibacy characterises a considerable proportion of the population of advanced age of each sex in pre-industrial Western European societies (Coale, 1969; Hajnal, 1965), this nuptiality pattern has diminished gradually, and may now be re-appearing in a modified guise (=cohabitation). In contrast, lifelong celibacy was a rare phenomenon throughout most parts of Asia until the 1960s (Dixon, 1971). If the percentages of ever-married women in the older age groups are regarded as an index of lifelong celibacy, the evidence suggests that this contrast between European and Asian nuptiality still existed around 1990, although the extent of this contrast was not so remarkable.

A clear difference between the Western and Asian countries could not be identified in terms of mean age at marriage. Around 1990, the average of female SMAMs (=Singulate Mean Age at Marriage) was 26.58 for the Asian countries and 26.57 for the Western countries, both the ages being almost equal. This is probably due to the fact that the Western countries yielded a greater percentage of women ever-married in the 20-24 age group than the five Asian countries, whereas the latter produced larger percentages in the older age groups than the former. For instance, the proportion of women ever-married in the 30-34 age group, on average, reached 85.8% for the five

Asian countries and 79.9% for the Western countries. In contrast, the mean of the Western countries was 22.2% in the 15-19 age group and that of the Asian countries stood at 19.6%. As a result of this, the effects of age groups on the SMAM cancelled out each other, consequently yielding the equivalent mean age of marriage. In other words, these patterns suggest that, a considerable number of women in the Asian countries enter into marriage in their late twenties, while those in the Western countries marry in their thirties.

Although a salient difference was not observed between the Western and the Asian countries in terms of female SMAM, it is important to bear in mind that SMAM is not always equal to the true mean age at first marriage which is directly computed by vital statistics. The SMAM, which was first proposed by Hajnal (1953), is easy to compute and widely used, but can only be interpreted as indicating the true mean age at first marriage at the time of the population census under stringent assumptions. More specifically, when we calculate the SMAM, the proportions of unmarried people from a single census are used as a hypothetical cohort instead of proportions from a true cohort. Hence, this method provides a proper measure of nuptiality only if marriage patterns have not changed in the recent past, and if there are no differentials in mortality and migration according to marital status. If these conditions are not satisfied, the value of the SMAM is somewhat biased, although they are rarely violated to so great an extent as to undermine analysis. In 1990, for instance, the female mean age at marriage obtained from vital statistics was 26.2 for Finland, 25.9 for West Germany and 25.9 for Japan⁴, which are slightly different from the SMAMs in Table 2.1.

⁴ For detailed figures of the mean age at marriage in European countries, see Coleman (1993).

Table 2.1: Proportions of Women Ever-married, Selected Industrialized Countries around 1990s

	Year	Age							SMAM	TFR
		15-19	20-24	25-29	30-34	35-39	40-44	(%) 45-49		
Finland	1987	1.1	19.5	56.0	76.6	85.5	89.4	90.4	26.81	1.59
Ireland	1988	0.7	20.1	64.5	83.9	90.1	91.7	91.0	25.27	2.17
Norway	1990	0.7	17.2	53.8	78.1	88.7	93.1	94.4	27.53	1.93
Sweden	1988	0.5	10.3	36.1	60.4	75.5	85.8	90.9	30.44	1.96
United Kingdom	1989	2.5	30.0	64.8	84.5	91.3	94.3	95.1	25.67	1.79
Denmark	1988	0.9	13.1	46.3	72.5	86.5	93.2	95.1	28.59	1.56
France	1989	0.8	22.4	61.6	81.7	88.5	91.7	93.1	26.44	1.79
West Germany	1988	2.3	24.0	62.9	82.9	90.5	93.8	94.4	26.10	1.40
Luxembourg	1990	2.9	28.2	64.3	83.3	89.4	92.6	93.0	25.71	1.62
Netherlands	1989	1.4	21.2	60.3	81.0	89.7	93.6	94.9	26.69	1.55
Switzerland	1988	1.2	19.3	57.6	79.3	87.1	90.3	91.2	26.69	1.57
Spain	1986	3.7	29.3	70.2	85.5	89.5	91.0	91.5	24.75	1.52
Australia	1990	1.2	24.4	67.4	84.3	91.1	94.3	95.4	26.05	1.89
Canada	1989	2.0	32.3	70.4	85.1	90.2	92.8	94.0	25.23	1.66
Hong Kong	1991	1.6	17.1	54.5	80.2	89.6	93.2	96.3	27.72	1.73
Japan	1990	1.8	15.0	59.8	86.1	92.5	94.2	95.4	26.75	1.57
Singapore	1990	1.4	21.5	60.7	79.1	85.2	88.5	92.7	27.05	1.82
South Korea	1990	0.5	19.5	77.9	94.7	97.6	98.9	99.4	25.45	1.70
Taiwan	1990	2.7	24.6	68.7	88.9	94.0	96.4	98.1	25.95	1.81
Mean (all countries)		1.6	21.5	60.9	81.5	89.1	92.6	94.0	26.57	1.72
Coefficient of Variance		0.564	0.271	0.153	0.086	0.049	0.031	0.026	0.050	0.109
Mean (Asian Countries)		1.6	19.6	64.3	85.8	91.8	94.2	96.4	26.58	1.73
Mean (Western Countries)		1.6	22.2	59.7	79.9	88.1	92.0	93.2	26.57	1.71
Correlation with TFR (all Countries)		-0.451	-0.179	-0.122	-0.157	-0.177	-0.165	-0.099	0.149	
Correlation with TFR (Western countries)		-0.534	-0.267	-0.167	-0.176	-0.187	-0.190	-0.163	0.163	

Source: United Nations (various years). Demographic Yearbook.
 Census and Statistics Department, Hong Kong (1993). Hong Kong Annual Digest of Statistics.
 Superintendent of Census, Department of Statistics (1992). Singapore Census of Population 1990.
 National Bureau of Statistics, Republic of Korea (1994). Korea Statistical Yearbook.
 Census Office of the Executive Yuan. (1992). An Extract Report on the 1990 Census of Population and Housing, Taiwan-Fukien Area, Republic of China.

As mentioned earlier, although it is argued that an early entry to marriage is linked to a large family size, such a consistent relation was not observed in the recent industrialised countries (see Table 2.1). The correlation between the TFR and the SMAM was only 0.149 for all the countries, which indicates that the timing of marriage has almost no relation to the fertility rate. Likewise, when we excluded the Asian countries, the correlation between the two variables was almost unchanged. Thus, the association between fertility and female age at marriage does not differ in Asian and Western countries.

However, as far as Table 2.2 shows, fertility and marriage age changed differently in the Western and the Asian countries. From 1970 to

1990, the female mean age at marriage, on average, rose by 3.72 and the TFR declined by 33.3% for all the industrialised countries. However, the change rate differs between Asian and Western countries with respect to the age at marriage and the TFR. Compared with the Western countries, the five Asian countries yielded a greater decline of TFR, but a rise in the age at marriage was relatively small in these countries. The mean value of the female SMAMs rose by 4.20 for the Western countries and by 2.96 for the Asian countries, whereas the mean of the TFRs fell by 22.54% for the former and by 50.60% for the latter. The evidence suggests that, although the Western countries experienced a considerable rise in the female mean age at marriage, the fertility decline of these countries was relatively mild in comparison with that of the Asian countries. In contrast, the Asian countries experienced a mild rise in the mean age at marriage, but the reduction of their fertility rates was quite large. Hence, compared with Asian countries, Western countries have a weaker link between female age at marriage and the level of fertility.

This difference is probably due to the fact that a large number of extramarital births increase the total number of births in Western countries. On the other hand, because relatively few children are born outside wedlock in Asian countries, a smaller variation in marriage age leads to a larger variation in fertility (Caldwell, 1993). Therefore, the influence of marriage pattern on fertility is much greater in Asian than in Western countries.

Japan stands between the West and Asia in terms of the relation between marriage and fertility. The female SMAM of Japan rose from 24.23 in 1970 to 26.75 in 1990 by 2.52, which was close to the average of the changes in the Asian countries. On the other hand, during the same period, the Japanese TFR fell from 2.13 to 1.53 by 28.17%, which was much lower than the mean of the reductions in the other Asian countries, and was

slightly greater than that in the Western countries. Thus, it follows that the degree of association between age at marriage and fertility is weaker in Japan than in the other Asian countries, but stronger than in the Western countries.

Table 2.2: Changes of Female Mean Age at Marriage and TFR, Selected Industrialized Countries around 1970 and 1990

	Year	SMAM	TFR	Year	SMAM	TFR	Increase of SMAM	%Decline of TFR
Finland	1970	22.57	1.83	1987	26.81	1.59	4.24	13.11
Norway	1970	21.85	2.51	1990	27.53	1.92	5.68	23.51
Sweden	1970	23.69	1.94	1988	30.44	1.96	6.76	-1.03
United Kingdom	1971	23.91	2.38	1989	25.67	1.79	1.75	24.79
France	1968	23.09	2.75	1989	26.44	1.79	3.35	34.91
Switzerland	1970	22.58	2.09	1988	26.69	1.57	4.11	24.88
Australia	1971	21.54	2.95	1990	26.05	1.89	4.51	35.93
Canada	1971	22.03	2.19	1989	25.23	1.66	3.20	24.20
Hong Kong	1971	23.80	3.42	1991	27.72	1.25	3.92	63.55
Japan	1970	24.23	2.13	1990	26.75	1.53	2.52	28.17
Singapore	1970	24.25	3.10	1990	27.05	1.83	2.80	40.97
South Korea	1970	23.28	4.47	1990	25.45	1.54	2.17	65.55
Taiwan	1970	22.57	4.00	1990	25.95	1.81	3.38	54.75
Mean (all countries)							3.72	33.33
Mean (Western Countries)							4.20	22.54
Mean (only Asian Countries)							2.96	50.60

Source: United Nations (various years). Demographic Yearbook.
 Census and Statistics Department, Hong Kong (1993). Hong Kong Annual Digest of Statistics.
 Superintendent of Census, Department of Statistics (1992). Singapore Census of Population
 1990.
 National Bureau of Statistics, Republic of Korea (1994). Korea Statistical Yearbook.
 Census Office of the Executive Yuan. (1992). An Extract Report on the 1990 Census of
 Population and Housing, Taiwan-Fukien Area, Republic of China.
 Thornton, A., & Lin, H. (1994). Social change and the family in Taiwan.

Next, let us turn to the relation between contraception and fertility. Some studies indicate that a fall of fertility in the industrialised countries of the 1980s is attributed to the spread of new contraceptive methods (Murphy, 1993a, 1993b; Westoff & Ryder, 1977). Of particular importance here is whether or not a country with the popularity of modern effective methods such as the pill yields a lower birth rate than that with the popularity of old methods such as condom.

Table 2.3 displays the contraceptive usage of industrialised countries in the 1980s. First of all, there was no clear difference between the Western countries and the Asian countries in terms of the percentage of couples

practising contraception. In terms of using contraception currently, the average of the former countries stood at 76.3%, and that of the latter countries was 73.4%, the difference between the two groups being negligible. In addition, the coefficient of variation reached only 12.0, which means that variation in contraceptive practice is quite small among the industrialised countries.

Nevertheless, the types of contraceptive methods used by couples varied from country to country. Compared with the Western countries, the Asian countries yielded a larger proportion of couples using condoms. In contrast, the pill was more frequently used in the West. In concrete terms, with reference to condom usage, the average of the Asian countries stood at as much as 31%, but that of the Western countries was only 17%. On the other hand, 32% of couples, on average, used the pill in the Western countries, while only 11% of couples used it in the Asian countries. Compared to Western couples, Asian couples tend to use older contraceptive methods more frequently. Interestingly, among all countries, the percentage of couples using condoms was highest in Japan (=75%), whereas that of couples using the pill was lowest (=1%).⁵ Hence, Japanese couples follow the typical pattern of Asian contraceptive usage.

Despite these differences in the pattern of contraceptive usage, the prevalence of effective contraceptive methods does not always result in a low birth rate. For instance, the TFR of Canada, with the highest percentage of pill users, stood at 1.69, which was equal to that of Japan with the highest percentage of condom users. Furthermore, Spearman's rank correlation between the TFR and the percentage of condom users was only -0.04, and between the TFR and the percentage of pill users was -0.20. This evidence implies that the types of contraceptive method used are weakly connected to the level of fertility. Thus, the differences of fertility

⁵ As of 1996, the oral contraceptive pill has not been formally licensed by the government.

among industrialised countries cannot be sufficiently accounted for by the level of the popularity of effective contraceptive methods.

Admittedly, the main reason for practising contraception is the avoidance of future unwanted births or postponement of the next birth. Hence, the effectiveness of the method used is likely to be one of the primary factors concerning what type of contraceptive method couples choose. However, the choice of a contraceptive method is not dependent upon only a contraceptive's efficiency. Other factors such as side-effects on health, the availability of methods, and the advice of medical specialists have an influence on the selection of a contraceptive method (Bulatao, 1989). Thus, it is very likely that there is not a simple relation between the level of fertility and the type of contraceptive method used.

Table 2.3: Contraceptive Usage, Selected Industrialized Countries in the 1980s

Country	Contraception (married women)		% of current users using							TFR
	Year of Survey	% using currently	Sterilization (Either partner)	Pill	IUD	Condom	Rhythm	Withdrawal	Other	
Austria	1982	71	1	56	12	6	12	8	5	1.78
Belgium (Flemish Population)	1982	81	21	39	10	8	5	16	1	1.61
Denmark	1975	63		35	14	39	1	2	9	1.92
Finland	1977	80	6	14	36	40	1	3	0	1.69
France	1978	79	5	34	13	8	9	29	2	1.82
West Germany	1985	78	16	43	19	7	5	5	5	1.28
Italy	1984	78	0	18	3	17	11	46	5	1.46
Netherlands	1985	76	19	55	12	9	2	1	2	1.51
Norway	1977	71	9	18	39	23	4	5	2	1.75
Portugal	1980	66	1	29	5	8	6	39	12	2.19
Spain	1985	59	8	26	10	21	6	27	2	1.61
Sweden	1981	78	4	30	26	32				1.63
Switzerland	1980	71	22	39	15	12	6	2	4	1.55
United Kingdom	1983	83	30	36	11	19	1	5	4	1.77
Canada	1984	95	59	15	8	11	3	1	3	1.69
USA	1982	92	41	20	7	14	5	12	1	1.83
Hong Kong	1982	80	30	27	5	20	11		9	1.86
Japan	1987	65	8	1	5	75	14	16	1	1.69
Singapore	1982	74	31	16		33			21	1.71
South Korea	1985	70	58	6	11	10			16	1.70
Taiwan	1985	78	33	7	25	17			19	1.89
Mean (all countries)		75.6	20.1	26.9	14.3	20.4	6.0	13.6	6.2	1.71
Coefficient of Variation		12.0	89.0	56.0	70.0	80.0	68.0	106.0	102.0	11.0
Mean (Western countries)		76.3	16.1	31.7	15.0	17.1	5.1	13.4	3.8	
Mean (Asian countries)		73.4	32.0	11.4	11.5	31.0	12.5	16.0	13.2	1.69
										1.77

Note: Blank indicates no data separately available for that method.
Percentages do not add to 100 because women using a combination of methods are shown under each method.

Source: Bulatao, R. A. (1989). The contraceptive method mix: an overview.
United Nations. (1988). World Population Trends and Politics: 1987 Monitoring Report.
United Nations. (1989). Levels and Trends of Contraceptive Use As Assessed in 1989.

In addition to the effects of contraceptive methods on fertility patterns, it is necessary to consider the relation between fertility and abortion, because abortion is one of the most effective measures to avert unwanted births.

Other things being equal, a high abortion rate will, in theory, result in a low fertility, but the observed relation between fertility and abortion was not as clear in Table 2.4 as to support the theory. Although the mean of abortion rates was higher in the Asian countries, they did not always show a lower fertility rate either. For instance, the highest abortion rate was observed in Singapore (=553 per 1000 live births), whereas the lowest abortion rate appeared in Spain (=39 per 1000 live births). Nevertheless, the latter level of fertility was as low as the former level. Moreover, the correlation between the abortion rate and the TFR was 0.41, and its value fell down to 0.34 when the Asian countries were excluded. This evidence implies that the influence of induced abortion on fertility was not substantial.

Interestingly, the Asian countries with their higher percentage of condom users tend to have a higher abortion rate than the European countries. More specifically, Japan and Singapore, which had a considerably higher percentage of couples using condoms (see Table 2.3), show a very high abortion rate. The abortion rate of the former was 384 per 1,000 live births, while that of the latter reached as many as 553 per 1,000 live births. By contrast, the Netherlands and Canada, where the percentages of condom users was small, have a low abortion rate. The rate of the former was only 97, and that of the latter was 167.

Because the availability of abortion is influenced by legal and cultural factors, it is difficult to argue a definite causality between the level of induced abortion and patterns of contraceptive usage. Legal abortion is still not available in Ireland and Belgium, and has been permitted in Spain since 1985, but only on limited grounds. The Spanish low abortion rate in Table 2.3 is probably due to this special situation. In contrast, Asian countries tend to be more tolerant toward the availability of legal abortion (Hong, 1988; Muramatsu, 1988; Ratnam, 1988; Chen, 1985). This situation, however, suggests that induced abortion plays a complementary role in the avoidance of unplanned births caused by a less effective contraceptive method. To put it another way, if couples have the definite target number of children they want to have, they are likely to employ various combinations of measures to achieve their target number under given social and cultural constraints. For instance, as is the case in Japan, where the use of the pill is strictly limited, couples will avert unplanned births by a combination of condom and abortion. Hence, an inter-country difference in the level of fertility depends more on people's preference for family size than on the degree of diffusing effective contraceptive methods.

Table 2.4: Induced Abortion Rates, Selected Industrialized Countries in the 1980s

	Year	Abortion Rate	TFR
Austria	1985	205	1.47
Denmark	1985	371	1.45
Finland	1985	220	1.64
France	1985	226	1.82
West Germany	1985	143	1.28
Italy	1985	364	1.41
Netherlands	1985	97	1.51
Norway	1985	286	1.68
Spain	1987	39	1.46
Sweden	1985	313	1.73
United Kingdom	1985	241	1.80
Canada	1985	167	1.67
USA	1985	422	1.84
Hong Kong	1986	235	1.35
Japan	1985	384	1.76
Singapore	1985	553	1.62
South Korea	1987	120	1.24
Mean (all countries)		258.0	1.57
Coefficient of Variance		0.51	0.12
Mean (Western countries)		238.0	1.60
Mean (Asian countries)		323.1	1.49
Correlation with TFR (all countries)		0.405	
Correlation with TFR (Western countries)		0.340	

Note: Abortion rate is the number of legal abortions per 1,000 live births per year.

The abortion rate of South Korean is an estimated value.

Source: United Nations. (various years). Demographic Yearbook.
Council of Europe. (1993). Recent demographic development in Europe and North America, 1992.
Hong, M. S., Yi, S. Y., Chang, Y. S., Oh, Y. H., & Kye, H. B. (1994). 1994 National Fertility and Family Health Survey.

2.4 A Comparison of Socio-economic Factors Affecting Fertility

The conventional wisdom has held that socio-economic factors are primary underlying determinants of fertility, although this view has been challenged (Freedman, 1979; Watkins, 1989). As was discussed in the previous chapter, the New Home Economics theory particularly claims that reproductive behaviour depends on socio-economic factors such as wages, education and female labour participation rates in developed countries (Becker, 1960; Becker & Lewis, 1973; Butz & Ward, 1979). If so, variations in fertility among industrialised countries will, to some extent, be accounted for by variations in these variables. Hence, this section will investigate the relation between fertility pattern and these socio-economic factors.

Table 2.5 displays the enrolment rates of tertiary education around 1990. To begin with, compared to the Western countries, the Asian countries had a lower level of enrolment in tertiary education. The mean of the Western countries stood at 36.7%, whereas that of the Asian countries was 29.4%. This difference is probably derived from a gender gap in the percentage of enrolment in higher education. The enrolment rate for tertiary education was much lower for women than for men in the Asian countries. As far as the enrolment rates show, both the Western and Asian countries, on average, yielded approximately 35% of the male enrolment rate in tertiary education, and no remarkable difference was identified between the two groups. In contrast, the female mean was 35.8% for the Western countries and only 23.0% for the Asian countries, the difference of the two reaching as much as 12.8 points.

This tendency was particularly conspicuous in Japan, Singapore and South Korea. The enrolment rate was 42.6% for men and 26.4% for women in Singapore, and 51.4% and 25.9% in South Korea. The number of women enjoying higher education was almost half that of men in these two countries. Although a gender gap in tertiary education was narrower in Japan than in the two Asian countries, the enrolment rate of Japanese women was still 13 points lower than that of Japanese men.

Despite there being the salient difference in the enrolment rate of the third level of education, the level of TFR did not differ between the Western and Asian countries. The mean of TFRs stood at around 1.5 for both groups. In addition, since the coefficient of variation was 15.7 for the TFR and 36.1 for the total enrolment rate, it follows that variations in TFR among the countries are not as great as those in enrolment rate.

With reference to the relation between educational level and fertility, the observed results were not as simple as expected in the New Home Economics theory. The correlation coefficient between the TFR and the

total enrolment rate reached only 0.38 for all countries. As was mentioned in the previous chapter, the New Home Economics theory holds that a preference for a higher quality of children results in a smaller number of children (Becker & Lewis, 1973). Assuming that the enrolment rate of tertiary education is an index of the quality of children, this variable will, *ceteris paribus*, have a negative impact on fertility. Therefore, the enrolment rate is expected to be negatively correlated with TFR in the cross-sectional analysis of industrialised countries. However, the sign of the correlation coefficient between the total enrolment rate and the TFR in Table 2.3 was, in reality, positive. This was in opposition to what the New Home Economics assumes. The same is the case with the female enrolment rate and the male enrolment rate. The correlation between the TFR and the enrolment rate stood at 0.40 for women and 0.32 for men.

Interestingly, the relation between education and fertility became weaker when the Asian countries were excluded. The correlation between the TFR and the total enrolment rate fell down 0.29, when only the Western countries were included. Likewise, the correlation of the TFR with the enrolment rate was 0.21 for men and 0.33 for women. This evidence suggests that, compared to the Asian countries, the Western countries have a weaker relation between fertility and education. This is probably because the enrolment levels of Western countries are close to the maximum. In addition, when Japan and the Western countries was included, the correlation coefficients did not increase drastically in comparison with those computed for only the Western countries. In concrete terms, the correlation between the TFR and the total enrolment rate stood at 0.30. Similarly, the correlation of the TFR with the enrolment rate was 0.20 for men and 0.36 for women. Hence, in Japan, as in the Western countries, there is a relatively weak connection between education and fertility rates, which means that the Japanese reproductive pattern is

closer to the Western pattern than the general Asian pattern. In fact, it is claimed that the recent fertility decline of South Korea has been caused by parents' strong desire for having well-educated children (Tai-Hwan, 1993).

Table 2.5: Enrollment Rates in Tertiary Education by Sex, Selected Industrialized Countries around 1990 (%)

Country	Year	Total	Male	Female	TFR
Finland	1990	46.7	44.0	49.6	1.78
Ireland	1989	26.4	28.3	24.5	2.12
Norway	1989	42.5	39.0	46.3	1.92
Sweden	1990	32.8	29.6	36.2	2.14
United Kingdom	1989	25.2	25.8	24.5	1.83
Austria	1990	33.2	35.3	30.9	1.45
Belgium	1989	37.2	37.9	36.4	1.58
Denmark	1988	31.5	30.0	33.2	1.56
France	1990	40.0	36.7	43.4	1.78
West Germany	1989	33.3	38.5	27.8	1.49
Netherlands	1989	34.3	37.5	30.9	1.55
Switzerland	1990	27.6	35.1	19.6	1.59
Greece	1988	28.9	28.3	29.5	1.52
Italy	1990	30.7	31.7	29.7	1.29
Portugal	1986	14.0	12.5	15.6	1.63
Spain	1989	33.5	32.7	34.4	1.38
Australia	1990	34.5	32.0	37.2	1.89
Canada	1990	69.8	60.0	79.9	1.71
New Zealand	1989	40.7	39.7	41.7	2.12
USA	1990	70.3	63.4	77.4	2.08
Hong Kong	1990	15.1	12.2	12.4	1.19
Japan	1990	30.6	37.1	24.0	1.53
Singapore	1990	36.5	46.2	26.4	1.83
South Korea	1990	39.2	51.4	25.9	1.70
Taiwan	1990	26.7	26.8	26.6	1.81
Mean (all countries)		35.2	35.7	34.6	1.69
Coefficient of Variation		36.1	33.4	46.2	15.7
Mean (Western Countries)		36.7	35.9	37.4	1.71
Mean (Asian Countries)		29.6	34.1	22.8	1.61
Correlation with TFR (all countries)		0.378	0.324	0.402	
Correlation with TFR (Western Countries)		0.292	0.210	0.339	
Correlation with TFR (without Asian NICS)		0.303	0.203	0.359	

Note: Enrolment rate is the number of students over the number of population aged 20-24.

Source: Unesco (various years). Statistical yearbook.
 Directorate-General of Budget, Accounting and Statistics Executive Yuan
 (various years). Statistical Yearbook of the Republic of China.
 Ministry of Education, Singapore (1994) Education Statistics Digest 1994.

Next, we shall examine the relation between wage levels and fertility in Table 2.6. To begin with, the levels of wages are, on the whole, higher in the Western countries than in the Asian countries. The average of male hourly wages stood at 11.04 dollars for the Western countries and 7.59 dollars for the Asian countries. Similarly, the mean of female wages was

8.39 dollars for the former and 3.83 dollars for the latter. Moreover, the difference between the male wage and the female wage is also greater in the Asian countries than in the Western countries. This wage gap between men and women is more clearly understood by looking at the wage ratio. The mean of wage ratios reached 0.75 for the Western countries, whereas the Asian mean of the ratio was 0.55.

As is argued by the New Home Economics theory, if children can be regarded as consumer goods, a higher level of wages will bring a larger number of children (Becker, 1960). However, the results in Table 2.8 do not support this theoretical connection sufficiently. Although a considerable wage differential is apparent between the Western and Asian countries, the difference between the two groups is negligible in terms of the TFR. The mean of TFRs was 1.78 for the former countries and 1.61 for the latter countries. Moreover, the correlation of the TFR with the male wages was 0.196 for all countries, and the correlation with the female wages was 0.305. It therefore follows that the wages were quite weakly linked to the fertility rate in these countries. Female wages may be thought of as an index of their opportunity cost at the same time. According to the New Home Economics theory, higher female wages should lead to a lower level of fertility (Mincer, 1963). The observed correlation of the TFR with the female wage was positive, in opposition to the relation assumed by the theory. Nevertheless, we should bear it in mind that this result may fall into the ecological fallacy. The correlation between variables based on aggregated data such as averages for a geographical area does not always indicate the relation between the properties of individuals (Robinson, 1950). Hence, it is too early to conclude from the present evidence that highly-salaried women have fewer children. In Chapter 4, we will, in detail, discuss the relation between women's wages and fertility.

It is worth noting that the correlation coefficient between the male

wage and the TFR increased slightly, when it was calculated without the Japanese figure (see Table 2.8). More specifically, the correlation coefficient rose from 0.196 to 0.282 by 0.086. This increase is due to the fact that the exclusion of Japanese figure reduced the effects that disturbed the linear relation between the two variables. Thus, the positive relation between male wages and the fertility rate is weaker in Japan than in the other countries. In other words, Japan is in a different position from the other countries with reference to the relation between the two variables. In fact, Japan yielded the highest male hourly wage (=17.13 dollars). Nevertheless the Japanese TFR stood at 1.53, which was almost the same as that of Portugal with the lowest male hourly wage (=2.85 dollars).

In terms of the relation between the female wage and the TFR, a clear difference was not identified between Japan and the Western countries. The correlation between female wage and the fertility rate reached 0.237, when it was calculated for only the Western countries. Furthermore, when the Asian NICS were excluded, the correlation coefficient between the two variables stood at 0.253, and no substantial difference was found out between the two correlation coefficients. The evidence suggests that the inclusion of Japan hardly changes the linear connection seen in only the Western countries. Hence, there is no difference in the effect of a female wage on fertility in Japan and the Western countries.

Table 2.6: Hourly Wages in Manufacturing by Sex, Selected Industrialized Countries in 1990 (US \$)

Country	Male Wage	Female Wage	Wage Ratio	TFR
Finland	13.36	10.33	0.77	1.78
Ireland	9.94	6.88	0.69	2.12
Norway	15.12	13.07	0.86	1.92
Sweden	15.11	13.43	0.89	2.14
United Kingdom	9.78	6.69	0.68	1.83
Belgium	10.89	8.12	0.75	1.62
Denmark	16.77	14.19	0.85	1.67
France	8.88	7.01	0.79	1.78
West Germany	13.18	9.58	0.73	1.45
Luxembourg	10.31	6.10	0.59	1.62
Netherlands	12.49	9.41	0.75	1.62
Switzerland	16.83	11.42	0.68	1.59
Greece	4.63	3.63	0.78	1.42
Portugal	2.58	1.78	0.69	1.51
Australia	10.50	8.66	0.82	1.89
New Zealand	8.57	6.43	0.75	2.18
USA	11.02	7.91	0.72	2.08
Japan	17.13	7.08	0.41	1.53
Singapore	5.63	3.08	0.55	1.83
South Korea	5.82	2.92	0.50	1.70
Taiwan	5.28	3.21	0.61	1.81
Hong Kong	4.07	2.84	0.70	1.19
Mean (all countries)	10.66	7.66	0.71	1.77
Coefficient of variance	0.405	0.471	0.174	0.132
Mean (Western countries)	11.04	8.39	0.75	1.78
Mean (Asian countries)	7.59	3.83	0.55	1.61
Correlation with TFR (all countries)	0.196	0.305	0.261	
Correlation with TFR (Western countries)	0.173	0.237	0.271	
Correlation with TFR (without Asian NICS)	0.074	0.253	0.353	
Correlation with TFR (without Japan)	0.282	0.306	0.193	

Note: Wage ratio = female wages / male wages.

Wages are converted to US dollar by purchasing power parity.

Source: Directorate-General of Budget, Accounting and Statistics Executive Yuan (various years). Statistical Yearbook of the Republic of China.
 Directorate-General of Budget, Accounting and Statistics Executive Yuan (various Years). Yearbook of Earnings and Productivity Statistics Taiwan Area.
 International Monetary Fund (various years) International Financial Statistics.
 Census and Statistics Department of Hong Kong (various years). Hong Kong Annual Digest of Statistics.
 United Nations (various issues). Monthly Bulletin of Statistics.
 International Labour Office (various years). Yearbook of Labour Statistics.

Let us turn to an investigation of the relationship between fertility and the female labour participation rate. Table 2.7 shows the female labour participation rate around 1990. First of all, the total rate of female labour participation was, in general, higher in the Western than in the Asian countries. As far as the mean of the total rates shows, the percentage of women who worked stood at 64.8 for the Western countries and 47.0 for the five Asian countries, and the former was greater by about 17 points than the latter. The main reason for this difference is that, compared with the

Western countries, the Asian countries yielded smaller percentages in the age groups after age 25. More specifically, the mean of the Western countries remained at about 70% of the rate in these age groups, while that of the Asian countries fell to 62% in the 25-29 age group, and fluctuated around 55% in the latter age groups.

Secondly, a close look, however, shows us some features peculiar to Japan in terms of the female labour participation rates. Although the Japanese total percentage stood between the Western and the Asian average concerning the female labour participation rate (=58.4%), there was a conspicuous movement from the 30-34 to 35-39 age group. In concrete terms, the age-specific rate fell to 55.1% in the 30-34 age group, after which it rose again to 62.6% in the 35-39 age group. This steep rise is not seen in the other countries.

Thirdly, the total percentage of the female labour participation rate was positively connected to the TFR, and the correlation coefficient between the two variables stood at 0.450 for all countries. Assuming that the degree of compatibility between child-rearing (and childbearing) and working does not differ across the countries, a larger percentage of the female labour participation rate is expected to result in a lower birth rate. However, the observed connection between the fertility rate and the labour participation rate is positive, which is not in accord with the above reasoning. On the other hand, assuming that the female labour participation rate signifies the degree of compatibility between working and child-rearing, the positive association between the two variables seems plausible. In other words, if we suppose that a country with a large percentage of the female labour participation rate provides conditions more compatible with working and bringing up children than a country with a small percentage of the labour participation rate, women in the former country will be more willing to give birth to children than those in the latter.

In this case, the level of fertility will probably show a positive connection to the female rate of labour participation. Indeed, Sweden, with a quite high total rate of female labour participation, revealed a TFR of 2.14, whereas Italy, with a considerably low total rate of female labour participation, showed a TFR of 1.29.

When thinking of the relation between fertility and the labour participation of women, we should not overlook the influence of family policy on fertility behaviour. The extent of compatibility between working and child-rearing depends on types of welfare benefits and services which the state provides. A high level of state support for working mothers such as a generous maternity and parental leave, and an ample provision for child-care facilities, allows them to work outside the home more easily, which will consequently encourage childbearing. In contrast, a poor level of state support will make working women give up having children or retreat from the labour market for childbearing (and child-rearing). Thus, the observed positive correlation between the TFR and the female labour participation rate around 1990 may be affected by the level of welfare benefits and services provided by the state. Specifically, a rise in the level of state support may increase both the female labour participation rate and the TFR. However, welfare policies have a weak effect on the fertility rate. In the analysis of 22 OECD countries, Gauthier (1991) finds that increasing cash transfers to families by 25% rose the TFR by only 0.02. Therefore, the effect of welfare policies on fertility is open to question. In fact, although fertility in France and Britain has been following a similar trend since the mid-1960s, family policies differ considerably between the two countries (Gauthier, 1996a).

Fourthly, salient dissimilarities were identified between the Western and Asian countries with respect to the relation of the TFR to the female labour participation rate in each age group. More specifically, the

correlation of the TFR with the labour participation rate of age group 20-24 stood at 0.118 for all countries, but that of the Western countries rose to 0.352. Similarly, in the case of the age group 25-29, its correlation coefficient to the TFR increased from 0.106 for all countries to 0.262 for only the Western countries. These changes of the correlation coefficients are derived from the disturbing effect of the Asian countries on the Western linear relation between the variables. Accordingly, the exclusion of Asian countries removed this disturbing effect, which consequently increased the correlation coefficients. This evidence indicates that the labour participation rate of women in their twenties are more strongly connected to the TFR in the Western than the Asian countries. In addition, compared to the correlation coefficients for only the Western countries, those calculated for the Western countries and Japan failed to reveal distinguishable changes for the 20-24 and the 25-29 age groups. In concrete terms, the correlation coefficient between the TFR and the female labour participation rate fell from 0.352 to 0.329 by 0.023 for the 20-24 age group, and rose from 0.262 to 0.291 by 0.029 for the 25-29 age group. These results imply that the inclusion of the Japanese rates hardly affected the Western linear relation between fertility and female labour participation. Thus, compared with the Asian NICS, Japan is closer to the Western countries with reference to the connection between fertility and female labour participation.

Despite these weak correlations, it may be inappropriate to say that the female labour participation rate has little influence on the total fertility rate. Since the influence of county-specific factors is not controlled out in the cross-national analysis in Table 2.7, its weak correlations may result from a difference in the social and institutional circumstances of countries. For example, in a country with an ample provision of child-care facilities, the female labour participation rate will have a relatively weak relation to

the fertility rate. On the other hand, if a country has scant child-care facilities, the level of women's participation in the labour force will exert a relatively strong influence on the level of fertility (Gauthier, 1991, 1996b). Thus, we cannot rule out the possibility that social and institutional factors disturb the linear relation between the TFR and the female labour participation rate.

Table 2.7: Female Labour Participation Rates by Age Group, Selected Industrialized Countries around 1990

Country	Year	Age							(%)	
		15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total	TFR
Finland	1990	38.1	67.8	81.0	84.0	88.4	89.9	89.9	78.4	1.78
Ireland	1990	23.6	73.3	64.8	44.6	34.0	30.8	29.3	42.7	2.12
Norway	1990	43.5	67.1	75.0	78.2	81.0	81.9	83.5	73.4	1.92
Sweden	1990	50.5	80.7	87.1	91.1	93.0	93.8	93.1	85.5	2.14
United Kingdom	1993	58.0	71.2	71.7	69.7	74.4	79.1	77.9	71.6	1.79
Austria	1989	46.5	72.8	67.3	63.9	63.6	64.0	60.3	63.1	1.45
Denmark	1990	65.2	79.3	86.9	90.7	90.3	89.6	87.3	84.2	1.67
France	1989	60.1	79.3	72.1	72.4	67.3	46.5	60.8	65.8	1.79
West Germany	1989	38.4	74.1	69.3	62.9	64.4	64.8	61.8	63.1	1.49
Luxembourg	1990	24.4	71.6	66.2	53.1	48.0	48.4	38.8	51.6	1.62
Netherlands	1990	41.9	77.1	69.9	61.3	61.2	58.3	52.5	61.1	1.62
Switzerland	1990	49.2	80.4	71.4	60.9	62.9	66.8	66.6	66.0	1.59
Greece	1988	19.7	46.7	55.6	56.9	54.7	51.2	43.9	46.9	1.52
Italy	1990	21.4	62.8	65.3	62.0	58.8	52.8	44.9	51.9	1.29
Portugal	1990	39.7	68.5	76.5	77.7	74.1	67.8	61.7	65.4	1.51
Spain	1990	31.2	61.4	65.1	57.1	49.0	41.1	34.5	49.3	1.30
Canada	1992	51.1	74.3	76.5	75.3	77.1	78.3	75.7	73.2	1.69
New Zealand	1990	56.7	69.8	61.8	61.5	71.6	78.5	77.3	67.4	2.18
USA	1989	43.8	72.0	73.4	72.7	74.7	76.8	74.3	69.9	2.00
Hong Kong	1990	25.8	83.2	77.7	55.0	52.0	53.2	52.0	26.5	1.19
Japan	1990	17.8	75.1	61.4	51.7	62.6	69.6	71.7	58.4	1.53
Singapore	1990	22.7	76.3	79.2	61.5	56.6	51.8	44.6	58.0	1.83
South Korea	1990	18.6	64.6	42.8	49.6	58.0	60.5	63.9	49.1	1.70
Taiwan	1990	24.2	57.2	50.1	43.0	43.0	42.1	36.1	43.0	1.81
Mean (all countries)		38.0	71.1	69.5	64.9	65.0	64.1	61.8	61.1	1.69
Coefficient of variance		0.388	0.117	0.151	0.204	0.230	0.265	0.301	0.231	0.156
Mean (Western countries)		42.2	71.1	71.4	68.2	67.8	66.3	63.9	64.8	1.71
Mean (Asian countries)		21.8	71.3	62.2	52.1	54.4	55.4	53.7	47.0	1.61
Correlation with TFR (all countries)		0.337	0.118	0.106	0.230	0.286	0.310	0.359	0.450	
Correlation with TFR (Western countries)		0.358	0.352	0.262	0.224	0.298	0.360	0.451	0.381	
Correlation with TFR (without Asian NICS)		0.385	0.329	0.291	0.256	0.305	0.350	0.430	0.392	
Correlation with TFR (without Japan)		0.316	0.133	0.087	0.210	0.284	0.322	0.379	0.448	

Source: International Labour Office (various years). Yearbook of Labour Statistics.
 Superintendent of Census, Department of Statistics (1992). Singapore Census of Population 1990.
 National Bureau of Statistics, Republic of Korea (1992). 1990 Population and Housing Census Report.
 Census Office of the Executive Yuan (1992). An Extract Report on the 1990 Census of Population and Housing, Taiwan-Fukien Area, Republic of China.

2.5 A Comparison of Values and Attitudes Affecting Fertility

The influence of ideas and values on reproductive behaviour is one of the

most debatable issues regarding the recent below-replacement level of fertility in industrialised countries (Cliquet, 1991). As was already discussed in the previous chapter, some demographers emphasise the influence of individual motivations and values on the low birth rate in industrialised countries (Lesthaeghe & Surkyn, 1988; van de Kaa, 1987). The central notion of this theory about ideational changes is that secularisation and individuation have spread over industrialised countries, and have motivated people to have fewer children. Some studies have already investigated the connection between ideational factors and fertility for European countries on a comparative basis, although an unassailable conclusion has not been drawn yet (Lesthaeghe, 1983, 1991, 1995; Lesthaeghe & Meekers, 1986; Simons, 1986). However, as is argued by Inglehart (1977, 1990), if ideational changes are tightly related to the high level of material prosperity and social security, the syndrome of secularisation and individuation is likely to expand to Asian industrialised countries, and to contribute to their fertility patterns, because they also have enjoyed a similar level of economic prosperity. Hence, it is necessary to examine the effect of ideational changes on fertility behaviour for Asian as well as Western countries. Unfortunately, there are only a few international comparative surveys with common questions in terms of people's values and attitudes. This section will explore the relation between ideational factors and fertility by using the results of the World Values Survey. This survey was carried out in 37 countries from 1989 to 1992, and made an international comparison of people's attitudes (Abramson & Inglehart, 1995). Thus, the data obtained from this survey are suitable for examining the relation between ideational factors and fertility pattern from the viewpoint of an international comparison.

Table 2.8 presents the aggregate response rates to questions in the World Values Survey. First of all, the percentages of respondents thinking

that God was very important in their lives varied among the countries to a considerable degree. The coefficient of relative variation reached fully 60.1 for this variable. However, the importance of God, which is regarded as an index of secularisation, was not strongly linked to the number of children ever-born. Spearman's rank correlation between the two variables was 0.311 for all countries, which suggests that a more secularised country does not always yield a low fertility rate. Hence, it follows that the extent of secularisation does not sufficiently account for variations in the level of fertility among industrialised countries. In fact, Japan and Spain showed the same number of children ever-born, but the percentage of respondents who had put much importance on God was only 4.9% in Japan, while the percentage reached 19.8% in Spain. The reason for this low correlation is probably that the influence of God on an individual life differs in Western and Asian countries. Generally speaking, Western countries have a long tradition of Christianity, and God has commanded a relatively influential position in people's consciousness. In contrast, Asian countries, and East Asian countries in particular, tend to lack such a tradition, and the existence of God is not generally perceived to be influential to human life in a secular world. The importance of God may, therefore, be a less proper index of secularisation for the Asian countries. Indeed, the rank correlation between the importance of God and the number of children ever-born rose to 0.418 when it was computed for only the Western countries.

As is suggested by Simons (1986a, 1986b), secularisation may, in a broader sense, be defined as a weakening of commitment to native traditions and morality in which people are engaged. To put it another way, if secularisation is thought of as a societal process in which the influence of over-arching and transcendent institutions is reduced, values and norms promulgated not only by religious sects as such, but also by groups and by nations will become less influential in a more secularised society or nation.

If we regard the sense of national pride as the degree of commitment to one's native tradition, this sense will be an appropriate index of the extent of secularisation.

The level of national pride is quite systematically related to the number of children ever-born, and countries with a higher level of national pride yielded a larger fertility (see Table 2.8). For instance, the percentage of respondents who had been very proud of their nationality was 16.9% in West Germany and 26.9% in Japan, and the number of children ever-born stood at 1.37 for the former and 1.69 for the latter. By contrast, more than 70% of the respondents felt very proud of their own nationality in Ireland and the United States, in both of which countries the mean value of children ever-born was more than two. In addition, Spearman's rank correlation between the two variables reached as much as 0.648 for all countries, which implies that the progress of secularisation indicated by this index tends to reduce the level of fertility.

Let us now turn to the relation between individuation and fertility. One of the most distinctive features indicating the development of individualism seems to be reflected upon changing attitudes to the role of a woman (Inglehart, 1990). More specifically, rearing children and being a housewife were traditionally viewed as central goals in a woman's life, and providing one of the greatest sources of satisfaction to women. In recent years, however, this assumption has increasingly been called into question. A growing number of women have devoted themselves to careers outside the home, and have sought their happiness from these careers. This increasing propensity to careers outside the home is probably originated in the spread of individualism (Lesthaeghe, 1991, 1995). Given that the expansion of individuation reduces the level of fertility, a country where more respondents express a negative view toward the traditional role of women will result in a lower fertility rate.

However, as far as the results in Table 2.8 show, the inter-country variation in fertility cannot adequately be accounted for by a variation in individuation. In concrete terms, the rank correlation between the number of children ever-born and the percentage of respondents who had supported the view that a woman needed children in order to be fulfilled was only -0.163 for all countries. The present result suggests that the ranking order of this attitudinal variable is almost unrelated to that of the number of children ever-born. For instance, 52% of the respondents agreed on this view in Japan, and this figure is greater by about 12 points than that of Spain. However, both countries yielded the same average of children ever-born. Moreover, the values of Spearman's rank correlation were constantly low without respect to the combination of countries. When the Asian countries were excluded, the correlation between the two variables was -0.165. Likewise, when the Western countries and Japan were dealt with, the rank correlation stood at -0.170. It follows from these results that the Asian countries do not disturb the linear relation which the Western countries have between the two variables.

As in the case of the Need of Children category in Table 2.8, the percentage of the Satisfaction of Housewife category also did not sufficiently account for a variation in the number of children ever-born. The rank correlation between the two variables was only -0.002 for all countries, which means that there is no consistent connection with respect to the rank orders of the two variables. In addition, although the value of correlation slightly rose to 0.040 for only the Western countries, there is no drastic improvement in terms of the strength of association between the two variables. Therefore, the degree of individuation indicated in the Satisfaction of Housewife category has a quite weak influence on reproductive behaviour in both the Western and the Asian countries.

It should be noted that the Japanese percentages of these two

attitudinal variables are not so different from those of the other industrialised countries. It has often been claimed that, compared to Western society, having children is more strongly emphasised as an obligation for women in Japanese society, with its traditional culture of the gender role motivating Japanese women to become housewives after marriage (Morgan, Rindfuss, & Parnell, 1984; Tsuya & Mason, 1995). However, as far as the results of the World Value Survey in Table 2.8 show, this argument is not appropriate for characterising contemporary Japanese society. About 52% of the Japanese respondents (both men and women) supported the view that a woman needs children to be fulfilled, but this figure is not significantly higher than that of the other countries. Denmark (71.5%), France (67.8%), Italy (59.8), and Portugal (60.4%) yielded a higher percentage concerning this question than Japan. Hence, contemporary Japanese society does not always have a particularly pronatalist culture. Similarly, approximately 13% of the Japanese respondents were as much satisfied with being housewives as engaging in paid work, but this figure was much lower than the mean of the Western countries. Therefore, there is no marked difference in the attitude toward the traditional gender role between Japan and the Western countries.

Table 2.8: Aggregated Response Rates to Selected Questions in the World Values Survey,
Selected Industrialized Countries

Country	Year of Survey	Importance of God	National Pride	Need of Children	Satisfaction of Housewife	INC	NOC	N
Austria	1990	24.6	50.4	40.5	24.0	2.37	1.71	1460
Belgium	1990	16.7	27.8	39.9	22.3	2.50	1.61	2792
Denmark	1990	8.4	40.7	71.5	16.6	2.56	1.62	1030
Finland	1990	14.1	36.9	18.9	20.4	2.71	1.85	588
Ireland	1990	48.8	76.2	23.9	18.3	3.52	2.31	1000
France	1990	13.7	32.3	67.8	18.6	2.60	1.70	1002
West Germany	1990	12.1	16.9	33.6	10.9	2.20	1.37	2101
Italy	1990	30.5	39.4	59.8	11.8	2.34	1.32	2018
Netherlands	1990	21.0	21.6	10.3	16.1	2.56	1.54	1017
Norway	1990	15.1	43.9	19.9	25.0	2.63	1.65	1239
Portugal	1990	18.8	41.8	60.4	25.2	2.47	1.61	1185
Spain	1990	19.8	43.4	40.2	19.3	2.36	1.69	1510
Sweden	1990	9.7	37.8	18.0	27.7	2.61	1.45	1047
United Kingdom	1990	17.6	50.1	19.9	10.0	2.52	1.73	1484
Canada	1990	30.1	59.0	21.8	18.4	2.77	1.87	1730
USA	1990	53.0	73.3	18.9	19.8	2.71	2.10	1839
Japan	1990	4.9	26.8	52.5	13.6	2.77	1.69	1011
South Korea	1990	25.5	45.2	25.3	46.2	2.08	1.61	1251
Mean (all countries)		21.4	42.4	35.7	20.2	2.57	1.69	
Coefficient variance		0.601	0.371	0.539	0.405	0.118	0.140	
Mean (Western countries)		22.1	43.2	35.3	19.0	2.60	1.70	
Mean (Asian countries)		15.2	36.0	38.9	29.9	2.40	1.70	
Rank Correlation with NOC (all countries)		0.311	0.649	-0.163	-0.020	0.664		
Rank Correlation with NOC (Western countries)		0.418	0.730	-0.165	0.040	0.678		
Rank Correlation with NOC (without South Korea)		0.373	0.680	-0.170	0.045	0.642		

Note:

Importance of God: The percentage of respondents thinking "God is very important in your life."

National Pride: The percentage of respondents who are very proud of their nationality.

Need of Children: The percentage of respondents endorsing the view that a woman needs children in order to be fulfilled.

Satisfaction of Housewife: The percentage of respondents who strongly agree that being a housewife is as satisfying as engaging in gainful work.

NOC: The mean value of the number of children ever-born.

INC: The mean value of the ideal number of children.

Source: Abramson, P. R., & Inglehart, R. 1995. Value change in global perspective.

Dentsu Institute of Human Studies (1995). 37 Ka Koku Sekai Kachikan Repôto [A Report on 37 countries' World Values Survey].

Ester, P., Halman, L., & de Moor, R. (Eds.). 1994. The Individualizing society: value change in Europe and North America (2nd ed.).

Conclusion

The purpose of this chapter was to explore the trend and correlates of Japanese reproductive behaviour from the viewpoint of an international comparison. Since the 1960s, fertility in almost all Western industrialised countries has declined to the below replacement level. Like these countries, Japan has entered the stage of this low fertility. Contemporary Japan shares, in this sense, a common feature with other industrialised countries.

Despite the overall similarity, a detailed examination showed some

differences in Japanese reproductive behaviour. First, compared with Western countries, Japan had a more compressed pattern in terms of birth timing. In particular, Japanese women tended to concentrate their childbearing in their late twenties. In the second place, the distribution of birth orders was considerably more homogeneous in Japan than in Western countries. More specifically, the percentage of fourth and higher order births was extremely small, whereas the cumulative percentage up to the second birth was rather large. This evidence suggests that Japan has the stronger two-child norm than Western countries. Thirdly, the change of female age at marriage was tightly linked to the change of the fertility rate in Japan. Compared to Western countries, a year increase in female age at marriage led to a greater decline of fertility in Japan. This indicates that marriage behaviour is still an important factor in considering fertility behaviour in Japan. Fourthly, condoms and induced abortion were more widely used to avert unplanned births in Japan than in Western countries.

In addition to the differences in behavioural level, the relation between fertility and its underlying determinants varied among industrialised countries, and some similarities and differences were observed between Japan and other countries. First of all, Japan and Western countries displayed a weaker influence of education on fertility than the Asian NICS showed. These findings suggest that a preference for the quality of children more powerfully reduces the level of fertility in the NICS than in Japan and Western countries. Secondly, although the connection between female wages and fertility did not much vary among countries, the effect of male wages on fertility in Japan differed substantially in comparison to other countries. Japan yielded the highest male wages among the countries, but its level of fertility was lower than the mean of Western fertility rates. Thirdly, Japan was more similar to Western countries than the Asian NICS with respect to the relation between fertility

and the female labour participation rate. In particular, the percentage of the female labour participation rate in the 20-29 age group was positively linked to the level of fertility in Japan and Western countries, but such a relation was not clearly observed in the NICS. Fifthly, religious secularisation did not have a definite effect on fertility in Japan. In concrete terms, Japan was religiously the most secularised country, but its level of fertility was equal to the average of all countries. Similarly, variation in the spread of individualistic attitudes also did not sufficiently explain variation in fertility among industrialised countries. Furthermore, no clear difference was found between Japan and Western countries in terms of the strength of association between fertility and individuation.

These complicated relations between reproductive behaviour and its underlying determinants will lead us to a further examination of Japanese demographic determinants. As has been shown by the comparative analysis of this chapter, reproduction and its correlates display different patterns from those of other industrialised countries. Nevertheless, Japan has reached the same low level of fertility as other industrialised countries. In subsequent analyses, we will, in detail, explore determinants of reproductive behaviour in Japan.

Chapter 3

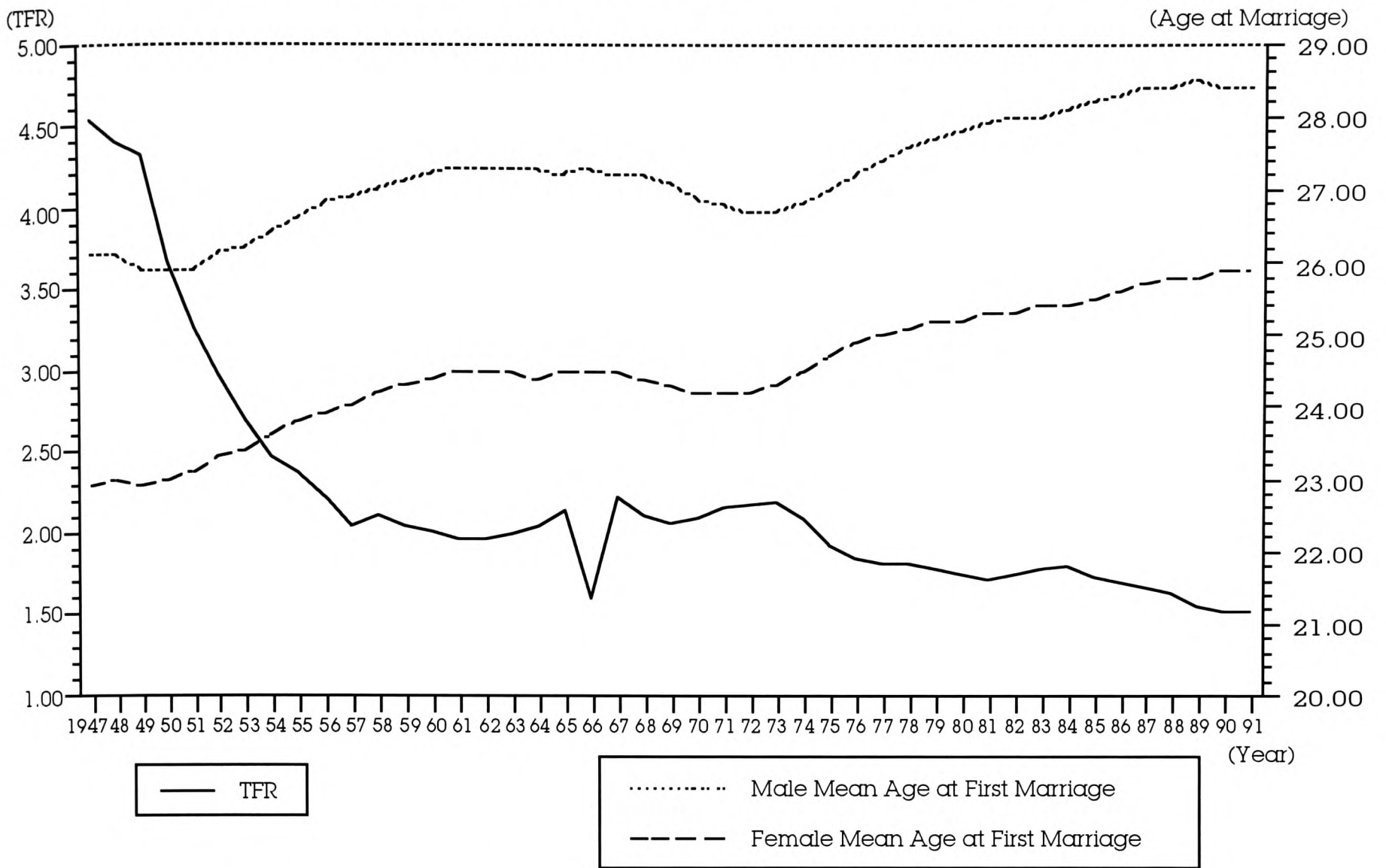
Analysis of Marriage Behaviour

Introduction

In this chapter, we will examine the factors that determine female marriage behaviour in contemporary Japan, and explore specifically the extent to which the delay of marriage and an increase in proportions of single people in Japan have been caused by socio-economic and attitudinal factors.

The Japanese total fertility rate (TFR) remained about two births per woman from 1957 until 1973, except for a dip in the 'Year of the Fire Horse' of 1966, which has traditionally been considered an unlucky year for giving birth to girls. In this period, marriage age also stabilised in Japan. Mean age at first marriage for men remained almost unchanged from 26.8 in 1957 to 26.7 in 1973, while that for women rose slightly from 23.9 to 24.2 during the same period. However, the TFR showed a steep downward trend from 2.14 births per woman in 1973 to 1.50 in 1995 in tandem with a rise in marriage age (see Graph 3.1).

Graph 3.1: Total Fertility Rate and Mean Age at Marriage in Japan since the Second World War



Source: Ministry of Health and Welfare (various years), Vital statistics.

In this chapter, we will first consider the relation between marriage and fertility in Japan. Then, we will briefly review theories of marriage behaviour, and discuss Japanese socio-economic and attitudinal changes relating to marriage. Thereafter, the determinants of female age at marriage will be examined, followed by a presentation of the analytical method and model. Finally, we will analyse female nuptiality probabilities.

3.1 The Importance of Marriage to Fertility

As mentioned in Chapter 1, changing marriage patterns are among the key factors contributing to the recent low fertility rate in Japan. The reason is firstly that extra-marital births have been extremely rare in Japan since the post-war period and most children have been born within marriage. Only 1.0% of total births have occurred outside marriage since 1960

(Kôseishô Jinkô Mondai Kenkyû Jo, 1995). In 1990, the proportion of extra-marital births stood at 1.1 in Japan. This figure is much smaller than the average in the EC countries (=16.1%) in the same year (Coleman, 1993). Thus, the prevalence of the delay of marriage in Japan serves to compress the reproductive period; a fall in the marriage rate reduces the number of reproductive units.

Secondly, divorces are quite rare in Japan. If women go through a divorce soon after marriage, and do not go on to remarry, their fertility rate will be lower than that of continuously married women. However, this association between fertility and divorce may be disturbed by divorce and its succession by remarriage or cohabitation, and it is likely that any new union ultimately will lead to a higher fertility rate for women. When couples divorce and remarry in their late twenties and thirties, they tend to have additional children in order to affirm their new relationship (Clark, Diamond, Spicer, & Chappell, 1993). Hence, the greater frequency of divorces and remarriages may raise the overall level of fertility.

However, the impact of divorce and eventual remarriage on fertility is negligible in Japan. Its divorce rate has remained low during these decades. The Japanese crude divorce rate stood at 1.28 per 1,000 population in 1990, and was almost the same as that in 1950 (0.84 per 1,000 population, see Chapter 6). Moreover, in 1990, the Japanese rate was lower than that of other industrialised countries such as the United Kingdom (2.96) and Sweden (2.53). This special situation in Japan shows the importance of marriage patterns to fertility.

Thirdly, there have been no drastic changes in the fertility control behaviour of Japanese couples over the past decades. Some demographers claim that fertility decline in the Western countries since the 1960s is related to innovation in contraception methods. For example, Westoff and Ryder (1977) argue that the spread of the pill was the main cause of

fertility decline in the US from the late 1960s. Similarly, Murphy (1993a; 1993b) claims that the fall in the British fertility rate in the 1960s and the 1970s was attributable to the increase of contraceptive pill users, and its further reduction in the 1980s was the result of the diffusion of sterilisation.¹

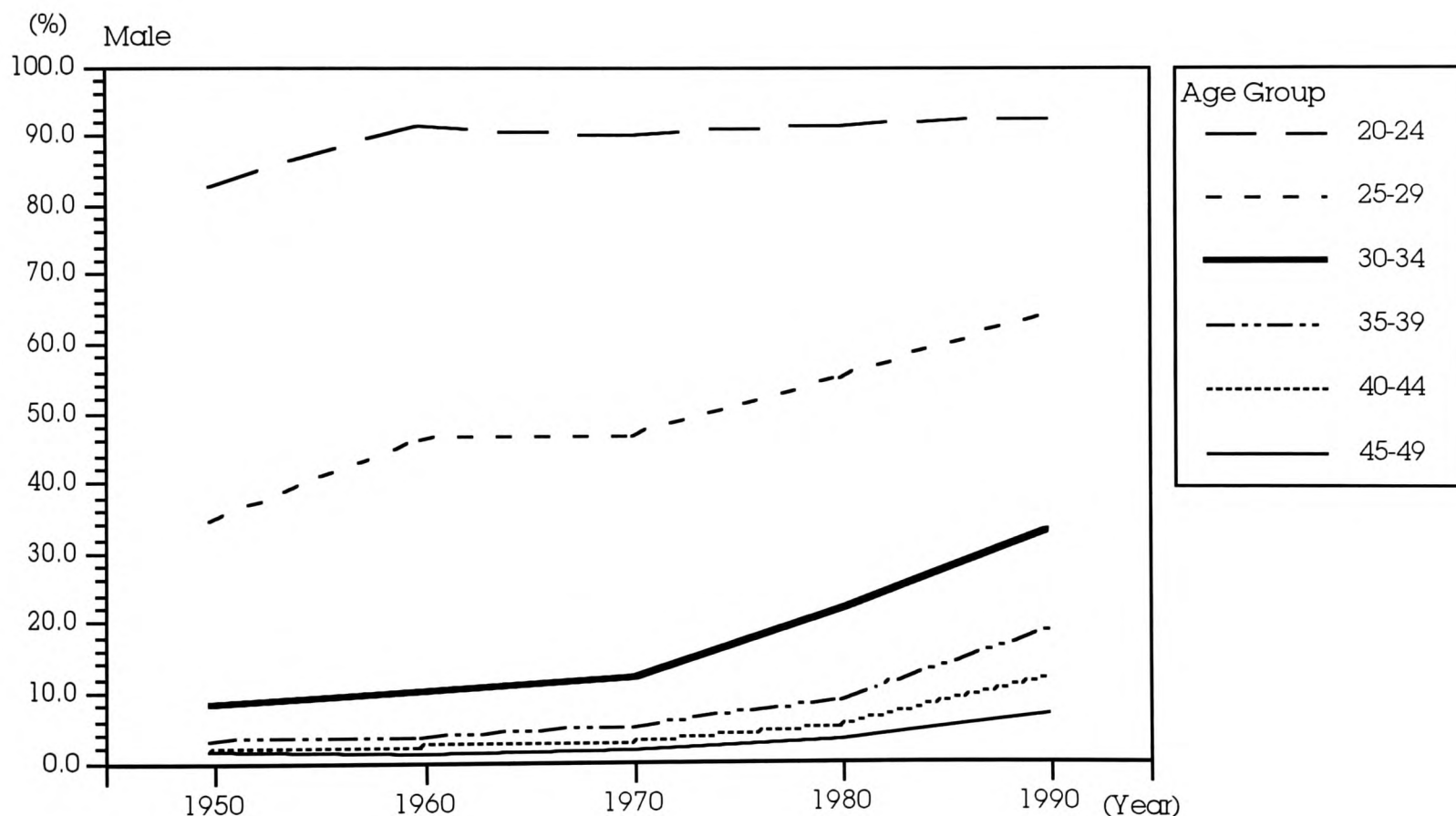
However, this is not the case in Japan. Several rounds of the Family Planning Survey by the Population Problem Research Council demonstrate that the dominant contraceptive method in Japan has been the use of condoms over the last few decades, and the proportion of Japanese couples using condoms has been stable at approximately 65% since 1961 (Mainichi Shimbunsha Jinkômondai Chôsakai, 1992). On the other hand, more effective contraceptive methods such as the pill, the IUD and sterilisation have not gained in popularity among Japanese couples. The percentage of pill and the IUD users stood at 0.6% and 3.7% respectively. Likewise, sterilisation was resorted to by only 7% of all couples. In addition, the percentage of Japanese wives who have never practised contraception has fluctuated at around 15% over the past 20 years, while approximately 30% of Japanese women have experienced abortion over the same period.

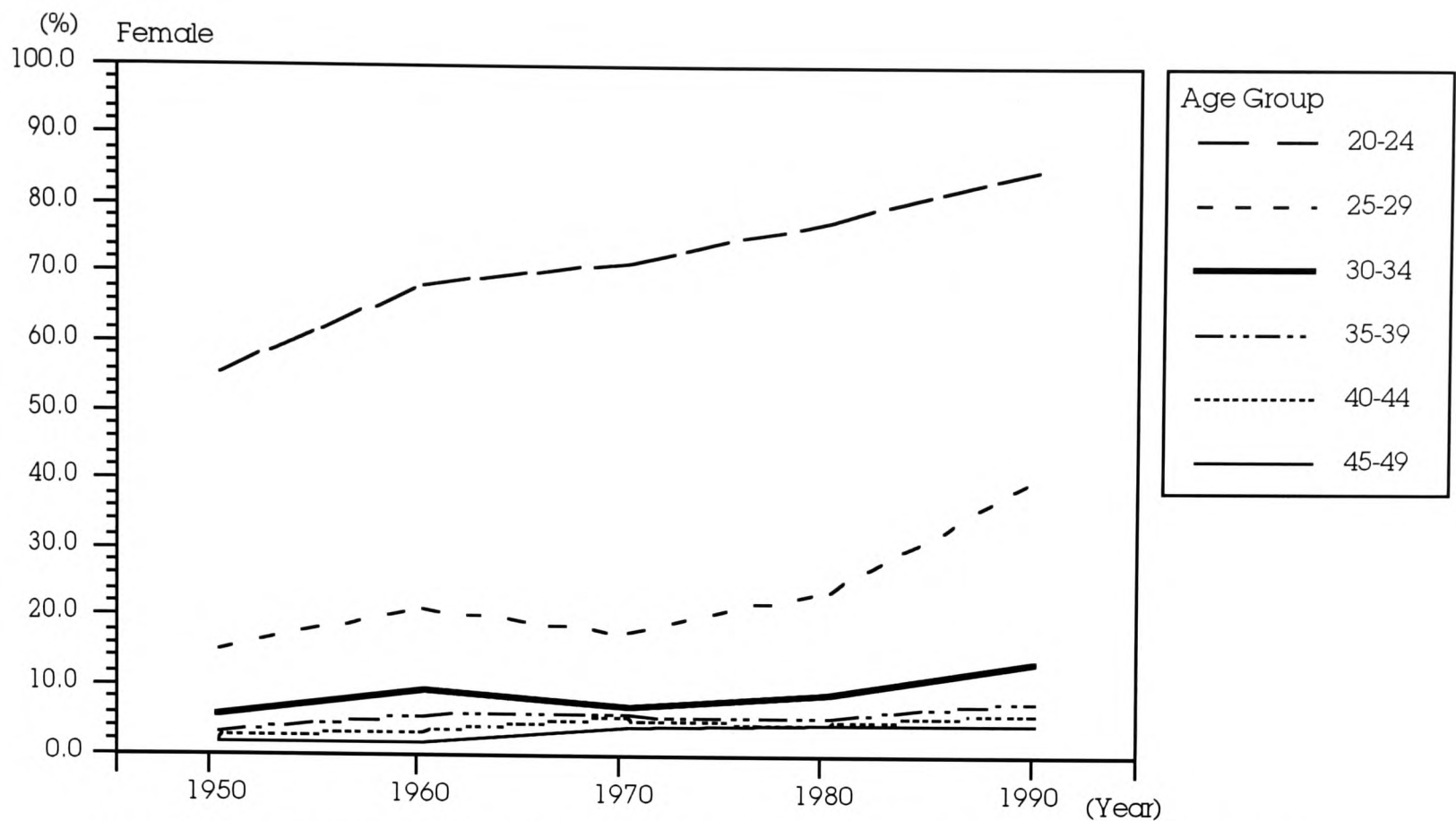
With this evidence in mind, it is unlikely that changing methods of fertility control have any crucial bearing on the prevailing low birth rate in Japan. Rather, women's marriage behaviour plays an important part in determining the Japanese fertility rate, and the level of which is, to a considerable extent, accounted for by women's marriage patterns. Therefore, the analysis of marriage behaviour, especially with regard to women, is essential in the investigation of Japanese fertility patterns. In fact, since the 1970s, female age at marriage has been rising together with

¹ Caution is needed when considering the relationship between fertility decline and contraceptive methods. Superficially, we can find the link between a reduction in fertility and a spread of effective contraception methods. However, explanations of this kind do not take into account the reason why such new methods have become popular as a method of contraception.

a fall in the fertility rate in Japan. The mean age at first marriage for women has steeply risen from 24.3 in 1973 to 25.9 in 1991 and that for men has similarly ascended from 26.7 to 28.4 during the same period (see Graph 3.1). At the same time, entry into married status has also been delayed in Japan. Since 1970, the percentages of male and female singles have soared up in their late twenties and early thirties (see Graph 3.2). For instance, the percentage of women aged 25 to 29 who had never married was only 18% in 1970, while that percentage reached at about 40% in 1990. Moreover, the proportion of women never-married in the 20-24 age group also rose steadily from 71.6% in 1970 to 85.0% in 1990.

Graph 3.2: The Percentage of Never -married persons in Japan, by Age-group, 1950-1990





Source: Management and Coordination Agency (various years), Japanese Population Census.

3.2 Theories of Marriage: Are we *Homo oeconomicus* or *Homo sociologicus*?

Recently, not only Japan but also other industrialised countries have experienced a rise in age at marriage, not necessary to the same degree.² Although several theoretical and empirical studies have already been carried out to discuss the causes for the delay of marriage seen in Western countries³ (Carter, 1976; Cherline, 1992; Easterlin, 1981; Ermish, 1981a; Kiernan, 1985; Murphy, 1987, 1989; Winegarden, 1984), we may say that this demographic phenomenon has mainly been explained from either a socio-economic or an attitudinal viewpoint. More specifically, the central issue in these arguments is whether a rise in age at marriage has been caused by socio-economic or attitudinal factors. In other words, both marriage behaviour and fertility behaviour have been analysed in similar conceptual frameworks. Therefore, we shall limit our review to two influential theoretical models for marriage behaviour, i.e., the economic

² For further details of the comparison of marriage and fertility patterns among industrialised countries, see van de Kaa (1987) and Coleman (1992, 1993).

³ For a discussion of the change of marriage patterns in the U.S., see Cherline (1992).

approach and the ideational approach, in this section. Easterlin's theory about marriage will be dealt with in Chapter 6, as it was originally proposed to explain the longitudinal changes of demographic patterns in the U.S.

The economic approach to marriage behaviour was first put forward by Becker and developed chiefly by his colleagues (Becker, 1973; 1974; Freiden, 1974; Santos, 1975). The important feature of his approach is that 'the principle of comparative advantage' proposed by David Ricardo can be applied to an analysis of marriage behaviour.

This approach begins with two basic theoretical assumptions. The first assumes that men and women allocate their own time to market activity and domestic activity. In the market activity, people work and earn money. On the other hand, people produce 'household commodities' such as meals, quality of health, companionship and children, and consume them in domestic activity in order to maximise their own utility. The second holds that there is a difference between men and women with regard to production efficiency in the two activities. For instance, if men earn a higher wage in the labour market than women, we can think that the men's efficiency in market activity is relatively superior to that of women. Based on these two assumptions, Becker and his colleagues regard marriage as the trading process of surpluses between a single man and woman for maximising their mutual utility. More specifically, if, after marriage, one of the partners with a comparative advantage in market production specialises in market work, and the other with a comparative advantage in household production devotes herself or himself to domestic work, then their total utility will become greater and they will be better off by being married than by remaining single. As a result, they will decide to marry. Conversely, single men and women will not marry and trade their surpluses with each other if the gains from marriage are negative; that is, if each partner perceives that he or she will be worse off by being married than by

remaining single. In short, men and women will marry only if it increases their utility. Otherwise, they will remain single. This is a precise application of 'the principle of comparative advantage'.

From this viewpoint, recent marriage patterns seen in industrialised countries may be regarded as a natural consequence of socio-economic changes since the gains from marriage are on the decrease. More specifically, in a society where there is a large gap between men and women with regard to earning capacity in the labour market, it becomes a good strategy for them to marry. For instance, if a man can earn more money than a woman, a husband would then specialise in market work and a wife in domestic work. The wife would thereby trade part of her domestic products with her husband in exchange for part of his income. However, as is seen in several industrialised countries, if women's earning capacity rises and the level of their wages approaches that of men's wages, women's specialisation in domestic work after marriage brings smaller benefits to them than before. This consequently brings about a delay (or avoidance) of marriage through a reduction in the incentive to marry.⁴

Explanations derived from Becker, both for fertility behaviour and for marriage behaviour, regard individual preference, or utility, as given and unchangeable. Hence, newly emerging marriage patterns are interpreted as the simple consequences of socio-economic changes such as wage levels, under the assumption of a fixed preference. However, whether or not marriage behaviour is entirely accounted for by these factors is debatable. First of all, the economic approach does not satisfactorily explain why cohabitation is favoured over marriage. More specifically, a rise in the mean age at marriage recently in Western Europe is partly due to an

⁴ In addition to the earning capacity, an incentive to marriage is likely to be given, when some commodities are supplied only by marriage. For instance, as long as sexual gratification is obtained primarily through marriage, it will continue to be encouraged. By contrast, if sexual gratification is available outside marriage, marriage may be discouraged. Unfortunately, the economic approach does not discuss the effect of such institutional aspects on marriage explicitly.

increase in cohabitation. In the 1980s, for instance, the proportion of cohabiting women in the 20-24 age group reached 45% in Denmark, 19% in France, 44% in Sweden and 11% in the United Kingdom. Cohabiting couples are legally unmarried, but their living arrangements are considerably similar to those of married couples. A cohabiting couple lives under one roof, as a married couple does. Moreover, cohabitation, in many cases, ends in marriage, serving as a kind of testing marriage (Coleman & Salt, 1992). However, it is difficult to explain why a considerable number of people choose to enter this intermediate stage before marriage only with socio-economic factors such as wage levels. Secondly, according to the economic approach, if the productivity of men and women is completely equal both in the market sphere and the domestic sphere, no man and woman will, in theory, marry, since the comparative advantage between both sexes will disappear. However, it is doubtful whether such an extreme case will arise in the real world. In fact, the ratio of women's wages over men's wages in 1990 was 0.85 in Denmark, 0.75 in Belgium, and the wage gap between men and women was smaller in the former than in the latter (see Chapter 2). Nevertheless, the marriage rate in 1990 was 6.1 per 1,000 population in the Denmark and 6.2 in the Belgium, both countries yielding almost the same figure. This evidence suggests that the marriage pattern is not a simple function of wage levels.

As an alternative explanation, the ideational approach to marriage behaviour emphasises the influence of values and attitudes on recent marriage patterns in Western industrialised countries. This approach, like the ideational theory of fertility decline, holds that, beyond the simple utility calculation of economists, attitudinal and ideational changes have caused a delay of marriage in these countries. Specifically, it is assumed in the ideational approach that the individual preference for marriage is not unchangeable, but is affected by attitudinal and ideational factors. Hence,

if people's attitudes change in a society, an individual preference for marriage is also transformed, which consequently leads to different behavioural patterns (Lesthaeghe, 1983, 1991; Lesthaeghe & Meekers, 1986; Lesthaeghe & Surkyn, 1988; van de Kaa, 1980, 1987). The two approaches depend upon different views regarding human behaviour. The economic approach holds that marriage behaviour is a direct result of cost-benefit calculation--*homo oeconomicus*--; the ideational approach holds that marriage behaviour is affected by attitudinal factors--*homo sociologicus*--.

With reference to the influence of attitudinal changes on demographic patterns, the argument brought forward regarding the ideational theory of fertility decline is applied in the case of marriage behaviour. We summarised from two points the salient features of attitudinal changes which the ideational theory claims that Western society is experiencing (see Chapter 1). In concrete terms, the first point is that the influence of traditional norms and values that regulated individual demographic behaviour in the past, especially religious ones, have been weakening in Western countries. This change allows people to enjoy much freedom of choice in demographic behaviour, as a result of which cohabitation and delaying (or avoiding) marriage have become accepted more broadly in society (Lesthaeghe & Meekers, 1986; van de Kaa, 1987). Secondly, a strong commitment to individualism has manifested itself in Western societies, and kindled aspirations to self-fulfilment in a social sphere rather than a domestic sphere. This attitude motivates individuals to attain their goals in the social sphere and to choose a more self-reliant and independent lifestyle. Consequently, people have become more reluctant to marry (Preston, 1986).

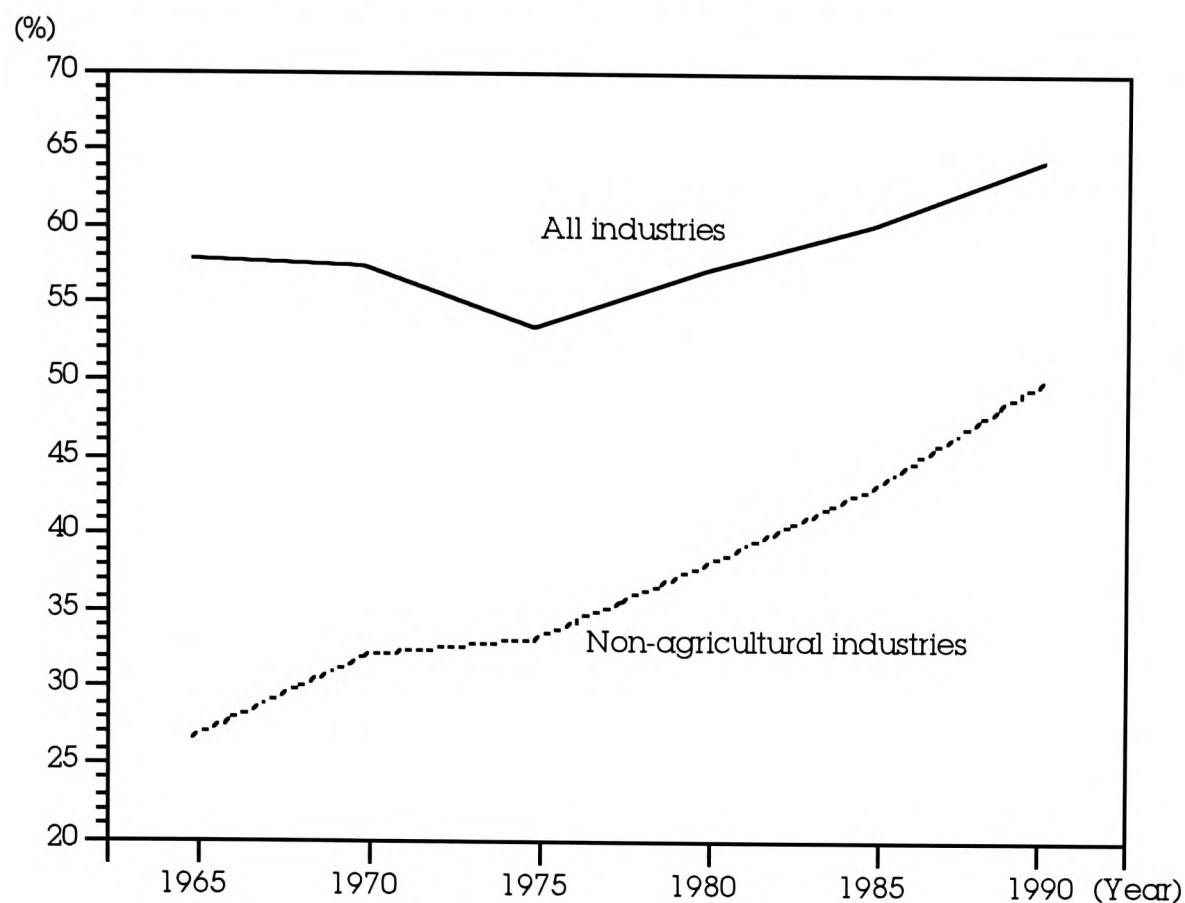
3.3 Recent Socio-economic and Attitudinal Changes in Japan

Turning to recent social circumstances of women in Japan, we can

recognise that Japanese society has undergone socio-economic and attitudinal changes, and pinpoint evidence which shows that women are driven to be discouraged from marrying. Female gains from marriage have recently decreased. Furthermore, women's consciousness of life style, especially marriage and family, has changed considerably at the same time. In this section, we will present some indirect evidence regarding women's changing socio-economic status and consciousness.

First, the labour force participation rate for women who are economically active shows a clear sign of increase from the 1980s (see Graph 3.3) Although this rate in women aged 20-54 remained constant at around 55% in the latter half of the 1960s and declined until 1975 in all industries, it rose steeply from 53.4% in 1975 to 64.3% in 1990. In particular, the tempo of increase for women engaged in non-agricultural industries was remarkably rapid. The labour participation rate of women aged 20-54 rose by approximately 10 points from 38.0% in 1980 to 50.0% in 1990, whereas it was rose only slightly from 26.6% in 1965 to 32.2% in 1975. Because the percentage of female employees in non-agricultural industries is regarded as a proxy for paid employment outside the home, these figures indicate that a growing number of women enjoy many opportunities for paid work outside the home. In addition to the expansion of female job opportunities, a gap between men's and women's wages has narrowed. The ratio of women's to men's hourly wages in regular workers aged 25 to 29 was 61.4% in 1960, while it reached 81.7% in 1990 (Osawa, 1993).

Graph 3.3: The Labour Participation Rate of Women Aged 20 to 54

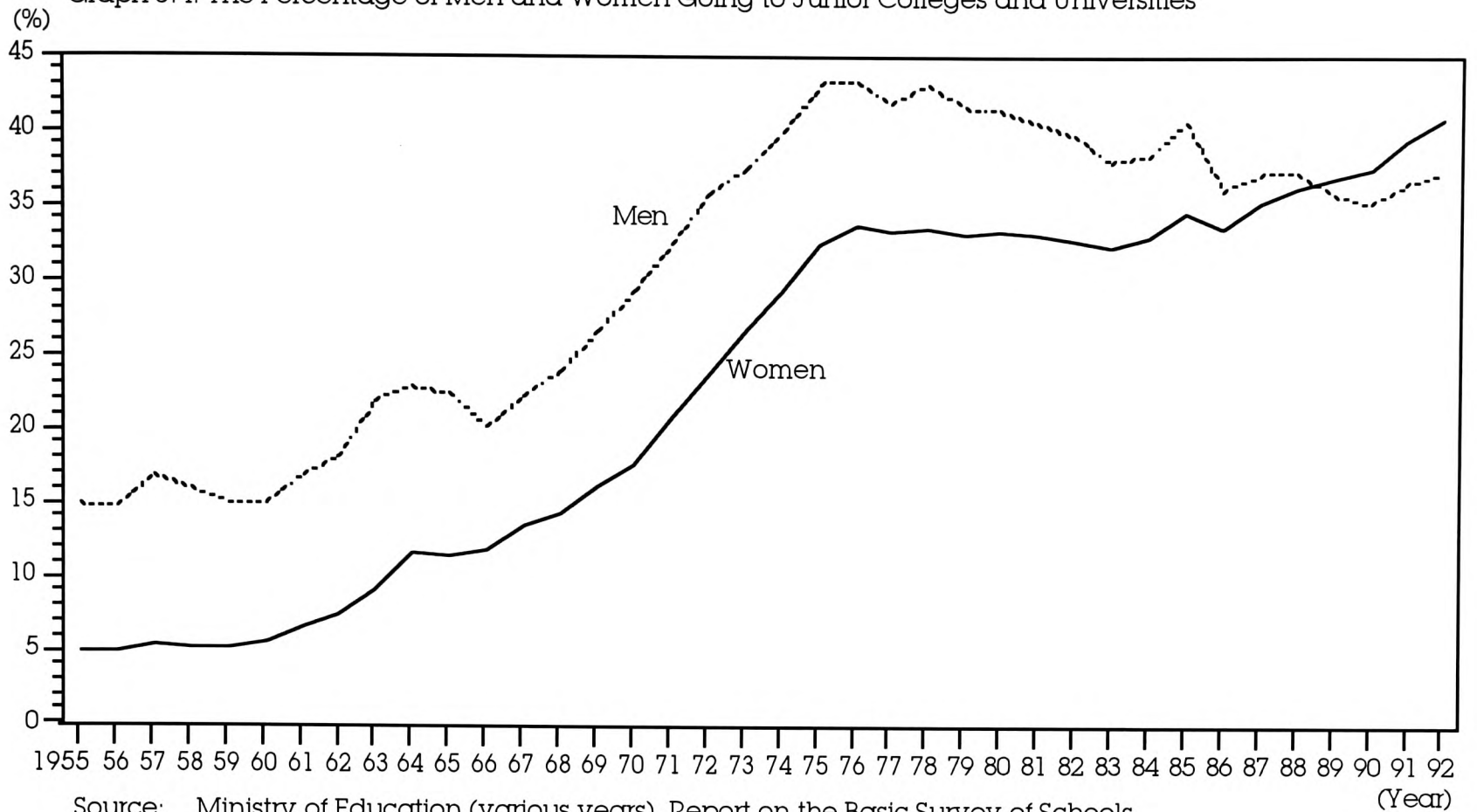


Source: Management and Coordination Agency (various years), Annual Report on Labor Force Survey.

Secondly, the level of education in women has also increased remarkably (see Graph 3.4). In 1955, only 5% of women of eligible age were enrolled in two-year junior colleges⁵ or four-year universities, compared with 15% of men. However, in 1992, these figures rose drastically to 41% for women and 37% for men, as a result of which the enrolment ratio for women surpassed that for men. Nevertheless, women tend to go to junior college, while men tend to go to university. According to the human capital theory (Becker, 1975), a rise in women's educational attainment enhances their labour productivity through an investment in human capital. Hence, the rising educational level of women naturally leads to the expansion of female paid employment after university graduation. Indeed, the proportion of female university graduates gaining employment upon graduation rose steeply from 68% in 1955 to 81% and 82% in 1991, while that of male graduates rose slightly from 75% to 82% (Monbu Shô, various years).

⁵ The 2-year junior college is a type of college offering less strenuous higher education combined with vocational training.

Graph 3.4: The Percentage of Men and Women Going to Junior Colleges and Universities



Source: Ministry of Education (various years), Report on the Basic Survey of Schools.

Based on Becker's economic approach, the above socio-economic changes are triggers which have brought about a delay in female marriage in Japan. More specifically, if women do not have enough employment opportunities and there is a considerable wage gap between men and women, the gains from marriage will be large and women's earnings lost on their retreat from the labour market will be small. In such a case, entering into marriage is a good strategy to maximise their utility. However, as women's economic conditions in the labour market approach men's conditions--caused in part by a rise in the female enrolment rate at higher education--single men and women will not need to marry and trade their surpluses from the economic standpoint. Consequently, as women's earning capacity rises, a woman's incentive to marry will diminish. In fact, a multivariate analysis of aggregated prefectural level data since the 1970s indicates that female hourly wages have a reducing effect on women's marriage probability⁶ in Japan (Ogura & Dekle, 1992).

⁶ Caution is needed when we interpret the statistical result of this study, because it may

Then, are the recent marriage patterns attributable only to simple reactions of changes in objective factors, such as women's job opportunities and educational attainment? Or do attitudinal factors also affect these patterns?

In terms of religious factors, Japan lies in a different context from European countries, for the social influence of Christianity is negligible in Japan while its other religious doctrines do not tend to intervene in the family sphere. Only Confucianism prescribes moral virtue in terms of family. Thus, it seems unnecessary to consider the effect of religious secularisation on changes in Japanese family formation. Indeed, the proportion of Japanese people who had no religious faith was 65% in 1958, and the figure held at no less than 67% in 1993 (Tôkei Sûri Kenkyûzyo, 1994).

However, it is likely that progressive and individualistic attitudes have become stronger than before. We can point out some evidence of these trends by taking up attitudes to marriage by Japanese females. The various rounds of the government's National Opinion Survey on Women⁷ (Sôrifu, 1972, 1979, 1987, 1990) shows that more Japanese women have become individualistic. This survey included a question on how respondents aged over 20 viewed the marriage of women. The response categories offered were: (1) 'it is better to get married because a woman's happiness lies in marriage'; (2) 'it is better to get married because emotionally and financially a woman can have a stable life'; (3) 'it is better for a woman to get married because it is the natural thing for a human being to do'; (4) 'if a woman can be independent, she does not need to get married'; (5) 'because marriage restricts women's freedom, it is better not ever to get married'; and (6) 'do not know'. Respondents could choose only one category.

suffer the ecological fallacy (see Langbein & Lichtman, 1978; Robinson, 1950).

⁷ Since, in the 1990 round, response categories were different from those in previous rounds, we cannot make a longitudinal comparison of the results of all rounds. As such, we did not present the results of the 1990 round.

For the purpose of convenience, we categorise (4) and (5) as an individualistic response about marriage. Between the 1972 and the 1987 round of this survey, the proportion of respondents expressing the individualistic view rose from 13.5% to 24.7% for women and from 7.6% to 15.7% for men. In contrast, the percentage of respondents to category (1) fell from 39.7% to 28.0% for women and from 36.2% to 32.5% for men. These results suggest that individualistic attitudes have considerably spread among Japanese people, and a considerable proportion of women no longer seek their happiness only in marriage. In particular, this attitude is seen more sharply in the younger than the older generation. In the 1987 round, about 15% of women aged 30 to 35 fell into category (4), whereas more than 30% of women aged 20 to 24 came within this category. Since we cannot judge whether this difference of attitude among the generations was derived from a life-cycle effect or a cohort effect, it still remains to be seen whether the younger cohort continues to hold the same attitudes in its later years. In spite of such a drawback, it is likely that a substantial number of marriageable women have an individualistic attitude toward their life style.

Let us now turn to traditional values in Japan. As is well known, Japanese family relations are, to a considerable extent, influenced by Confucianism, which has contributed heavily to the ethical formations of Japanese people and has also affected their household formation (Dore, 1953). These ethics have strongly emphasised intergenerational ties and filial obligation. However, it seems that these ethics have also been gradually changing over time. To illustrate this trend, we will take up the changes of attitude towards the care of elderly parents.

The Population Problems Research Council of the Mainichi Newspaper Company conducted surveys on this issue from 1963 up to 1990 (Mainichi Shimbunsha Jinkômondai Chôsakai, 1992). One of the

questions posed to female respondents under the age of 50 in these surveys was, 'Do you intend to depend on your children in your old age?' and its answering categories were: (1) 'expect to depend'; (2) 'do not expect to depend'; and (3) 'never thought of it'.

As far as these surveys show, for the past several decades, the parents' dependence on their children in old age has clearly become unpopular, and a traditional sense of filial obligation has become attenuated to a considerable degree. While 33.3% of female respondents said that they expected to depend on their children in 1963, those who gave the same answer in 1990 made up only 17.5% of the respondents. On the other hand, the percentage of 'do not expect to depend' rose steeply from 47.7% in 1963 to 61.7% in 1990. During the same period, the 'never thought of it' category fluctuated between 15% and 20%.

Theoretically, when parents rely on children's support in their latter years, people are motivated to get married and to have children by a specified age in order to secure their well-being in their latter years⁸ (Morgan & Hiroshima, 1983a; Smith, 1981, 1986). Under these circumstances, a delay in marriage or voluntary celibacy may jeopardise parents' well-being in old age. A good strategy is to have children who will come of age before their parents' retirement. However, this strategy will lose its attractiveness, if aged people can live an independent life without assistance from their children, and a sense of dependence upon their children for their life becomes diluted through a weakening of filial obligations alongside improvements in the pension system. Accordingly, we may argue that recent marriage patterns in Japan are derived from a decline in the influence of Confucian ethics.

It is clear that the evidence presented in this section is insufficient and shows only part of recent changes in women's socio-economic positions

⁸ In a sense, filial obligation can be regarded as a kind of inter-generational wealth-flow mechanism (see Caldwell, 1982).

and attitudes in Japan. Therefore, we cannot draw definite conclusions. However, we can definitely recognise that Japanese women have entered a new stage in their socio-economic and attitudinal position. The evidence suggests that socio-economic and ideational factors have changed female marriage behaviour. The rise in women's economic power may reduce their gains from marriage in the way that the economic approach assumes. At the same time, however, women's new values and attitudes may cause them to delay marriage, and remain single in their pursuit of new lifestyles. However, few studies have been carried out to show how these two factors, socio-economic and ideational, affect Japanese female marriage behaviour. Thus, it is necessary to examine the relation between the two factors and marriage patterns in detail.

3.4 Analytical Framework of Marriage Behaviour

We have introduced the main theories of marriage behaviour and discussed socio-economic and cultural changes in Japan. The heart of the previous discussion was that, taking the evidence of socio-economic and attitudinal changes into consideration, we can infer that recent female marriage patterns have been influenced by both factors--the economic and the attitudinal.

To reiterate, the purpose of this chapter is to examine what factors determine female marriage behaviour by using our survey data. Before showing the results of the analyses, in this section, we will briefly picture an analytical framework, referring to the previous discussion. Figure 3.1 illustrates the analytical framework of marriage behaviour. We may roughly classify explanatory variables examined in this analysis into four categories: (a) socio-economic; (b) value and attitudinal; (3) natal background; (d) other specific factors.

(a) Socio-economic factors

Our analysis will consider the effect of two socio-economic variables on marriage. The first variable is the level of education, which will negatively affect marriage patterns in some channels. In general, women with a high level of education tend to stay unmarried or to marry later in life than women with a lower level of education. First of all, since student marriages are relatively rare, a rise in women's level of education will raise their marriage age, as long as there is not a large time lag between their graduation from school or university, and marriage (Marini, 1978). In the second place, as has been discussed in the economic approach to marriage behaviour, women with a higher level of education have more earning power in the labour market than those who are less-educated. As a result, higher levels of education will decrease women's gains from marriage, and their incentive to marry will also be attenuated.

The second variable is occupation. Two conflicting hypotheses are put forward with regard to its effect on marriage. One is that good employment opportunities for women such as professional and managerial jobs will encourage marriage (Goode, 1963). This assumes that the enhancement of female earning power makes it more viable to maintain a new household after marriage. In particular, where 'neo-localism' is a strong rule of household formation, a rise in household income brought by a wife's work will have a positive relation to nuptiality (Hajnal, 1965, 1983; Schofield, 1989). On this hypothesis, women engaged in highly-salaried employment such as a professional or a managerial job may marry early and be unlikely to remain single.

In contrast, a negative effect on marriage behaviour is expected from Becker's economic theory which assumes that a key factor in marriage decision-making lies in gains from marriage. According this theory, a woman whose income is equal to that of her partner will have only small

prospective gains from marriage. Hence, it is expected that, owing to the diminution of gains from marriage, women engaged in high-salary jobs will be less willing to trade surpluses with men than those engaged in low-salary jobs. This will consequently make women more reluctant to marry and induce them to delay (or avoid) marriage.

However, this hypothesis may not be relevant to people engaged in agriculture and those who are self-employed. Becker's theory implicitly assumes that, after marriage, one devotes oneself either to housework or work outside the home. But production work outside the home is, to some extent, compatible with housework for women engaged in agriculture and those who are self-employed, since their home and work place are usually the same. In such working conditions, even if a woman has a high earning capacity, she can continue to work after marriage. Therefore, taking gains from marriage into consideration will have little effect on her marriage decision. In such a case, her employment is likely to have a positive effect on her marriage, because she will be in a better economic position to maintain a household. With this point in mind, we hypothesise that small business proprietors and women engaged in agriculture are likely to get married relatively earlier, and are less likely to remain single.

(b) Value and attitudinal factors

As discussed in Section 3.2, the proponents of the attitudinal explanation claim that the attenuation of traditional norms and values and the spread of individualism are causes of recent demographic changes in Western countries (Ariès, 1980; Lesthaeghe, 1983, 1991, 1995; Lesthaeghe & Meekers, 1986; Lesthaeghe & Surkyn, 1988; Simons, 1986; van de Kaa, 1987). This argument may hold true for recent demographic changes in Japan. For instance, Atoh (1993) suggests that the reinforcement of individualistic attitudes causes a delay in marriage in Japan.

In order to examine the influence of these two types of attitudinal factors on demographic behaviour, our survey asked several questions to measure views and attitudes of respondents concerning marriage, children and the family. These questions are classified into two categories: 'progressiveness' and 'individualism'. The first category indicates variations in the acceptance of traditional norms, and the second category signifies variations in the level of commitment to individualism.

The extent to which a respondent accepts or affirms non-traditional values and family types is employed as an indicator of the 'progressiveness'. More specifically, its extent was first scaled by attitudes with reference to progressive family types including homosexual couples, common-law marriages, and unmarried women with children. These new types of family are contrary to the traditional model family, since mainstream families are still made up of a child and a heterosexual legally-married couple. Thus, the more acceptable these new family patterns are to a respondent, the more progressive her position will be. In the second place, the degree of affirmation to aged parents' care and co-residence with parents is also employed as an index of the progressive attitude. In particular, since Confucianism teaches that the care of aged parents is an important filial obligation, the attitude toward aged parents can be regarded as a proper index of traditional values in Japan. In these indices, the less committed a respondent is to these traditional family relationships, the more oriented she is to progressive attitudes. In addition, since an attitude towards the traditional gender role between husband and wife (a husband for market work and a wife for housework), was asked for in the survey, this question is also used as an index of the 'progressiveness'.

The individualism category indicates how much weight people place on marriage and family in their lives, compared to self-fulfilment and goal attainment. For the purpose of measuring the degree of commitment to

individualism, we asked respondents to compare the level of relative importance they set as to marriage, children and self-fulfilment. More specifically, we asked questions to discover whether they felt divorce and an unmarried life were justifiable in the realisation of one's own well-being and goal in life. Because a more individualistic person attaches great importance to self-fulfilment, she will agree to a divorce and accept an unmarried life to attain her own goal. In addition, questions dealing with one's own well-being as a parent in comparison to one's children's well-being were indices of individualism from a parental aspect. Thus, individualistic people should show a response pattern which put more importance on parental well-being than on their children's well-being.

Based on the above classification, we hypothesise that progressive and individualistic attitudes have a negative effect on marriage (postponing marriage and reducing marriage probability).

(c) Natal background factors

According to conventional sociological wisdom, the family is the first crucible in which personalities are moulded (Parsons & Bales, 1955). What one learns in one's natal family can, of course, be altered and reshaped, as well as cemented and fixed, by other agencies of socialisation such as a school (Havighurst, 1953; Erikson, 1963, 1980). None the less, it is likely that certain features of one's natal family and its surrounding regional conditions, or individual background attributes, affect marriage behaviour (Elder, 1977). We shall, hence, examine two variables regarding background characteristics: natal household occupation and rural-urban origin.

The first variable is occupation of a respondent's father. According to the result of the survey carried out by the Institution of Population Problems (Kôsei Shô Jinkô Mondai Kenkyûjo, 1994a, 1994b), men engaged in agriculture and manual work tend to get married earlier than those in

managerial work and small business proprietors. Assuming that children internalise their parents' behaviour patterns, their own marriage behaviour will be influenced by patterns internalised through the socialisation process in the home in childhood. Therefore, it is expected that daughters of a father engaged in agriculture or in manual labour will marry earlier than daughters of a father engaged in a different occupation.

The same is the case with the place of birth.⁹ Since a community is one of the agents of socialisation, the type of place where people spend their childhood is likely to affect their marriage patterns. Generally speaking, rural areas reveal an earlier and more universal marriage pattern than urban areas.¹⁰ Given that regional characteristics of rural areas motivate people to marry under the power of socialisation, women of rural origin will marry earlier and more universally than those of urban origin.

However, the extent of influence of the two variables depends on the relative strength of socialising power by each agent. Needless to say, not only family and community but also other agents such as school contribute to socialising and moulding behavioural patterns. If school has a more influential socialising power in determining female marriage behaviour, the above two variables will not affect marriage patterns significantly. Therefore, we cannot hypothesise the significance of the two variables *a priori*.

(d) Other specific factors

⁹ Regarding place of birth, while it would certainly be useful to know where a respondent was born, it can be inappropriate to ask for this information in a Japanese questionnaire due to a culturally specific form of discrimination practised historically in Japan with regard to the so-called 'Burakumin' caste. People belonging to this caste are identifiable chiefly through details of their place of birth. As such, surveys carried out in Japan do not as a rule place respondents in a position where they are required to supply information of this kind. In our survey, we asked only for the most general information in this regard, such as where the respondent's birthplace was urban or rural.

¹⁰ According to the tenth Japanese Fertility Survey, the mean age at marriage for men who had married over the previous 5 years was 28.34 in urban areas and 28.26 in rural areas. On the other hand, that for women stood at 25.90 in urban areas and at 25.36 in rural areas (see Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b).

Marriage types and inheritance types, two variables peculiar to Japanese cultural settings, are considered in this analysis.

In England, parents have not actively intervened in the selection of their children's marriage partner, except, at least in some periods, among the aristocracy. The choice of a partner is made according to the child's own will, and this is one of the most marked features in English marriage (Coleman, 1984; Coleman & Haskey, 1986; Macfarlane, 1987, 1978). However, this has not been the case in Japan. Even in 1987, 26.6% of all marriages over the previous five years had been arranged, whereas the figure of love matches reached 73.8% (Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b). This indicates that more than one in five marriages was mediated by relatives, parents and other related persons, and that an arranged marriage is still a typical way of mating in Japan.

Theoretically, types of marriage such as a love match or an arranged marriage, are expected to affect the timing of marriage. From a conventional point of view, an arranged marriage is a connection between two families of the same social stratum, in which an early marriage is desirable to consolidate an affiliation between two families, as soon as possible. However, this may not be true of recent arranged marriages in Japan. Several rounds of the Japanese Fertility Survey conducted by the Institute of Population Problems show that the mean age of women brought together by a love match was lower than that by an arranged marriage (Atoh, 1994). Otani (1991) suggests that these results are derived from the fact that, in recent years, arranged marriage has been a final resort to find a partner. In contemporary Japan, most women who wish to marry through a love match before reaching a specified age initially attempt to search for their partner on their own. However, if they cannot find a suitable partner by a specified age, they make an arranged marriage. As a result, people joined in matrimony through an arranged marriage tend to be

older than those who marry through a love match.

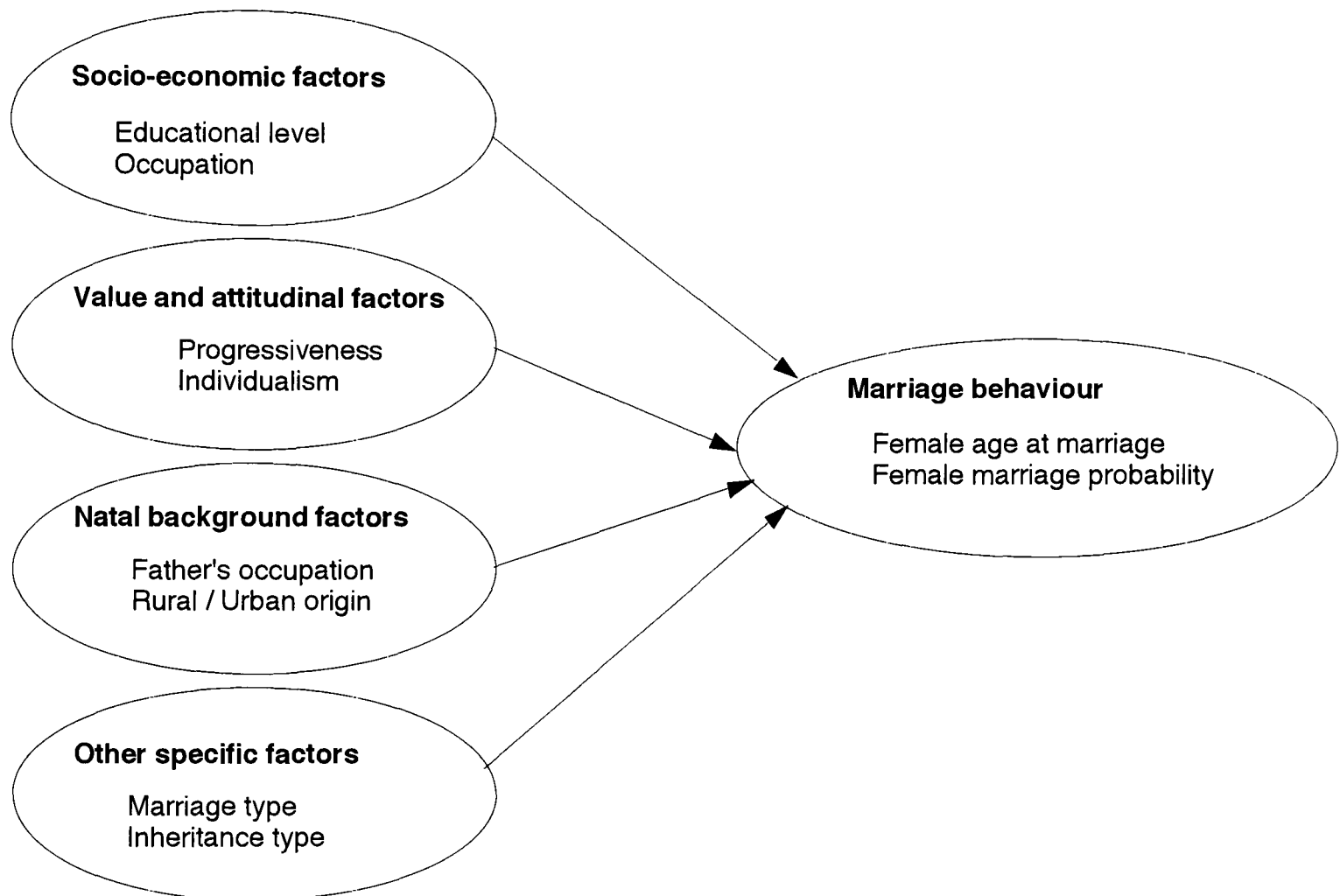
With this point in mind, we hypothesise that a love match will exert a hastening effect on marriage timing, whereas an arranged marriage will affect it in the opposite way.

The inheritance type is likely to be a variable influencing marriage patterns as well. If a family line is maintained by primogeniture, the first-born child will suffer from stronger social pressure in favour of marriage than a second and a third child. It is a desirable strategy for the first-born child to marry as early as possible and have a child to succeed in the family line. On the other hand, a second and a third child are free from this duty. Hence, their choice in marriage will be primarily based on their own will, and they will remain single or marry later than the first-born child. In particular, because Japanese society has held the cultural tradition of the patrilineal family system, or the so-called 'Ie', parental pressure to marry is most likely to be put on the first-born son. Even in the case of daughters, it seems possible that a first-born daughter without any male siblings is strongly urged to marry early, because she must serve in the place of a male heir for the continuation of her family line. To investigate the effect of inheritance type on marriage patterns, we classify respondents into two groups: the successor and the non-successor. First-born daughters without any male siblings comprise the former, whereas first-born daughters with male siblings, and second- or later-born daughters make up the latter.

The effect of this variable on marriage is, however, unclear in contemporary Japan. First, if maintaining a family line is no longer a principal concern in Japanese society, this variable will not affect marriage behaviour. For instance, the proportion of people who thought that continuing the family line was important fell remarkably from 63% in 1958 to 22% in 1994 (Tôkei Sûri Kenkyûzyo, 1994). Secondly, we can expect an inverse causal relationship between marriage and inheritance types. If a

mate is selected for a first-born child with more care and if much more time is spent in searching for a suitable partner, his or her marriage timing will be postponed, even though a sense of maintaining a family line lingers. Thus, the effect of this variable cannot be determined *a priori* because both positive and negative effects can be expected.

Figure 3.1: Analytical Framework of Marriage Behaviour



3.5 Differences in Age at Marriage

The final goal of this analysis is to examine female marriage patterns by applying multi-variate analyses to our survey data. Before developing a multi-analysis model, we will first provide a description of female mean age at marriage obtained from the survey data, relating to the explanatory variables presented in the analytical framework. In this description, we will exclude remarried women because their marriage ages are quite different from those of first-married women. Therefore, the marriage ages dealt with here are those of married women who have never experienced remarriage.

Table 3.1 presents the marriage ages according to explanatory variables falling into the socio-economic factors of the analytical framework. As might be expected, a clear positive connection was observed between the mean age at marriage and the level of education.¹¹ The marriage age of junior or high school graduates (=24.3) was more than a year lower than that of vocational school or junior college graduates. Furthermore, women who enjoyed a university education married about a year later than those who terminated their education in a vocational school or a junior college.

Concerning occupation before marriage, leaving aside the 'student' and 'others'¹² categories, the mean age at marriage was lowest among agricultural workers (=22.4), while the highest age was seen among professionals (=25.6). It is worth noting that, in terms of the mean age at marriage, the manual group was lowest (=23.6) and the professional group was highest (=25.6) among the three categories (professional, clerical and manual). Moreover, the mean age of the clerical group was 25.1, standing between the manual group and the professional group. Probably because female earning capacity in the labour market is highest in the professional or managerial group, and lowest in the manual group, the age difference in the three categories is consistent with the argument proposed by the economic theory of marriage.

¹¹ In the present Japanese educational system, education is compulsory up to the junior high school level. However, since the latter half of the 1960s, the percentage of students going to senior high school has reached almost 100%. Hence, we combined the two educational categories into one.

¹² In coding questionnaires, if respondents marked 'others' on the question about their occupation and specified their occupation, we re-coded it according to the occupational classification of the Japanese national census. If their occupation was not specified, we coded it into the 'others' category.

Table 3.1: Female Age at Marriage according to Socio-economic Variables

Education	Mean	Standard Deviation	N	Occupation before Marriage	Mean	Standard Deviation	N
				Agriculture	22.35	1.86	20
Junior or Senior High School	24.34	2.94	652	Small usiness	24.94	2.88	85
				Professional or managerial	25.63	2.79	159
Vocational School or Junior College	25.69	2.96	215	Clerical or sales	25.13	2.65	511
				Manual	23.59	2.55	112
University or Higher	26.45	2.55	110	Not working	24.92	2.91	70
				Student	21.88	1.77	19
Others	28.15	2.34	2	Others	24.70	2.80	8
Total	24.88	3.01	979	Total	24.88	3.01	984

Source: Survey Data

Source: Survey Data

Note: Agriculture: Agriculture, forestry, or fisheries
 Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
 Professional or managerial: professional workers or managerial workers
 Clerical or sales: clerical workers or salespersons
 Manual: Manual workers such as factory workers, craftspersons
 Not working: housework or not working

Next, we shall look at the relationship between marriage age and attitudinal factors in Table 3.2. Fourteen questions were asked to measure respondents' attitudes toward marriage, children and family in this survey. Questions A to H fall into the 'progressiveness' dimension introduced in the previous section, and Questions I to N are included in the 'individualism' dimension.

With regard to 'progressiveness', we found that, in Questions A (never married), B (common-law marriage), C (unmarried women with children), G (husband works/wife at home) and H (co-residence with parents), more progressive women tended to postpone marriage, although the age difference among the answering categories varied from question to question. For instance, in Question A, the mean age at marriage of women answering 'completely acceptable' reached 25.9, while that of the 'completely unacceptable' category stood at 24.4. Hence, it follows that approximately

a year's difference existed between both extreme answers to the question. In contrast, no consistent linear trend was discovered in the remaining questions. For example, in Question E, the least progressive women, who strongly disagreed on pre-marital sexual intercourse, were highest in the mean age at marriage (=25.4), while women in the 'disagree' group showed the lowest marriage age (=24.4). Likewise, in Question D (homosexual relationship), the marriage age of the 'unacceptable' group was the second highest among all answering categories.

With respect to 'individualism' dimension, the overall impression is that a systematic trend was not observed in terms of the mean age at marriage, and only responses to Questions K (mother home during infancy years) and N (unmarried life for goal-pursuing) showed a consistent connection between the marriage age and the attitude. Therefore, it can be argued that the individualistic variables did not have a distinct effect on the mean age at marriage. For instance, in Question M, which is a direct index of the relationship between marriage and self-fulfilment, the highest mean age was 25.2, which appeared in women who disagreed with this view. On the other hand, women who agreed strongly with it yielded the second highest mean age (=24.8). Furthermore, the marriage age of the remaining two groups ('agree' and 'disagree strongly') was lower than that of the above two groups.

Table 3.2: Relationship between Female Age at Marriage and Attitudinal Variables

A: Never getting married throughout life				B: Common-law marriage			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Completely acceptable	25.94	3.15	84	Completely acceptable	25.88	3.09	94
Acceptable	25.20	3.01	171	Acceptable	25.39	2.75	157
Unacceptable	24.93	2.79	421	Unacceptable	24.95	2.72	394
Completely unacceptable	24.35	3.18	301	Completely unacceptable	24.29	3.31	332
D.K. or N.A.	24.18	1.89	5	D.K. or N.A.	24.18	1.89	5
Total	24.88	3.01	982	Total	24.88	3.01	982
C: Unmarried women bearing and rearing children				D: Homosexual relationships			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Completely acceptable	25.46	3.56	81	Completely acceptable	25.71	2.95	35
Acceptable	25.14	2.79	144	Acceptable	24.98	2.89	60
Unacceptable	24.99	2.89	375	Unacceptable	25.63	2.94	207
Completely unacceptable	24.56	3.07	377	Completely unacceptable	24.65	3.00	658
D.K. or N.A.	24.18	1.89	5	D.K. or N.A.	23.30	3.06	22
Total	24.88	3.01	982	Total	24.88	3.01	982
E: A man and a woman love each other, their pre-marital sexual intercourse is permissible.				F: It is a child's duty to care for aged parents.			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Agree strongly	25.13	2.94	175	Agree strongly	25.04	3.01	379
Agree	25.15	2.97	445	Agree	24.78	2.98	507
Disagree	24.35	3.88	271	Disagree	25.11	3.17	63
Disagree strongly	25.43	3.36	63	Disagree strongly	25.56	1.94	10
D.K. or N.A.	23.09	3.30	28	D.K. or N.A.	23.59	3.30	23
Total	24.88	3.01	982	Total	24.88	3.01	982

G: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

	Mean	Standard Deviation	N
Agree strongly	24.21	3.46	93
Agree	24.49	2.88	425
Disagree	25.13	2.82	303
Disagree strongly	26.22	3.04	130
D.K. or N.A.	23.80	2.78	31
Total	24.88	3.01	982

I: Parents duty is to do their best for their children, at the expense of their own well-being.

	Mean	Standard Deviation	N
Agree strongly	25.21	3.07	135
Agree	24.07	2.98	376
Disagree	25.19	2.97	331
Disagree strongly	26.27	3.15	124
D.K. or N.A.	23.99	3.01	16
Total	24.88	3.01	982

K: When a child is small, a mother should stay home without working outside the home.

	Mean	Standard Deviation	N
Agree strongly	24.21	3.27	275
Agree	25.09	2.84	497
Disagree	25.29	2.74	125
Disagree strongly	25.86	3.02	63
D.K. or N.A.	23.30	3.06	22
Total	24.88	3.01	982

H: It is better to live with parents after marriage.

	Mean	Standard Deviation	N
Agree strongly	23.94	3.47	47
Agree	24.54	2.93	319
Disagree	25.17	2.98	468
Disagree strongly	25.19	2.85	125
D.K. or N.A.	23.63	3.39	23
Total	24.88	3.01	982

J: When personalities do not match, a divorce is reasonable.

	Mean	Standard Deviation	N
Agree strongly	26.49	3.09	130
Agree	25.02	2.97	319
Disagree	24.32	2.98	341
Disagree strongly	24.65	2.78	163
D.K. or N.A.	24.23	3.29	29
Total	24.88	3.01	982

L: Children are important to a successful marriage.

	Mean	Standard Deviation	N
Agree strongly	24.24	2.90	440
Agree	25.20	3.03	411
Disagree	26.76	2.72	66
Disagree strongly	24.17	3.21	50
D.K. or N.A.	24.17	3.22	15
Total	24.88	3.01	982

M: Even After marriage, one should not sacrifice one's own goals in life for one's family.

N: It is not essential to get married if it means sacrificing one's own goal in life.

	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Agree strongly	24.86	3.10	141	Agree strongly	25.24	3.12	285
Agree	24.80	3.04	513	Agree	24.88	2.84	528
Disagree	25.22	2.85	260	Disagree	24.48	3.20	123
Disagree strongly	24.55	2.89	52	Disagree strongly	23.98	4.09	20
D.K. or N.A.	23.72	3.18	16	D.K. or N.A.	23.43	2.92	26
Total	24.88	3.01	982	Total	24.88	3.01	982

Note: D.K. or N.A. : do not know or no answer

The inquiring sentence of these questions is "What do you think of the following life styles and views?"

Let us turn to the father's occupation. The fact that the father's occupation and the respondent's occupation before marriage had a similar pattern in terms of the mean age at marriage has been identified (see Table 3.3). More specifically, the earliest mean age at marriage appeared in the agriculture category, whose value stood at 23.9. On the other hand, daughters of professional or managerial fathers got married latest, their mean age at marriage being 25.6. The difference between the two groups was 1.5 years. In addition, among the three groups (manual, clerical and professional) the mean age of the professional group was highest, and that of the manual category was lowest. The clerical category stood between these two categories with regard to the mean age at marriage.

A salient feature was seen with respect to the natal residential types (see Table 3.3). While women who had grown up in rural areas, on average, married at the age of 24.1, those from urban areas married at age 25.2. The difference between the two groups is about one year. However, caution is needed in interpreting the age difference between the two groups, for the difference is not necessary attributable to where a woman had grown up. Since more people are likely to be engaged in agriculture, forestry and

fishery in rural areas, it follows that respondents from such areas will have fathers who, in most cases, are employed in agriculture and like categories. Hence, Early marriage among women in rural areas may find its source in their fathers' occupations, and not in the geographical region in which they had grow up.

Table 3.3: Female Mean Age at Marriage according to Natal Variables

Father's Occupation	Mean	Standard Deviation	N	Residential Type before finishing primary school	Mean	Standard Deviation	N
Agriculture	23.91	2.91	190				
Small business	25.27	2.82	220	Urban	25.20	3.05	663
Professional	25.61	3.19	247				
Clerical or sales	24.59	2.87	122	Rural	24.14	2.73	308
Manual	24.18	2.75	146				
Not working	25.55	2.64	19	Foreign	28.95	4.18	6
Others	26.04	3.11	37				
Total	24.88	3.01	981	Total	24.89	3.01	977

Source: Survey Data

Source: Survey Data

Note: Agriculture: Agriculture, forestry, or fisheries
 Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
 Professional or managerial: professional workers or managerial workers
 Clerical or sales: clerical workers or salespersons
 Manual: Manual workers such as factory workers, craftspersons
 Not working: housework or not working

Finally, we will look at the relation between marriage age and the remaining explanatory variables. Table 3.4 shows the female mean age at marriage by marriage type and inheritance type. Compared to the arranged marriage group where the age reached 25.3 years, the mean age of the love match group was slightly lower at 24.8 years. The difference between the two was approximately 0.6 years. These findings support Otani's argument that, in recent years, arranged marriage has been a final resort to find a partner (Otani, 1991). On the other hand, a marginal gap in mean age at marriage was observed between the 'successor' (an heiress for

the continuation of her family line) and the 'non-successor' (a non-heiress for the continuation of her family line) category as well. Female successors of a family line, on average, married about 0.7 year earlier than the non-successors.

Table 3.4: Female Mean Age at Marriage according to Other Specific Variables

Marriage Type	Mean	Standard Deviation	N	Inheritance Type	Mean	Standard Deviation	N
Love Match	24.75	2.63	720	Successor	25.45	3.29	201
Arranged Marriage	25.31	3.46	234	Non-Successor	24.74	2.92	781
Other	24.81	3.51	28	Total	24.88	3.01	982
Total	24.88	3.01	982				

Source: Survey Data

Source: Survey Data

Note:

Successor: The first-born daughter without any male siblings

Non-Successor: The first-born daughter with a male sibling or the second- or later-born daughter

We cannot, of course, draw a definite conclusion from this description of marriage age, as it does not partial out the effect of covariates. Thus, determining the factor that have a statistically significant effect on women's marriage age will require further investigation. In what follows, we will carry out multi-variate analyses to examine the true effect of these variables.

3.6 Analytical Method of Age at Marriage

Multiple classification analysis¹³ (MCA) is here used to test our hypothesis regarding the determinants of female age at marriage. This analysis is most suitable for a quantitative dependent variable. In this model, the score of the dependent variable of each individual is treated as a sum of the average of all cases and the effects of predictor variables. The model can be

¹³ For further details of the multiple classification analysis, see Andrews, F., Morgan, J., Sonquist, J., & Klein, L. (1973).

expressed as follows:

$$Y_{ij...n} = \bar{Y} + a_i + b_j + \dots + e_{ij...n}$$

where

$Y_{ij...n}$ = The score (on the dependent variable) of individual n who falls into category i of predictor A, category j of predictor B, etc.

\bar{Y} = grand mean on the dependent variable

a_i = the effect of membership in the i^{th} category of predictor A

b_j = the effect of membership in the j^{th} category of predictor B

$e_{ij...n}$ = error term for this individual

In our analysis, the dependent variable is female age at marriage, and the predictor variables are the categorical variables presented in the analytical framework. In the multiple classification analysis, the direction of the effect of a predictor variable is indicated as each of two sorts of deviations from the grand mean (=the mean of the entire sample). One is the unadjusted deviation, which indicates a gross effect of a predictor without controlling for other predictor variables. The other is the adjusted deviation, which shows a net effect of a predictor by controlling the effect of other predictor variables. The η and the β are used for assessing the importance of a predictor, or the degree of the relation between a dependent variable and predictor variables. η is an index for assessing the simple bivariate relationship between the predictor and the dependent variable, and the β measures the net degree of relationship between the predictor and the dependent variable while controlling for all other predictors.

We employed four MCA models that did not include interaction terms. Indeed, it may be possible that the age at which a woman marries has an interaction effect such as that between the level of education and occupation. However, because our models include many predictor variables for main effects, introducing interaction terms is likely to make the

interpretation of results too complicated. Therefore, our models excluded interaction terms, and we confined our analyses to main effects on age at marriage. In addition, all models included age groups as a predictor variable in order to control the influence derived from data particularity. Because most women in the younger age groups were single at the time of the survey, the analysis of marriage patterns using this survey data covered only those women who were already married at the time. Hence, to eliminate the effect brought on by this censoring of data, we used age groups as predictor variables.

3.7 Results of the Multi-variate Analysis of Age at Marriage

The first model¹⁴ of MCA was carried out in order to examine the effects of predictors falling into the socio-economic, the natal and the other specific factors. The result is displayed in Table 3.5.

Among all predictor variables except the age group, a statistically significant effect was found out in terms of the father's occupation, the level of education, and the female occupation before marriage. All these values of β were very large. More specifically, with respect to educational level, as might be expected, the value of the adjusted deviation was largest in the university graduates' category, and was lowest in the high school graduates'. The former category raised the age at marriage by 1.11 years from the grand mean, and the latter lowered it by 0.37 years. The adjusted deviation of the women who went to a vocational school or a junior college was 0.60, standing between the two educational categories. These results means that the higher the women's educational attainment, the later they

¹⁴ It is not to be denied that predictor variables are dependent upon each other. For example, the influence of attitudinal factors on demographic behaviour may be more powerful among women with high educational qualifications than among those with low educational qualifications. In theory, it is desirable that a statistical model employs interaction terms as predictor variables. In practice, however, the inclusion of interaction terms into a model makes the interpretation of results complicated, even unmanageable. Hence, we excluded interaction variables from the models examined in this chapter, confining our analyses to the main effects of independent variables on demographic patterns.

marry.

In terms of women's occupation before marriage, women in the agriculture group yielded the adjusted deviation of -1.51, and married the earliest with the exception of the student group. Compared to the manual group, both the professional and clerical group showed a late marriage pattern. The age at marriage in the manual group was 0.61 years lower than the grand mean, while the professional group raised the age by 0.42 years from the grand mean, and the clerical group raised it by 0.31 years. These findings support Becker's economic explanation for marriage behaviour.

Interestingly, contrary to our hypothesis, the small business proprietor category showed a delaying effect on the age at marriage, its adjusted deviation being 0.18. This is probably attributable to the fact that women in this category do not enjoy enough opportunities to meet a future partner. According to the tenth Japanese Fertility Survey in 1991, more than 40% of 'love match' couples who had been married for more than 15 years answered that they had met each other for the first time in the work place (Kôsei Shô Jinkô Mondai Kenkyûjo, 1994b). As small businesses have fewer employees, it may be inferred that women working in these small businesses have less of a chance of encountering a future partner.

As in the case with the women's occupation before marriage, women whose fathers' occupation fell into the agricultural and manual categories tended to marry earlier. Daughters of fathers working in agriculture married 0.58 years earlier than the average age for all women. On the other hand, women in the professional category tended to marry later, and its adjusted deviation was 0.27. However, compared with the women's educational levels and the female occupations, the β 's values of the father's occupations were relatively small, which suggests that the effect of the father's occupation on age at marriage is not as great as that of women's

educational levels and occupations.

Residence in an urban or rural area, inheritance types and marriage types did not show any significant effect on the marriage age, although the signs of these variables were consistent with the results of uni-variate analyses. For instance, the adjusted deviation of the 'love match' group was -0.02, while that of the 'arranged marriage' group was 0.05. However, these values were not statistically significant at the 10% level. In contemporary Japan, therefore, these factors show no significant effect on the age at which women marry.

Table 3.5: The Result of MCA of the First Model

Predictor Variables	N	Unadjusted Deviation	η	Adjusted Deviation	β
Age Group					
20-24	33	-2.35		-2.34	
25-29	119	-0.55		-0.32	
30-34	155	1.71		1.43	
35-39	193	0.82		0.14	
40-44	243	-0.52		0.03	
45-49	198	-0.81		-0.66	
			0.32		0.27**
Father's Occupation					
Agriculture	184	-0.99		-0.58	
Small Business	212	0.40		0.47	
Professional	234	0.73		0.27	
Clerical	117	-0.28		-0.22	
Manual	142	-0.59		-0.39	
Other	52	0.98		0.83	
			0.23		0.15**
Residential Type before finishing primary school					
Urban	639	0.35		0.05	
Rural	302	-0.74		-0.11	
			0.15		0.03
Inheritance Type					
Successor	187	0.57		0.15	
Non-Successor	754	-0.14		-0.04	
			0.09		0.02
Educational Level					
High School	627	-0.52		-0.37	
Junior College	207	0.80		0.60	
University	107	1.54		1.11	
			0.26		0.18**
Female Occupation before Marriage					
Agriculture	19	-2.54		-1.51	
Small Business	82	0.06		0.18	
Professional	153	0.74		0.42	
Clerical	494	0.24		0.31	
Manual	108	-1.29		-0.61	
Not Working	67	0.04		0.17	
Student	18	-2.97		-3.44	
			0.28		0.21**
Marriage Type					
Love Match	710	-0.14		-0.02	
Arranged Marriage	231	0.44		0.05	
			0.01		0.01
Multiple R Squared					0.222
Multiple R					0.471
Grand Mean = 24.86					

* p<.05 ** p<.01

Note: Father's Occupation

Agriculture: Agriculture, forestry, or fisheries

Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries

Professional: professional workers or managerial workers

Clerical: Clerical workers or salespersons

Manual: Manual workers such as factory workers, craftspersons

Other: Not working and other

Female Occupation before Marriage

Agriculture: Agriculture, forestry, or fisheries

Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries

Professional: professional workers or managerial workers

Clerical: Clerical workers or salespersons

Manual: Manual works such as factory workers, craftspersons

Successor: The first-born daughter without any male siblings

Non-Successor: The first-born daughter with a male sibling or the second- or later- born daughter

Educational Level

High School: Junior or High School

Junior College: Vocational School or Junior College

University: University or Higher

The second model was employed to examine the effect of attitudinal variables on marriage age. The predictor variables used in this model were divided into two groups. One group was composed of variables which showed a significant effect in the first model; the other consisted of variables which fell into the 'progressiveness' category (excluding Japanese traditional variables).

Table 3.6 presents the results of the second model. Among the six attitudinal predictor variables, two variables, QA (never married) and QF (husband works/wife at home), were significant at the 1% level, and their values of adjusted deviation indicate that women marries later as they show more progressive attitudes. For example, the adjusted deviation of 'completely acceptable' in QA was 0.15 and that of 'acceptable' was 0.11. By contrast, the 'unacceptable' and the 'completely unacceptable' category yielded a negative adjusted deviation, its value being -0.03 and -0.07 respectively. On the other hand, the attitudes to common-law marriage, unmarried women and homosexual relationships did not reveal a statistically significant effect on the age at marriage. Moreover, in QC (unmarried women with children), QD (homosexual relationship) and QE (couple-premarital sex permissible), the signs of adjusted deviation were

inconsistent. For example, the 'completely acceptable' group in QC yielded the adjusted deviation of 0.96, whereas the 'completely unacceptable' group also showed a positive adjusted deviation (=0.02). In contrast, a negative adjusted deviation was observed in the remaining two categories in this question. These findings suggest that these variables did not significantly affect Japanese female marriage patterns.

It is of note that, compared to the first model, the multiple R^2 of the second model was greater by about 0.12. This means that the latter model had more explanatory power than the former. It can be argued from this evidence that attitudinal factors exert an influence on the age at marriage. However, compared with the β s' values of the significant attitudinal predictor variables (=QA and QF), those of the socio-economic variables, which had a significant effect in the first model, were greater and statistically significant even in the second model. Hence, we can conclude that the effects of 'progressiveness' variables were not as great as those of the socio-economic variables.

Table 3.6: The Result of MCA of the Second Model

Predictor Variables	N	Unadjusted Deviation	η	Adjusted Deviation	β
Age Group					
20-24	33	-2.35		-2.24	
25-29	119	-0.55		-0.37	
30-34	155	1.71		1.20	
35-39	193	0.82		0.17	
40-44	243	-0.52		0.09	
45-49	198	-0.81		-0.62	
			0.29		0.24**
Father's Occupation					
Agriculture	184	-0.99		-0.57	
Small Business	212	0.40		0.37	
Professional	234	0.73		0.16	
Clerical	117	-0.28		-0.16	
Manual	142	-0.59		-0.18	
Other	52	0.98		0.49	
			0.22		0.12*
Educational Level					
High School	627	-0.52		-0.38	
Junior College	207	0.80		0.53	
University	107	1.54		1.23	
			0.25		0.19**
Female Occupation before Marriage					
Agriculture	19	-2.54		-0.78	
Small Business	82	0.06		0.12	
Professional	153	0.74		0.37	
Clerical	494	0.24		0.22	
Manual	108	-1.29		-0.57	
Not Working	67	0.04		0.11	
Student	18	-2.97		-3.96	
			0.28		0.19**
QA					
Completely acceptable	80	1.07		0.15	
Acceptable	165	0.30		0.11	
Unacceptable	406	0.04		-0.03	
Completely unacceptable	290	-0.52		-0.07	
			0.18		0.13**
QB					
Completely acceptable	91	0.98		0.63	
Acceptable	151	0.50		0.27	
Unacceptable	379	-0.06		0.08	
Completely unacceptable	320	-0.60		-0.39	
			0.19		0.11
QC					
Completely acceptable	78	0.60		0.96	
Acceptable	139	0.25		-0.19	
Unacceptable	361	0.11		-0.13	
Completely unacceptable	363	-0.33		0.02	
			0.11		0.10
QD					
Completely acceptable	34	0.82		-0.59	
Acceptable	59	-0.11		-0.68	
Unacceptable	203	0.73		0.51	
Completely unacceptable	645	-0.25		-0.08	
			0.14		0.11
QE					
Agree strongly	173	0.20		-0.30	
Agree	439	0.22		0.09	
Disagree	267	-0.59		-0.26	
Disagree strongly	62	0.51		1.34	
			0.13		0.10
QF					
Agree strongly	92	-0.68		-0.52	
Agree	420	-0.40		-0.19	
Disagree	300	0.24		0.13	
Disagree strongly	129	1.30		0.76	
			0.21		0.12**
Multiple R Squared				0.358	
Multiple R				0.597	
Grand Mean =	24.86				

* p<.05 ** p<.01

Note:

QA: Never getting married throughout life

QB: Common-law marriage

QC: Unmarried women bearing and rearing children

QD: Homosexual relationships

QE: A man and a woman love each other, their pre-marital sexual intercourse is permissible.

QF: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

The third model tested whether individualistic attitudes have an influence on age at marriage. Table 3.7 displays the results of the third model. In terms of the individualism variables, QH (mother home during infancy years) and QL (unmarried life for goal-pursuing) had a significant effect on the marriage age at the 5% level. In the two significant predictor variables, as women became more individualistic, the values of the adjusted deviations rose linearly. For example, the mean age at marriage in women who agreed strongly with the QH's view was lower than the grand mean by 0.38 years, while women who agreed with this view had a mean age that was 0.06 years higher than the grand mean. In contrast, women who disagreed strongly with that view raised the mean age at marriage by 0.25 years and those who disagreed with it married 0.16 year later. This evidence suggests that a strong commitment to self-fulfilment in a sphere outside the home postpones marriage. On the other hand, the remaining attitudinal predictor variables were insignificant and their adjusted deviations did not show a systematic relation between the age at marriage and the women's attitude. QG (divorce) is a good example of this. The 'agree strongly' and the 'disagree strongly' categories yielded a positive adjusted deviation, which indicates that women in these categories delay their marriage. In contrast, the remaining two categories revealed a negative deviation, which suggests that women in these categories marry earlier.

Also, the third model's multiple R^2 was 0.240, which was greater only by 0.02 than that of the first model. This indicates that, compared to the

latter model, the former yielded a slight improvement in explanatory power. Thus, it can be argued that individualistic factors did not have a strong influence on marriage age.

Table 3.7: The Result of MCA of the Third Model

Predictor Variables	N	Unadjusted Deviation	η	Adjusted Deviation	β
Age Group					
20-24	33	-2.35		-2.05	
25-29	119	-0.55		-0.38	
30-34	155	1.71		1.37	
35-39	193	0.82		0.12	
40-44	243	-0.52		0.09	
45-49	198	-0.81		-0.53	
			0.30		0.25**
Father's Occupation					
Agriculture	184	-0.99		-0.60	
Small Business	212	0.40		0.27	
Professional	234	0.73		0.33	
Clerical	117	-0.28		-0.11	
Manual	142	-0.59		-0.26	
Other	52	0.98		0.55	
			0.22		0.12**
Educational Level					
High School	627	-0.52		-0.42	
Junior College	207	0.80		0.58	
University	107	1.54		1.29	
			0.27		0.20**
Female Occupation before Marriage					
Agriculture	19	-2.54		-1.37	
Small Business	82	0.06		0.15	
Professional	153	0.74		0.38	
Clerical	494	0.24		0.33	
Manual	108	-1.29		-0.73	
Not Working	67	0.04		0.18	
Student	18	-2.97		-3.44	
			0.28		0.21**
QG					
Agree strongly	128	1.59		0.63	
Agree	315	0.12		-0.32	
Disagree	337	-0.58		-0.04	
Disagree strongly	161	-0.24		0.47	
			0.11		0.10
QH					
Agree strongly	270	-0.69		-0.38	
Agree	486	0.18		0.06	
Disagree	123	0.39		0.16	
Disagree strongly	62	0.96		0.25	
			0.15		0.13*
QI					
Agree strongly	428	-0.65		-0.31	
Agree	400	0.31		0.28	
Disagree	64	1.87		1.16	
Disagree strongly	49	0.57		-1.43	
			0.18		0.10
QJ					
Agree strongly	132	0.32		0.08	
Agree	366	-0.82		-0.21	
Disagree	322	0.30		0.14	
Disagree strongly	121	1.38		1.13	
			0.10		0.11
QK					
Agree strongly	137	-0.03		-0.14	
Agree	500	-0.10		-0.21	
Disagree	253	0.32		0.57	
Disagree strongly	51	-0.35		-0.61	
			0.08		0.10
QL					
Agree strongly	281	0.33		0.06	
Agree	520	-0.04		0.04	
Disagree	121	-0.42		-0.15	
Disagree strongly	19	-0.87		-0.27	
			0.15		0.12*
Multiple R Squared				0.24	
Multiple R				0.49	
Grand Mean =	24.86				

* p<.05

** p<.01

Note: QG: When personalities do not match, a divorce is reasonable.
QH: When a child is small, a mother should stay home without working outside the home.
QI: Children are important to a successful marriage.
QJ: Parents duty is to do their best for their children, at the expense of their own well-being.
QK: Even After marriage, one should not sacrifice one's own goals in life for one's family.
QL: It is not essential to get married if it means sacrificing one's own goal in life.

Finally, we will examine the effects of attitudes toward Japanese traditional values with the fourth model. This model included the attitudes to aged parents' care and co-residence with parents after marriage as predictor variables. Table 3.8 displays its result. The attitudes to co-residence with parents had a significant and linear relation to the dependent variable. Women showing the most negative attitude to co-residence with parents (=‘disagree strongly’) delayed their marriage by 0.27 years from the grand mean, and those with the second most negative attitude to it (=‘disagree’) postponed their marriage by 0.15 years. In contrast, women in the ‘agree strongly’ category revealed a 0.06 year younger marriage age than the overall average, and those in the ‘agree’ category entered marriage 0.04 years earlier. However, attitudes to aged parents' care showed an insignificant and inconsistent effect. The signs of the two intermediate categories (=‘agree’ and ‘disagree’) in this variable were negative, while those of both extreme categories (=‘agree strongly’ and ‘disagree strongly’) were positive. Only ten women answered ‘disagree strongly’ in QM (care of aged parents), so the sign of this answering category is probably not statistically reliable. If this category were excluded, we would conclude that women less committed to their aged parents' care delay marriage.

As in the case of the third model, the multiple R^2 of the fourth model (=0.240) was almost equivalent to that of the first model, which implies that the explanatory power of the third model is slightly greater than that of the first model. It follows that attitudes toward Japanese traditional norms exert little influence on age at marriage.

Table 3.8: The Result of MCA of the Fourth Model

Predictor Variables	N	Unadjusted Deviation	η	Adjusted Deviation	β
Age Group					
20-24	33	-2.35		-2.34	
25-29	119	-0.55		-0.44	
30-34	155	1.71		1.36	
35-39	193	0.82		0.10	
40-44	243	-0.52		0.08	
45-49	198	-0.81		-0.61	
			0.30		0.26**
Father's Occupation					
Agriculture	184	-0.99		-0.58	
Small Business	212	0.40		0.47	
Professional	234	0.73		0.22	
Clerical	117	-0.28		0.27	
Manual	142	-0.59		-0.39	
Other	52	0.98		0.83	
			0.23		0.15**
Educational Level					
High School	627	-0.52		-0.39	
Junior College	207	0.80		0.53	
University	107	1.54		1.32	
			0.26		0.20**
Female Occupation before Marriage					
Agriculture	19	-2.54		-1.51	
Small Business	82	0.06		0.14	
Professional	153	0.74		0.42	
Clerical	494	0.24		0.23	
Manual	108	-1.29		-0.54	
Not Working	67	0.04		0.11	
Student	18	-2.97		-3.53	
			0.26		0.19**
QM					
Agree strongly	372	0.13		0.25	
Agree	497	-0.12		-0.13	
Disagree	62	0.22		-0.52	
Disagree strongly	10	0.68		0.43	
			0.05		0.08
QN					
Agree strongly	46	-0.95		-0.87	
Agree	313	-0.36		-0.41	
Disagree	459	0.27		0.25	
Disagree strongly	123	0.29		0.44	
			0.13		0.14**
Multiple R Squared				0.223	
Multiple R				0.472	
Grand Mean =	24.86				

* p<.05 ** p<.01

Note :

QM: It is a child's duty to care for aged parents.

QN: It is better to live with parents after marriage.

3.8 Tempo Aspect versus Quantum Aspect of Marriage Pattern

As far as the analyses of marriage age in the previous section show, socio-economic factors such as educational level and occupation are powerful determinants of female marriage patterns in Japan. Women with a university degree and those engaged in professional and managerial jobs tended to delay marriage. However, attitudinal factors affected female

marriage behaviour at the same time. In particular, progressive attitudes had a postponing effect on age at marriage. Hence, we can conclude that both socio-economic and attitudinal factors contribute to the recent delay of marriage.

Despite these findings, it should be noted that the analyses in the previous section dealt only with marriage age, and did not examine the probability of marriages occurring. More specifically, these analyses were carried out only for married women, and did not deal with single women. Therefore, although we may conclude from the results of these analyses that socio-economic and attitudinal factors affected female marriage age, this conclusion is relevant only for married women. In other words, the previous analyses dealt with only one side of recent marriage patterns in Japan. We can easily imagine another side of marriage behaviour. For example, it is very likely that women with a strong preference for self-fulfilment choose not to delay their marriage but to reject marriage itself (Eldridge & Kiernan, 1985). In this case, attitudinal factors will affect the probability of women's marrying.

In demographic studies, a sharp line is drawn between the tempo and quantum aspects of marriage. Nevertheless, since the previous analyses focused only on female age at marriage, it remains an unsettled question whether socio-economic and attitudinal factors have an influence on the probability of women's entering marriage in Japan (the quantum aspect of marriage). Hence, we attempt to examine the determinants of the probability of marrying in the following sections.

3.9 Differences in Nuptiality Probability

Since the 1970s, female marriage age has risen in tandem with a decrease in the proportion of married women in Japan. In particular, a marked upward trend in the percentage of singles is seen in younger women aged

from 20 to 34 (see Graph 3.2). For instance, while only 18% of women in the 25-29 age group remained single in 1970, the figure rose sharply to 40% in 1990. Hence, we will, in this section, select women up to the age of 34¹⁵ from our survey data, and provide a description of the proportion of those women marrying according to the variables proposed in the analytical framework.

Table 3.9 displays the proportion of women marrying according to the socio-economic variables. In terms of educational level, the higher the level of women's education is, the lower the percentage of women marrying becomes. In particular, university graduates revealed the lowest proportion of women marrying. About 60% of women in the 20-34 age group married in the junior or senior high school category, while only 41.7% of women with a university or higher degree in the same age group married. Concerning occupation, the proportion of women marrying was highest in the agricultural category, with 62.5% of women in this category married by the age of 34. Interestingly, there was a clear increase in the proportion of women marrying among the three categories (professional, clerical and manual). The percentage of married women who belonged to the professional category was 48.6%, whereas this percentage in the clerical category stood at 53.4%. In addition, the percentage of women marrying reached fully 57.5% in the manual group. This evidence suggests that low-salaried women are more likely to enter marriage than high-salaried women.

¹⁵ We excluded divorcées and widows in our analysis. By definition, the divorcées and widows are included in an unmarried category. However, since they have married before, their marriage behaviour is thought to differ from that of women who have never married. Thus, the inclusion of divorcées and widows is very likely to disturb the association between individual attributes and nuptiality probability. In addition, remarried women were excluded because we did not obtain any information about their previous marriages.

Table 3.9: Female Proportions Marrying up to Age 34 according to Socio-economic Variables

Education	% of women marrying	N	Occupation	% of women marrying	N
Junior or senior high school	58.8	262	Agriculture	62.5	8
Vocational school or junior college	46.4	196	Small business	56.3	32
University or higher	41.7	108	Professional or managerial	48.6	138
Others	50.0	4	Clerical or sales	53.4	307
Total	51.2	570	Manual	57.5	40
			Not working	35.0	20
			Others	30.4	23
			Total	51.2	568

Source: Survey Data

Source: Survey Data

Note:

Occupation

Agriculture: Agriculture, forestry, or fisheries

Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries

Professional or managerial: professional workers or managerial workers

Clerical work or sales: Clerical workers or salespersons

Manual: Manual workers such as factory workers, craftspersons

Not working: Housework or not working

Others: Students and others

Married women were classified according to their occupation before marriage and unmarried women were classified according to their present occupation.

Let us turn to the relationship between the proportion of women marrying and attitudinal factors. The percentages of married women in each attitudinal question are given in Table 3.10. As in the case of age at marriage, Questions A to H fall into the 'progressiveness' category and Questions I to N are included in the 'individualism' category. In the 'progressiveness' category, Questions B (common-law marriage), C (unmarried women with children), E (couple-premarital sex permissible) and H (co-residence with parents) revealed a consistent relationship. The more tolerant the women were to new family styles, the lower the probability of their marrying. Question B, which inquired into the attitude towards an alternative to 'traditional' marriage, is a case in point; 40.8% of women who

found common-law marriage completely acceptable married by the age of 34, whereas about 56% of women who did not completely accept common-law marriage married at the same age. On the other hand, no systematic relation between individual attitudes and proportions marrying was observed in Questions A, D, F and G. For example, the highest percentage (=52.4%) appeared in the 'unacceptable' group of Question A, while the 'completely acceptable' group displayed the lowest percentage (=48.6%). The remaining two categories, 'acceptable' and 'completely unacceptable', held at around 50%.

With respect to the 'individualism' category, in Questions I (parents devoted to children over self-interest), J (divorce), K (mother home during infancy years) and N (unmarried life for goal-pursuing), the percentage of women marrying decreased as they had more individualistic attitudes. A good example of this trend is illustrated in Question N, which is a direct index of comparison in importance between marriage and self-fulfilment. The percentage of married women who agreed with Question N's view strongly stood at 48.0%, while that of women who disagreed strongly with this view reached as much as 58.3%. Moreover, the proportion of married women was 52.0% in the 'agree' category and 53.7% in the 'disagree' category. This evidence suggests that more individualistic women are reluctant to marry. However, in Question L, there was no discernible relation between proportions marrying and individualistic attitudes. The highest percentage (=53.5%) appeared in the 'agree strongly' group, and the lowest percentage (=49.5%) was in the 'agree' group. In the case of Question M, the percentage in the 'disagree strongly' category was highest (=58.3%), whereas that of the 'agree strongly' was lowest (=47.4%). However, the figure in the 'agree' and the 'disagree' categories were 51.7% and 51.5% respectively, the difference between the two being negligible.

Table 3.10: Relationship between Female Proportions Marrying up to Age 34 and Attitudinal Variables

A: Never getting married throughout life	% of women marrying	N	B: Common-law marriage	% of women marrying	N
Completely acceptable	48.6	72	Completely acceptable	40.8	71
Acceptable	50.0	84	Acceptable	46.4	84
Unacceptable	52.4	267	Unacceptable	52.4	267
Completely unacceptable	50.4	141	Completely unacceptable	56.3	142
D.K. or N.A.	50.0	2	D.K. or N.A.	50.0	2
Total	51.0	566	Total	51.0	566

C: Unmarried women bearing and rearing children	% of women marrying	N	D: Homosexual relationships	% of women marrying	N
Completely acceptable	38.8	67	Completely acceptable	47.2	36
Acceptable	40.6	192	Acceptable	50.7	146
Unacceptable	58.7	189	Unacceptable	49.0	155
Completely unacceptable	62.0	116	Completely unacceptable	52.5	223
D.K. or N.A.	50.0	2	D.K. or N.A.	50.0	6
Total	51.0	566	Total	51.0	566

E: A man and a woman love each other, their pre-marital sexual intercourse is permissible.	% of women marrying	N	F: It is a child's duty to care for aged parents.	% of women marrying	N
Agree strongly	48.1	207	Agree strongly	53.8	234
Agree	52.0	302	Agree	49.8	233
Disagree	54.3	46	Disagree	47.3	74
Disagree strongly	60.0	5	Disagree strongly	47.4	19
D.K. or N.A.	50.0	6	D.K. or N.A.	50.0	6
Total	51.0	566	Total	51.0	566

G: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.	% of women marrying	N
Agree strongly	52.3	44
Agree	53.3	244
Disagree	47.6	164
Disagree strongly	50.0	108
D.K. or N.A.	50.0	6
Total	51.0	566

H: It is better to live with parents after marriage.	% of women marrying	N
Agree strongly	57.1	14
Agree	53.0	206
Disagree	51.4	210
Disagree strongly	46.6	127
D.K. or N.A.	55.6	9
Total	51.0	566

I: Parents duty is to do their best for their children, at the expense of their own well-being.	% of women marrying	N
Agree strongly	55.7	61
Agree	53.6	263
Disagree	47.4	196
Disagree strongly	45.0	40
D.K. or N.A.	50.0	6
Total	51.0	566

J: When personalities do not match, a divorce is reasonable.	% of women marrying	N
Agree strongly	46.6	103
Agree	48.3	211
Disagree	54.5	198
Disagree strongly	58.3	48
D.K. or N.A.	50.0	6
Total	51.0	566

M: Even After marriage, one should not sacrifice one's own goals in life for one's family.	% of women marrying	N
Agree strongly	47.4	116
Agree	51.7	333
Disagree	51.5	99
Disagree strongly	58.3	12
D.K. or N.A.	50.0	6
Total	51.0	566

N: It is not essential to get married if it means sacrificing one's own goal in life.	% of women marrying	N
Agree strongly	48.0	196
Agree	52.0	300
Disagree	53.7	54
Disagree strongly	58.3	14
D.K. or N.A.	50.0	4
Total	51.0	566

Note: D.K. or N.A. : do not know or no answer
The inquiring sentence of these questions is "What do you think of the following life styles or views?"

Source: Survey Data

Next, we will look at the relationship between female proportions marrying and natal attributes. Table 3.11 presents the percentages of women marrying according to natal variables. In terms of the father's occupation, the proportions of women marrying are similar to those of the woman's own occupation. Women up to the age of 34 whose fathers were engaged in the agricultural category married at the most accelerated rate, and that percentage reached fully 62.5% by age 34. In contrast, women with fathers in the professional group showed a lower percentage (=48.1%) at the same age. Compared with this group, the percentage in women whose fathers were in the clerical group was greater by 4.8%, while that of women whose fathers were in the manual group was higher by 7.2%. The ordinal patterns of these three groups were almost the same as those of the women's own occupations.

With regard to residence in urban or rural areas, urban women married at a slightly lower rate than women of rural origin. 50.8% of women who lived in urban areas before finishing primary school entered married status by age 34, compared to 52.7% of those who grew up in rural areas.

Table 3.11: Female Proportions Marrying up to Age 34 according to Natal Variables

Father's Occupation	% of women marrying	N	Residential Type before finishing primary school	% of women marrying	N
Agriculture	62.5	8			
Small business	53.1	32	Urban	50.8	544
Professional or managerial	48.1	131	Rural	52.7	74
Clerical or sales	52.9	310	Foreign	50.0	4
Manual	55.3	38	Total	51.1	562
Not working	40.0	20			
Others	38.1	21			
Total	51.1	560			

Source: Survey Data

Source: Survey Data

Note: Agriculture: Agriculture, forestry, or fisheries
 Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
 Professional or managerial: professional workers or managerial workers
 Clerical work or sales: Clerical workers or salespersons
 Manual: Manual workers such as factory workers, craftspersons

Finally, we will turn to the factor peculiar to Japan. In the previous analysis of marriage age, inheritance types and marriage types were considered as factors specific to Japanese cultural settings. However, we excluded marriage types in the analysis of nuptiality probability, because both married and unmarried women were dealt with here. Hence, only inheritance types was examined as a specific factor. Table 3.12 displays proportions of women marrying by inheritance type. Compared to the successor group (first-born daughters without male siblings), the non-successor group showed a slightly higher proportion of women marrying. The percentage of female successors marrying by the age of 34 was 48.2%, while the percentage for non-successors stood at 52.3%. As discussed earlier, if a mate is chosen for a first-born child with more care and much time is spent in the selection process, the percentage of married women may be lower in the 'successor' group than in the 'non-successor' group. However, as far as the result in Table 3.12 shows, there is no marked

difference between the two groups in terms of the percentage of married women.

Table 3.12: Female Proportions Marrying up to Age 34, by Inheritance Type

Inheritance Type	% of women marrying	N
Successor	48.2	166
Non-successor	52.3	396
Total	51.1	562

Source: Survey Data

Note: Successor: The first-born daughter without any male siblings
 Non-Successor: The first-born daughter with a male sibling or the second- or later- born daughter

As is the case in Section 3.4, we cannot reach an unequivocal conclusion from the above results concerning the relationship between nuptiality probability and each explanatory variable, because the influences of other variables are not partialled out. Therefore, in order to examine what explanatory variables have a true effect on the probability of women's marrying, we will develop multi-variate analyses in the following section.

3.10 Analytical Method of Nuptiality Probability

For the multi-variate analysis of nuptiality probability, we will use the proportional hazard model¹⁶ (= Cox Regression). This model was introduced by D. R. Cox in 1972, and is regarded as a combination of life-table analysis and regression. Thus, this model assumes that explanatory variables, which are called covariates in the proportional hazard model, have an effect on a hazard function. The proportional hazard model, specified by hazard

¹⁶ For further detailed of this method, see Cox & Oakes (1984) and Kalbfleisch & Prentice (1980).

relationships, is given by:

$$h_z(t) = h_0(t) \exp(z\beta)$$

Where

$h_0(t)$ = an arbitrary baseline hazard function for time t

z = a set of covariates

β = a set of estimated coefficients of covariates

$h_z(t)$ = the time-specific hazard function of covariates for
time t

In our analysis, the hazard function of the model is the probability of women's marrying at age t and explanatory variables are those discussed in the analytical framework.

One of the major difficulties in employing the proportional hazard model in an event history analysis is the presence of censoring, which occurs when information of events is not completely collected. In general, censored data arise from cross-sectional surveys in demographic application, or by the termination of an experiment or a follow-up in clinical studies. Essentially, censored data contain only partial information of failure time. That is, we only know of the events that an individual has experienced when last observed. Because our survey data is cross-sectional, we cannot observe the time interval of marriage for women who did not marry when our survey was carried out. This type of censoring is sometimes called 'right-censoring', 'fixed censoring' or 'Type I censoring'. Naturally, it seems possible that the expected time interval of marriage for censored women is different from that for observed women. However, an event history analysis applying the proportional hazard model to right-censoring data generally assumes that individuals whose behaviour is unobserved behave as those observed, and processes the censored data along this assumption (Allison, 1984; Courgeau & Lelièvre, 1992). Therefore, our analysis follows this general rule.

Four models were employed to test our hypothesis. All models included age groups as an explanatory variable in order to control the effect of the heterogeneity of birth cohort. The proportional hazard model assumes that heterogeneity in the population under study is captured by a set of covariates included the model. However, it is likely that, since heterogeneity is not captured by any or all of the covariates included in the model, the heterogeneity still remains. In such a case, the model may lead to bias in the parameter estimation, and the estimated hazard may be different from the true hazard (Trussell & Richards, 1985). However, it is quite difficult to determine *a priori* whether or not the set of explanatory variables presented in the analytical framework capture the heterogeneity of our survey data entirely. In particular, each birth cohort may behave in its own way. For example, the sex ratio probably differs from one cohort to another. Owing to these unequal ratios, women in a female-excessive cohort may show a lower marriage probability than those in a male-excessive cohort. In fact, the sex ratio of Japanese people differs between cohorts. While the sex ratio of men over women (aged 20-29) was 0.99 in the 1940-49 birth cohort, it rose to 1.03 in the 1965-74 cohort. Therefore, in order to control such an effect derived from birth cohort characteristics, we included the age groups in our models as an explanatory variable.

3.11 Results of the Analysis of Nuptiality Probability

The first model was carried out to examine the effect of the explanatory variable excepting the attitudinal variables, with its result displayed in Table 3.13. Marked features were observed in terms of the socio-economic variables. As might be expected, woman's education had a reducing effect on the hazard rate of marriage. Compared with women terminating their education at a junior or a high school, the hazard rate of women who went to a junior college was 0.867, and that of women in the 'university' category

was 0.798. Furthermore, both regression coefficients were statistically significant at the 1% level.

Likewise, women's occupations were also an influential determinant of nuptiality probability, and all occupational groups save the 'not working' and 'other' groups had a significant effect on the hazard rate. Among the eight female occupational groups, the 'student' group showed the largest coefficient (=1.547), and the 'agriculture' group revealed the second largest value (=1.411). The high marriage hazard of students probably derives from the fact that female student had already found their future husbands during their school days and had married soon after graduation. We hypothesised that the probability of women's marrying was high in the agricultural category, due to the fact that housework is more compatible with a job outside the home for these women than for those belonging to other occupational groups. This large marriage hazard in the agricultural category is in accord with our hypothesis.

Compared with the 'manual' group, the coefficients of the 'professional' and of the 'clerical' group were considerably lower. The coefficient of the 'professional' group stood at 0.836, and that of the 'clerical' group was 0.880, both being significant at the 5% level. According to Becker's marriage theory, women engaged in highly-salaried jobs such as professional work should be more reluctant to marry than those engaged in low salaried jobs such as a manual work. This evidence, then, supports Becker's theory.

Interestingly, the marriage hazard was slightly lower in the 'small business' group (=0.896) than in the 'manual' group. Our hypothesis predicts that, as in the case of women in the agricultural group, the coefficient of small business proprietors was greater than those of other occupational groups. However, the result did not support our hypothesis. This low coefficient is probably due to the fact that the small business

women had meagre chances of meeting a future partner. As we have already pointed out in the analysis of marriage age, many women in Japan meet their future husband in the work place. Therefore, owing to the small number of working persons, women working for a small business proprietor may have showed a lower marriage probability.

With respect to natal variables, we did not identify a significant effect on the nuptiality probability. Only the 'agriculture' group in the classification of father's occupation had a significant effect at the 5% level. The coefficient of this group was 1.45, which indicates that this category increased the marriage hazard rate by 45% in comparison with the reference category. However, the remaining groups in the classification of father's occupation did not reveal any statistically significant coefficients. Similarly, residence in urban or rural areas before finishing primary school did not affect the nuptiality probability significantly. None the less, its coefficients are interesting. The hazard rate of women who grew up in urban areas was about 94% of the rate of women who grew up in rural areas. Although statistically insignificant, urban backgrounds tend to discourage marriage.

The effect of inheritance types was also insignificant and negligible. Compared to women in the 'non-successor' category, those in the 'successor' category exhibited only a 4% decrease in the marriage hazard. Moreover, the latter coefficient was insignificant. Thus, it follows that female demographic characteristics exert no influence on the probability of marriage.

Table 3.13: The Result of Cox Regression of the First Model

Explanatory Variables	Exponential Regression Coefficients	Standard Error
Age Group		
20-24	.8514*	.0452
25-29	.8833	.0892
30-34	.9046	.0803
35-39	1.0441	.0849
40-44	1.0169	.0791
(45-49)	1.0000	
Father's Occupation		
Agriculture	1.4350*	.0920
Small Business	.8610	.2120
Professional	.8332	.0961
Clerical	.8722	.0781
(Manual)	1.0000	
Not working	.8117	.2200
Other	.8184	.2029
Residential Type before finishing primary school		
Urban	.9363	.0475
(Rural)	1.0000	
Inheritance Type		
Successor	.9619	.0423
(Non-Successor)	1.0000	
Educational Level		
(High School)	1.0000	
Junior College	.8666**	.0417
University	.7975**	.0611
Female Occupation		
Agriculture	1.4110*	.0906
Small Business	.8962*	.0286
Professional	.8364*	.0443
Clerical	.8806*	.0304
(Manual)	1.0000	
Student	1.5469*	.1111
Other	.8139	.1566
Not working	.8527	.2315
Number of Cases	1291	
Degree of Freedom	22	
-2 log-likelihood	1681.636**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: Father's Occupation
 Agriculture: Agriculture, forestry, or fisheries
 Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
 Professional: professional workers or managerial workers
 Clerical: Clerical workers or salespersons
 Manual: Manual workers such as factory workers, craftspersons
 Female Occupation
 Married women were classified according to their occupation before marriage and unmarried women were classified according to their present occupation.
 Agriculture: Agriculture, forestry, or fisheries
 Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
 Professional: professional workers or managerial workers
 Clerical: Clerical workers or salespersons
 Manual: Manual workers such as factory workers, craftspersons
 Not working: Not working and housework
 Successor: The first-born daughter without any male siblings
 Non-Successor: The first-born daughter with a male sibling or the second- or later- born daughter
 Educational Level
 High School: Junior or High School
 Junior College: Vocational School or Junior College
 University: University or Higher

The second model was employed to test the effect of a progressive attitude on nuptiality probability, and included independent variables which had at least one significant sub-category in the first model. Since our survey measured respondents' progressive attitudes with four ordinal categories ('completely acceptable', 'acceptable', 'unacceptable' and 'completely unacceptable' or 'agree strongly', 'agree,' 'disagree' and 'disagree strongly'), a respondent's answer to each question can be thought of as an indicator of the degree to which her attitude is progressive. Therefore, by assigning numeric values to these answering categories in such a manner as to reflect the categorical ranking of the respondent's progressiveness, we dealt with these answers as a continuous variable¹⁷ in the Cox regression analysis. In concrete terms, we assigned numerical ratings as follows: 4 to the most progressive answer; 3 to the second most progressive; 2 to the third most progressive; and 1 to the least progressive. For example, if a woman answered 'completely acceptable' to QA, we coded it as 4. Likewise, if another woman answered 'completely unacceptable' to the same question,

¹⁷ It is a disputable point whether an ordinal variable can be treated as a continuous variable. Traditionally, the ordinal variable was dealt with as a discrete variable because it does not precisely correspond to the relative location of each category. However, the ordinal variable has recently been treated as a continuous variable (see Bentler and Chou, 1987; Boyle, 1970; Bohnsted & Knoke, 1988; Hanushek & Jackson, 1977; Lyons, 1971).

it was coded as 1.¹⁸

Table 3.14 presents the results of the second model. Three attitudinal explanatory variables, QB (common-law marriage), QC (unmarried women with children) and QE (couple-premarital sex permissible), were statistically significant at the 5% level and their coefficients were slightly below 1, which indicates that these variables had a reducing effect on the marriage hazard, although their effects were mild. In concrete terms, the coefficient of QC stood at 0.930, which means that a unit increase in this variable decreased the marriage hazard rate by 7%. Likewise, the coefficient of QB and QE were 0.945 and 0.950 respectively, and they reduced the nuptiality probability by about 5% with a unit increase. It follows from this evidence that the more progressive the women, the more their nuptiality probabilities decline. On the other hand, QA (never married), QD (homosexual relationship) and QF (husband works/wife at home) did not exhibit a statistically significant effect on the marriage rate, although their coefficients were less than 1.

What is interesting is that the second model had a similar pattern in terms of variables which showed a significant effect in the first model. In particular, women's educational level and occupation still had a significant reducing effect on the marriage hazard even in the second model. For example, compared to the high school category, the junior college category decreased the hazard rate by about 10%, and the university category decreased it by approximately 20% as well. This suggests that these socio-economic variables are still crucial to the probability of women's marrying when we control for the effect of attitudinal variables.

For the sake of assessing the goodness of fit for the second model, the second column of Table 3.14 presents the result of its reduced model excluding all attitudinal variable. The value of -2 log-likelihood (the log-

¹⁸ In the following Cox regressions, we excluded women who gave 'D.K.' or 'N.A' to attitudinal questions because their attitudes were not measured.

likelihood multiplied by -2) was 1693.446 for the reduced model, while that of the full model stood at 1637.676. The difference between the two values was 55.79, being statistically significant at the 1% level by the chi-square test with six degrees of freedom. Therefore, we can reject the hypothesis that the regression coefficients for the attitudinal variables are zero. This evidence suggests that not only the socio-economic but also the attitudinal variables are the significant determinants of differences in female nuptiality probability.

Table 3.14: The Result of Cox Regression of the Second Model

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Age Group				
20-24	.8697*	.0377	.8566*	.0451
25-29	.8874	.0910	.8849	.0895
30-34	.9602	.0822	.9091	.0814
35-39	1.0140	.0869	1.0797	.0756
40-44	1.0204	.0819	1.0100	.0689
(45-49)	1.0000		1.0000	
Father's Occupation				
Agriculture	1.3567*	.0870	1.5204*	.1145
Small Business	.8713	.0705	.8631	.0794
Professional	.8379	.0771	.8351	.0785
Clerical	.8782	.0921	.8758	.0934
(Manual)	1.0000		1.0000	
Not working	.8502	.2105	.8428	.2137
Other	.9437	.1601	.8461	.1678
Educational Level				
(High School)	1.0000		1.0000	
Junior College	.8964*	.0776	.8835**	.0391
University	.8090*	.0801	.7935**	.0707
Female Occupation				
Agriculture	1.4381*	.0918	1.5732*	.1233
Small Business	.8687*	.0374	.8737*	.0346
Professional	.8364*	.0463	.8259*	.0472
Clerical	.8506*	.0425	.8471*	.0428
(Manual)	1.0000		1.0000	
Student	1.3219*	.0697	1.4077*	.0903
Other	.8206	.2398	.8140	.2479
Not working	.8601	.2571	.8530	.2847
QA	.9765	.0507		
QB	.9426*	.0246		
QC	.9302*	.0296		
QD	.9889	.0571		
QE	.9503*	.0221		
QF	.9532	.0448		
Number of Cases	1244		1244	
Degree of Freedom	26		20	
-2 log-likelihood	1637.676**		1693.446**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QA: Never getting married throughout life
 QB: Common-law marriage
 QD: Homosexual relationships
 QC: Unmarried women bearing and rearing children
 QE: A man and a woman love each other, their pre-marital sexual intercourse is permissible.
 QF: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

Next, let us turn to the effect of individualistic attitudes on nuptiality probability. Table 3.15 presents the result of the third model. As in the

case in the second model, this model included independent variables which had shown a significant effect in the first model. Moreover, we treated the attitudinal variables falling into the 'individualism' category as continuous variables in the same way as was done in the second model.

In term of attitudinal variables, QH (mother home during infancy years), QJ (parents devoted to children over self-interest) and QL (unmarried life for goal-pursuing) had a significant effect on the marriage hazard, and their exponential coefficients were less than 1. To exemplify, the coefficient of QL stood at 0.943, indicating that the estimated marriage risk for women who agreed strongly with the QL's view was 94.3% of the risk for those who agreed with it. Likewise, a negative impact on the marriage hazard appeared in the remaining two attitudinal variables, QG (divorce), QI (children important) and QK (goal-oriented individual), although their coefficients were statistically insignificant. For example, the coefficient of QI was 0.954, which indicates that a unit increase in this variable reduced the marriage rate by about 5%. As far as these findings show, the more individualistic women are, the lower the probability of their marrying.

Again, it should be noted that women's educational level and occupation had a significant effect on the marriage hazard even in the third model. Compared to women in the high school category, the estimated marriage risk for women in the junior college category was 0.904 times lower, and that of women in the university category was 0.806 times lower. Because these parameters are estimated by controlling the effect of other variables, it follows that socio-economic factors are important determinants in female nuptiality probability even in the third model.

In order to examine the goodness of fit for the full model in the third Cox regression, the result of its reduced model is displayed in the second column of Table 3.15. Compared to the value of -2 log-likelihood for the

reduced model, the full model revealed a considerable change in the value. The difference between the two values reached 84.739, and the chi-square test with six degrees of freedom yielded a significant value at the 1% level. Therefore, these attitudinal variables play an important role in determining the probability of women's marrying.

Table 3.15: The Result of Cox Regression of the Third Model

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Age Group				
20-24	.8690*	.0411	.8566*	.0451
25-29	.8983	.0903	.8849	.0895
30-34	.9346	.0819	.9091	.0814
35-39	1.0133	.0806	1.0797	.0756
40-44	1.0169	.0808	1.0100	.0689
(45-49)	1.0000		1.0000	
Father's Occupation				
Agriculture	1.3504*	.0827	1.5204*	.1145
Small Business	.8772	.0763	.8631	.0794
Professional	.8320	.0740	.8351	.0785
Clerical	.8753	.0926	.8758	.0934
(Manual)	1.0000		1.0000	
Not working	.8479	.2149	.8428	.2137
Other	.8197	.1697	.8461	.1678
Educational Level				
(High School)	1.0000		1.0000	
Junior College	.9040*	.0396	.8835**	.0391
University	.8058*	.0813	.7935**	.0707
Female Occupation				
Agriculture	1.4890*	.1044	1.5732*	.1233
Small Business	.8656*	.0382	.8737*	.0346
Professional	.8240*	.0474	.8259*	.0472
Clerical	.8336*	.0460	.8471*	.0428
(Manual)	1.0000		1.0000	
Student	1.3476*	.0767	1.4077*	.0903
Other	.8274	.2504	.8140	.2479
Not working	.8810	.2549	.8530	.2847
QG	.9716	.0738		
QH	.9461*	.0272		
QI	.9543	.0503		
QJ	.9320*	.0341		
QK	.9045	.0997		
QL	.9334*	.0343		
Number of Cases	1244		1244	
Degree of Freedom	26		20	
-2 log-likelihood	1628.727**		1693.446**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QG: When personalities do not match, a divorce is reasonable.
QH: When a child is small, a mother should stay home without working outside the home.
QI: Children are important to a successful marriage.
QJ: Parents duty is to do their best for their children, at the expense of their own well-being.
QK: Even After marriage, one should not sacrifice one's own goals in life for one's family.
QL: It is not essential to get married if it means sacrificing one's own goal in life.

Finally, we will examine the effect of attitudes to traditional Japanese values on marriage probability in the fourth model (Table 3.16). In this model, numeric values were assigned to two attitudinal variables in the same way as in the previous models.

With regard to attitudinal variables, both QM (care of aged parents) and QN (co-residence with parents) decreased marriage risk, although the effect of the former variable was negligible and statistically insignificant. The exponential regression coefficient of QN stood at 0.958, which means that a unit increase in this variable reduced the hazard rate by about 5%. On the other hand, the QM's coefficient was 0.992, and the rate reduced by approximately 1% with a unit increase of this variable.

This model, like the previous models, revealed significant effects with reference to women's educational level and occupation. The risk of marriage for women in the junior college group was 89.4%, and that for women in the university group was 80.0% of the risk for women in the high school group. Likewise, women who were engaged in professional job or clerical work showed a lower marriage hazard than those in manual employment. In view of this evidence, the influence of these socio-economic factors on marriage probability is still effective after the attitudinal variables related to the Japanese traditional values are controlled.

The second column of Table 3.16 displays the result of the reduced model without any attitudinal terms. The -2 log-likelihood for the full model having the attitudinal terms was 1677.277, which was greater by 16.219 than that for the reduced model. This value was significant at the 5% level by the chi-square test with two degrees of freedom, which indicates that the

full model showed a significant improvement in terms of the goodness of fit. As such, nuptiality probability in Japanese women is explained better with the model having these attitudinal variables than with the model excluding them.

Table 3.16: The Result of Cox Regression of the Fourth Model

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Age Group				
20-24	.8679*	.0422	.8566*	.0451
25-29	.8978	.0894	.8849	.0895
30-34	.9333	.0815	.9091	.0814
35-39	1.0575	.0755	1.0797	.0756
40-44	1.0914	.0783	1.0100	.0689
(45-49)	1.0000		1.0000	
Father's Occupation				
Agriculture	1.3538*	.0832	1.5204*	.1145
Small Business	.8891	.0786	.8631	.0794
Professional	.8379	.0779	.8351	.0785
Clerical	.8795	.0935	.8758	.0934
(Manual)	1.0000		1.0000	
Not working	.8414	.2132	.8428	.2137
Other	.8473	.1588	.8461	.1678
Educational Level				
(High School)	1.0000		1.0000	
Junior College	.8941*	.0440	.8835**	.0391
University	.8007*	.0808	.7935**	.0707
Female Occupation				
Agriculture	1.4432*	.0944	1.5732*	.1233
Small Business	.8876*	.0312	.8737*	.0346
Professional	.8540*	.0394	.8259*	.0472
Clerical	.8630*	.0360	.8471*	.0428
(Manual)	1.0000		1.0000	
Student	1.3407*	.0697	1.4077*	.0903
Other	.8274	.2504	.8140	.2479
Not working	.8482	.2553	.8530	.2847
QM	.9921	.0491		
QN	.9576*	.0247		
Number of Cases	1244		1244	
Degree of Freedom	22		20	
-2 log-likelihood	1677.227**		1693.446**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QM : It is a child's duty to care for aged parents.
 QN: It is better to live with parents after marriage.

Conclusion

From the beginning of the 1970s, female age at marriage has, in Japan,

being rising in tandem with a decline in the proportion of women marrying. As mentioned before, these phenomena are tightly connected to a low fertility rate within the Japanese demographic context.

Looking at Japanese society from a broad perspective, we can recognise that women's socio-economic circumstances have changed drastically over the past few decades. The percentage of women going to college or university has increased, as has the number of women engaged in gainful employment. Furthermore, as far as some national opinion surveys show, female attitudes towards the family and lifestyle have also changed during the same period.

Evidence emerging out of the analysis of this chapter, first of all, suggests that socio-economic factors are important determinants of the tempo and quantum of marriage in Japan. In fact, women with a high level of education tended to delay marriage, and remain single longer than women with a lower level of education. Furthermore, women engaged in highly-salaried employment such as professional and managerial also entered marriage later and remained unmarried longer. Nevertheless, the findings of this chapter also indicate that attitudinal factors significantly affect marriage behaviour in Japan. More progressive and individualistic attitudes postponed female marriage until a later age. In addition, the probability of women's entering marriage was decreased in tandem with the strengthening of both progressive and individualistic attitude. In other words, Japanese women can be regarded as '*homo sociologicus*' as well as '*homo oeconomicus*'. Finally, the results of this analysis revealed that natal background factors, marriage types and inheritance types have little effect on marriage behaviour in Japan.

By comparing the socio-economic and attitudinal factors, the magnitude of their estimated parameters indicates that socio-economic factors bear more powerfully on marriage patterns than attitudinal factors.

Therefore, it can be concluded that the delay of female marriage and the decline in the proportion of women marrying in recent Japan are mainly due to socio-economic factors. Nevertheless, we should not forget that socio-economic and attitudinal changes interrelate with each other. As discussed in Chapter 1, attitudinal changes in industrialised countries are related to a high level of prosperity derived from economic growth. Indeed, the findings of this chapter indicate that, in spite of their minimal effect, more progressive and individualistic attitudes delayed women's marriage, and decreased the probability of their entering marriage.

It should be born in mind that marriage is nothing but a proximate determinant of fertility, for the level of fertility is most affected by the reproductive pattern itself. Hence, it is necessary to make a direct analysis of fertility behaviour in order to investigate the determinants of low fertility rate in Japan more clearly. We will attempt just such an analysis in the next chapter.

Chapter 4

Analysis of the Number of Children

Introduction

The purpose of this chapter is to examine the quantum aspect of Japanese fertility. In the previous chapter, we examined female age at marriage. This is one of the main determinants of fertility, and the reasons for this are clear. In couples who hardly practice contraception, female marriage age will strongly be linked to their level of fertility through an increase in the risk of pregnancy over a period of time. On the other hand, if effective contraception is practised by married couples, the level of fertility will be more independent on marriage age. Accordingly, age at marriage should, in theory, have almost no relation to the level of fertility in industrialised countries where contraception is widely practised. None the less, even in a society where fertility control is carried out extensively and effectively, a correlation between age at marriage and the level of fertility is still observed (Bumpass, 1969; Bumpass & Mburugu, 1977; Busfield, 1972). Hence, the analysis of the previous chapter served to identify the determinants of fertility behaviour in Japan through intermediate factors, or marriage patterns.

However, it should, at the same time, be borne in mind that female marriage age is nothing more than an approximate determinant of fertility. Although the determinants of marriage patterns examined in the previous chapter have contributed to the recent decline in fertility in Japan to an extent, the level of fertility is not completely explained by marriage patterns. Therefore, it is necessary to investigate the determinants of the low fertility rate in Japan further by focusing on fertility behaviour itself.

In this chapter, we will examine determinants of the level of fertility in Japan. To begin with, we will look at the Japanese fertility trend, referring to socio-economic environments surrounding women and their

attitudes towards life-style and family. We will then present the analytical framework and methods used in this chapter. Finally, we will investigate the influence of socio-economic and attitudinal factors on the achieved number and the intended number of children.

4.1 Fertility Trends in Japan

As pointed out earlier, Japanese fertility as measured by the TFR has declined steadily since the 1970s. Despite this fact, much caution is needed in the interpretation of actual trends in fertility because the TFR is strongly affected by the timing of childbearing. Completed family size (CF) is a indicator of fertility that is not subject to fluctuations of childbearing ages. The CF is the simple average number of children that women of a particular cohort have during their fertile life span. The limitation of this index is, however, that we must wait until women in a specific cohort reach the end of their reproductive age. The age of 50 is often regarded as the end of a woman's reproductive period. On the other hand, the TFR is a convenient index of up-to-date fertility since it is calculated on a yearly basis. This index is computed on the assumption that women would actually follow the age-specific fertility pattern of a particular point in time. However, the disadvantage of the TFR is that it is not always equal to the CF. Because the TFR is calculated on the basis of hypothetical cohorts, its value is affected by rapid changes in the timing of childbearing. If age at childbearing declines, the TFR will overestimate the CF. In contrast, the TFR will underestimate the CF in the case of rising age at childbearing. Therefore, in grasping a true trend of fertility, it is necessary to look at the complete family size as well as the total fertility rate.

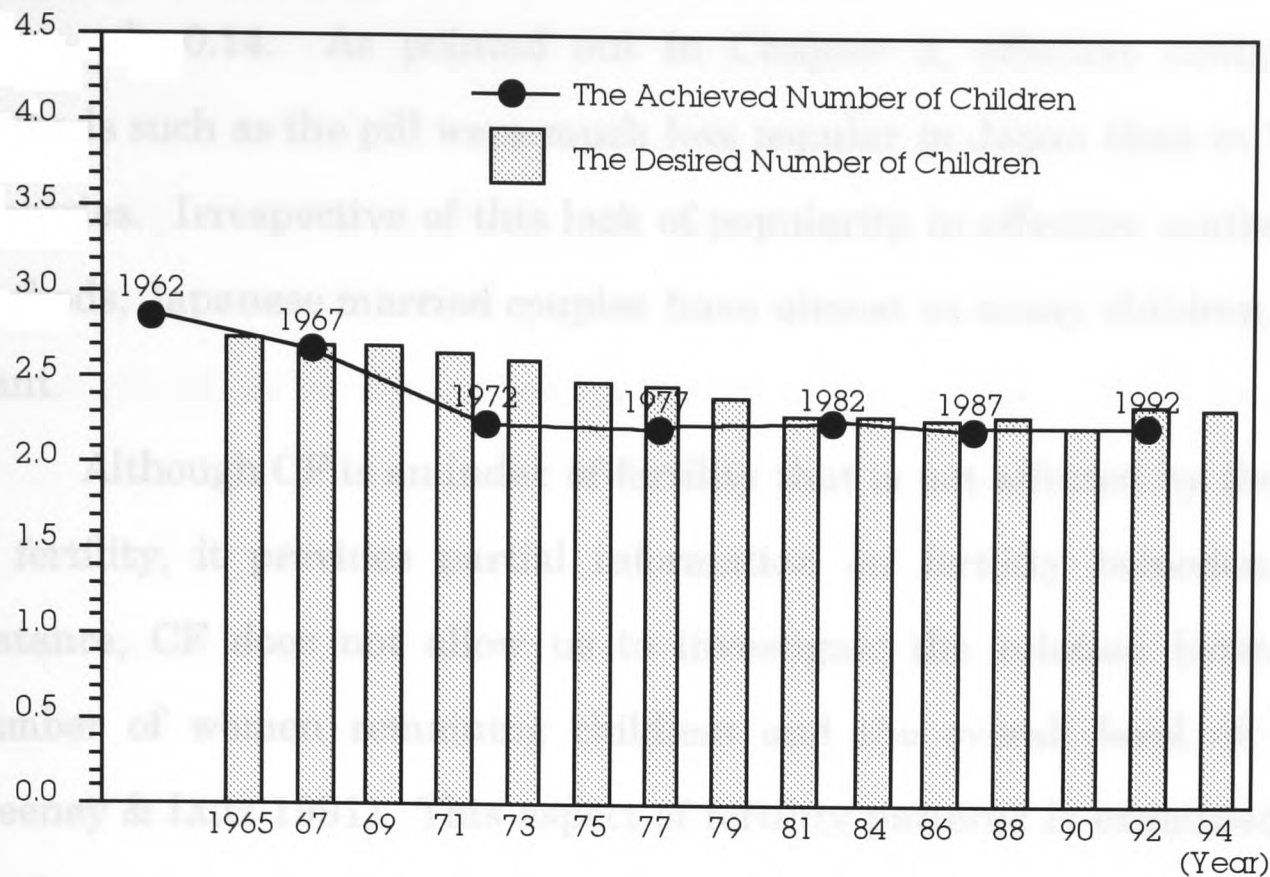
The thin line of Graph 4.1 shows the number of children born to a married couple. These figures are calculated for married couples who had

been married for more than fifteen years¹, and extra-marital births are very few in Japan. Thus, the figures can be regarded as a proxy measure of CF. The achieved number of children fell from 2.83 in 1962 to 2.20 in 1972, which indicates that the complete family size of Japanese couples declined considerably in the 1960s. Of note here is the fact that the achieved number has remained almost constant since 1972. For instance, the figure was 2.20 children in 1972, whereas it stood at 2.21 even in 1992. As shown in Chapter 3, the Japanese TFR has revealed a secular downward trend since the 1970s, but such a drastic trend was not found out in Graph 4.1. The two indices show a contradictory fertility trend. Since recently married women are excluded from the figures in Graph 4.1, the achieved numbers for more recent years may decline further. Thus, the final figures for these years substantially depend on how many children recently married women will have at the end of their reproductive age. Nevertheless, it is likely that such a drastic decline in the TFR mirrors changes in the timing of childbearing.²

¹ According to the Japanese national fertility survey, the cumulative number of children hardly increases beyond ten years of married life (see Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b).

² We will discuss the timing of births after marriage in detail in Chapter 5.

Graph 4.1: The Achieved and Desired Numbers of Children
(children)



Note: The achieved number of children is calculated for couples who have been married for more than 15 years.
 Source: Institute of Population Problems (1995). Latest Demographic Statistics.
 Mainichi Newspaper Company (1994). In Search of the New Family Model.
 Mainichi Newspaper Company (1992). The Record of Japanese Population.

In order to remove this ambiguity, let us look at the desired number of children in Graph 4.1. As in the case of the average number of children, the desired number of children exhibited a fall from the latter half of the 1960s to the beginning of the 1980s. Married couples, on average, wanted to have 2.72 children in 1965, whereas their desired number of children fell to 2.30 in 1981. However, the decline in the desired number of children stopped thereafter and the figure stabilised at around 2.3, which suggests that the desired number of children for Japanese couples since the latter half of the 1980s has rested at no less than two children. Thus, it is inferred that the Japanese TFR since the 1980s has been distorted by a change in age at childbearing

Interestingly, when comparing the achieved number and the desired number of children, we did not identify a large gap between the two. For example, the desired number of children was 2.35 in 1992, while the average

number of children ever-born was 2.21 in the same year, the difference being only 0.14. As pointed out in Chapter 2, effective contraceptive methods such as the pill were much less popular in Japan than in Western countries. Irrespective of this lack of popularity in effective contraceptive methods, Japanese married couples have almost as many children as they want.

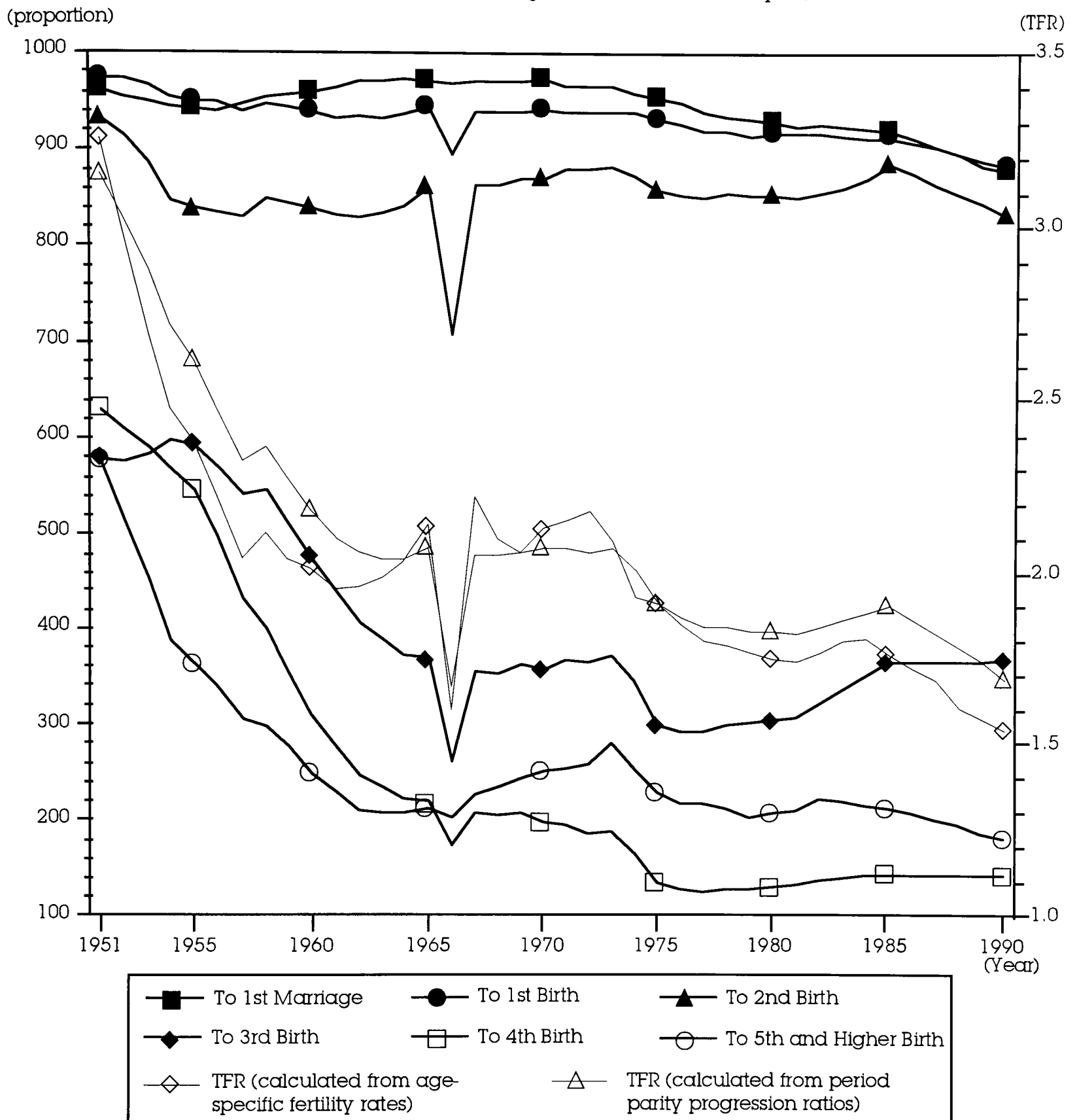
Although CF is an index of fertility that is not affected by the timing of fertility, it provides partial information on fertility behaviour. For instance, CF does not allow us to investigate the relation between the number of women remaining childless and the overall level of fertility (Feeney & Lutz 1991). This aspect of fertility patterns is examined by the parity progression ratio. Parity progression ratios indicate the proportions of women with at least n children who go on to have at least one more children. When the parity progression ratio is calculated for marriage or birth cohorts that have completed their childbearing, it is not an index of up-to-date fertility. However, it is also possible to compute parity progression ratios on a period basis. Some methods have been proposed to estimate the period parity progression ratio (Feeney, 1986, 1987, 1991; Henry, 1953/1980; Lutz, 1989; Murphy & Berrington, 1993; Ní Bhrolcháin, 1986). Since the period parity progression ratio (PPPR) is calculated on the basis of a synthetic cohort, it does not, in a strict sense, represent the fertility behaviour of a true cohort. However, the parity progression ratios of a synthetic cohort differ only slightly from those of a true cohort (Ní Bhrolcháin, 1987). Hence, the PPPR is a period measure fertility that is less affected by the timing of childbearing.

Graph 4.2 displays a trend of period parity progression ratios in Japan. First of all, progression ratios of higher order births have considerably declined since the mid-1970s. The progression ratio from third to fourth birth fell from 198 in 1970 to 142 in 1990. Likewise, the ratio from

fourth to fifth and higher births declined from 251 to 181 during the same period. By contrast, progression ratios of lower order births show a mild decline. The ratio from marriage to first birth was 941 in 1970, while it stood at 882 in 1990. Similarly, the ratio from first to second birth fell from 870 to 833 during the same period. Furthermore, the ratio from second to third birth fell in the second half of the 1970s, rising thereafter to the level of 1970. This evidence suggests that, although the number of women having four or more children has substantially reduced since the 1970s, that of women remaining childless and having only one child has not decreased so greatly. In other words, most Japanese couples have at least two children.

It is worth noting that the conventional TFR (calculated from age-specific fertility rates), as a whole, yields a smaller figure than that calculated from the period parity progression ratios. In particular, the difference between the TFRs has gradually become greater since 1975. The TFR calculated from the period parity progression ratios fell from 1.91 in 1975 to 1.69 in 1990, while the conventional TFR plunged from 1.91 to 1.54 during the same period. This evidence indicates that a decline in the conventional TFR since 1975 has considerably been caused by a change in the timing of fertility.

Graph 4.2: Period Parity Progression Ratios (per 1,000) and TFR in Japan, 1951-1990



Source: Feeney, G. (1986). *Period Parity Progression Measures of Fertility in Japan*.
 Ogawa, N., & Retherford, R. D. (1993). *The Resumption of Fertility Decline in Japan: 1973-92*.

4.2 Social Changes and Fertility Decline: Its Theoretical Implication

In Chapter 3, we pointed out that Japanese society has recently experienced socio-economic and attitudinal changes. We shall, in this section, discuss the relation between these changes and fertility decline in Japan.

The first point to be considered regarding socio-economic changes is

that the female enrolment rate in universities and colleges has increased. As pointed out in Chapter 3, the percentage of women enrolled in 2-year junior colleges and 4-year universities rose from 17.7% in 1970 to 41.8% in 1992 (see Graph 3.4). According to the human capital theory (Becker, 1975), the earning capacity in the labour market is a positive function of educational level. Hence, compared with women who terminate their education at the high school, those who enjoy a university education will earn a higher wage. For instance, in terms of women in the 25-29 age group, the average monthly wage was 191,000 yen for high school graduates and 235,300 yen for university graduates in 1994 (Rôdôshô, 1995)

The second point is that, in tandem with a rise in the female enrolment rate in colleges and universities, female labour participation rates in non-agricultural industries have increased. In terms of women from age 20 to 54, the labour participation rate in non-agricultural industries rose from 32.0% in 1970 to 50.0% in 1990 (see Graph 3.3). This evidence indicates that more Japanese women are engaged in paid work outside the home. In addition to the enlargement of employment opportunities for women, the wage gap between men and women has narrowed. The ratio of women's over men's monthly wage rose from 0.51% in 1970 to 0.60% in 1994 (Rôdôshô, 1995).

From the standpoint of the New Home Economics theory, these changes are driving forces in bringing about the low fertility rate in Japan. As discussed in Chapter 1, the New Home Economics theory holds that the level of fertility is negatively related to the opportunity cost of rearing children (Butz & Ward, 1979; Mincer, 1963). Since much time is spent on bearing children and caring for infant children by the mother (assuming a traditional gender role), working and childbearing are mutually exclusive for most women, at least for a few years. In other words, women who decide on

motherhood will most likely have to give up their jobs for a period. Where women have little opportunity for high-salaried employment, their earnings lost through bearing children and caring for them will be low. However, as women's opportunity for highly-paid work increases, the opportunity cost which bearing and caring for children imposes on women will become higher. Accordingly, a rise in female wages raises the opportunity cost of women's time spent on bearing and rearing children, which consequently leads to a low level of fertility.

Furthermore, we may notice that, owing to a low level of support for working mothers, making work and child-rearing compatible is very difficult for women in Japan. For instance, the period of maternity leave was only fourteen weeks in Japan in 1990, compared to sixty-five weeks in Sweden. In addition, the percentage of pay received during this period was 60% in the Japan, whereas it reached 74% in Sweden (Gauthier, 1993). Under these conditions, it is likely that married women in Japan will choose to have fewer children to avoid a loss of wages.

It should be bore in mind that the relation between fertility and women's employment may be more complicated than the New Home Economics theory holds. As more women are oriented towards employment (or a career) rather than motherhood, they may have a fewer children. Conversely, a reduction in family size may allow more women to be engaged in paid employment (Jones, 1981; Weller, 1977). In the first case, labour force participation affects family size; in the second case, family size affects labour force participation. Thus, it is difficult to determine the causal link between fertility and women's employment.

We must also point up the fact that standards of quality which parents expect of their children has increased in Japan. As seen Graph 3.4, there was an upward trend in the percentage of men and women going to junior colleges and university, from which evidence we infer that Japanese

parents want children of a higher quality. This percentage rose from 29.2% in 1970 to 40.9% in 1994 for men, and from 17.7% to 45.9% for women.

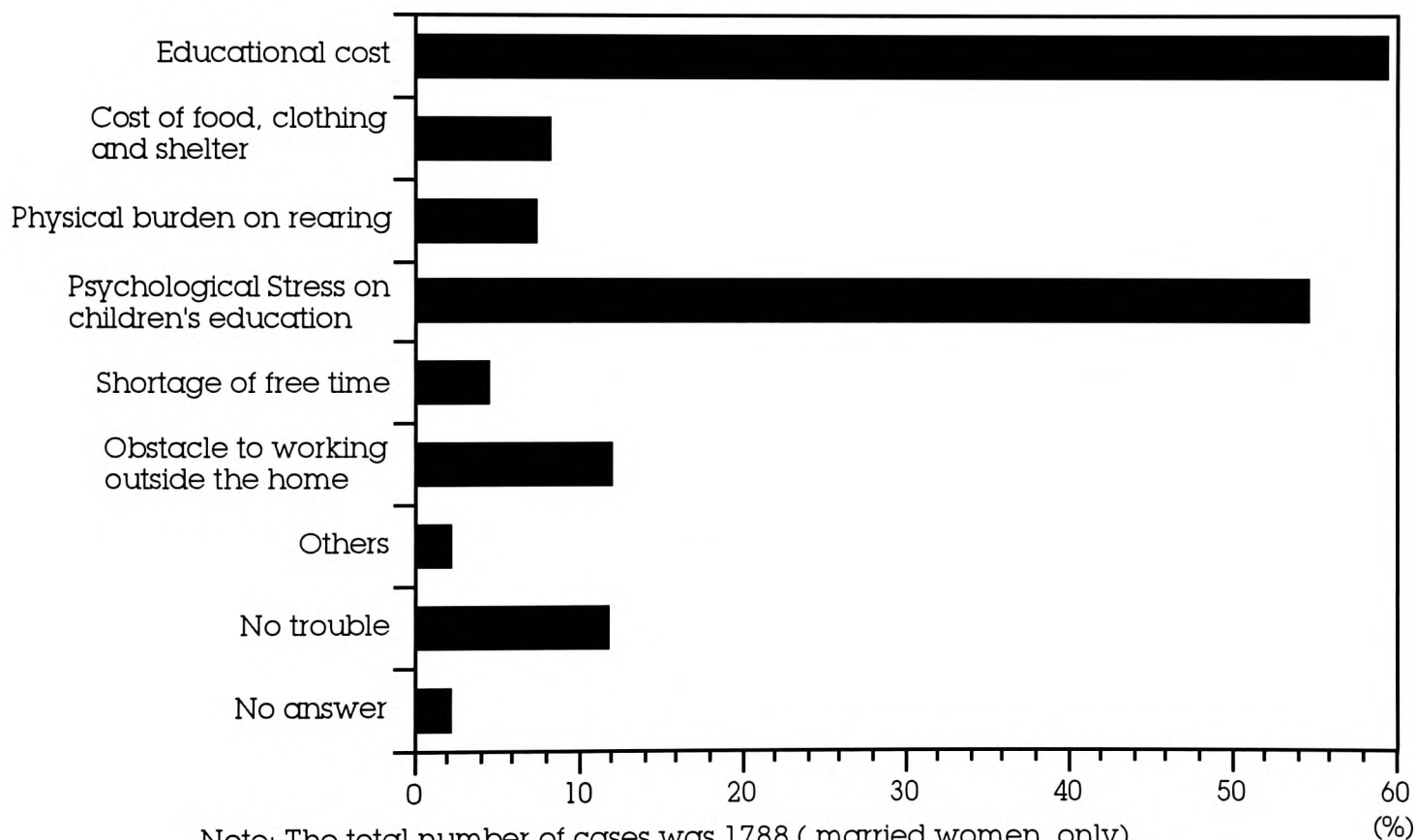
This situation may also reduce the demand for children from the viewpoint of the New Home Economics theory. As discussed in Chapter 1, the theory posits an interaction between the quantity and quality of children (Becker and Lewis, 1973). Therefore, when a unit increase in child quality is greater than a unit increase in child quantity with respect to parents' utility, they will have fewer children and enhance the quality of their children, instead of having more children.

Although the New Home Economics theory presents a plausible explanation with regard to the relation between recent socio-economic circumstances and fertility behaviour in Japan, it is debatable whether the Japanese low fertility rate is entirely attributable to socio-economic factors. Ideational (or attitudinal) theories claim that the weakening of traditional values and the spread of individualistic attitudes, following the satisfaction of material needs, are related to the low fertility rate in Western countries. If attitudinal theories are able to account for the fertility decline in Western countries, it may be that the fertility decline in Japan also takes root in these attitudinal changes. As seen in some surveys in Chapter 3, Japan has experienced similar attitudinal changes. More specifically, the percentage of Japanese women seeking an individualistic life-style has increased over the past few decades. A growing number of women have preferred to pursue their own goals and welfare instead of getting married. This shows that individualistic attitudes have spread among Japanese women. Similarly, the Japanese traditional parent-child relationship has lost the influence that it once had. Japanese people tend to depend less on their children for their livelihood in old age. The attenuation of these traditional values may lead to a decision to remain childless.

For further evidence of self-oriented attitudes among Japanese

people, we will look at the results of another opinion survey. Graph 4.3 shows difficulties involved in the rearing of children. Admittedly, the cost of education yielded the highest percentage with regard to difficulty in the rearing of children (=59.0%), and the psychological burden involved in educating children showed the second highest figure (=54.7%). The evidence indicates that maintaining or enhancing the quality of children is a primary concern in rearing children. However, some individualistic reasons comprised a considerable percentage in all categories, which suggests that a large number of Japanese women put much importance on ensuring their own well-being. To take a typical case, married women who thought that child-rearing was an obstacle to working outside the home reached 12.0%.

Graph 4.3: Difficulty in Rearing Children (Multiple Choice Question)

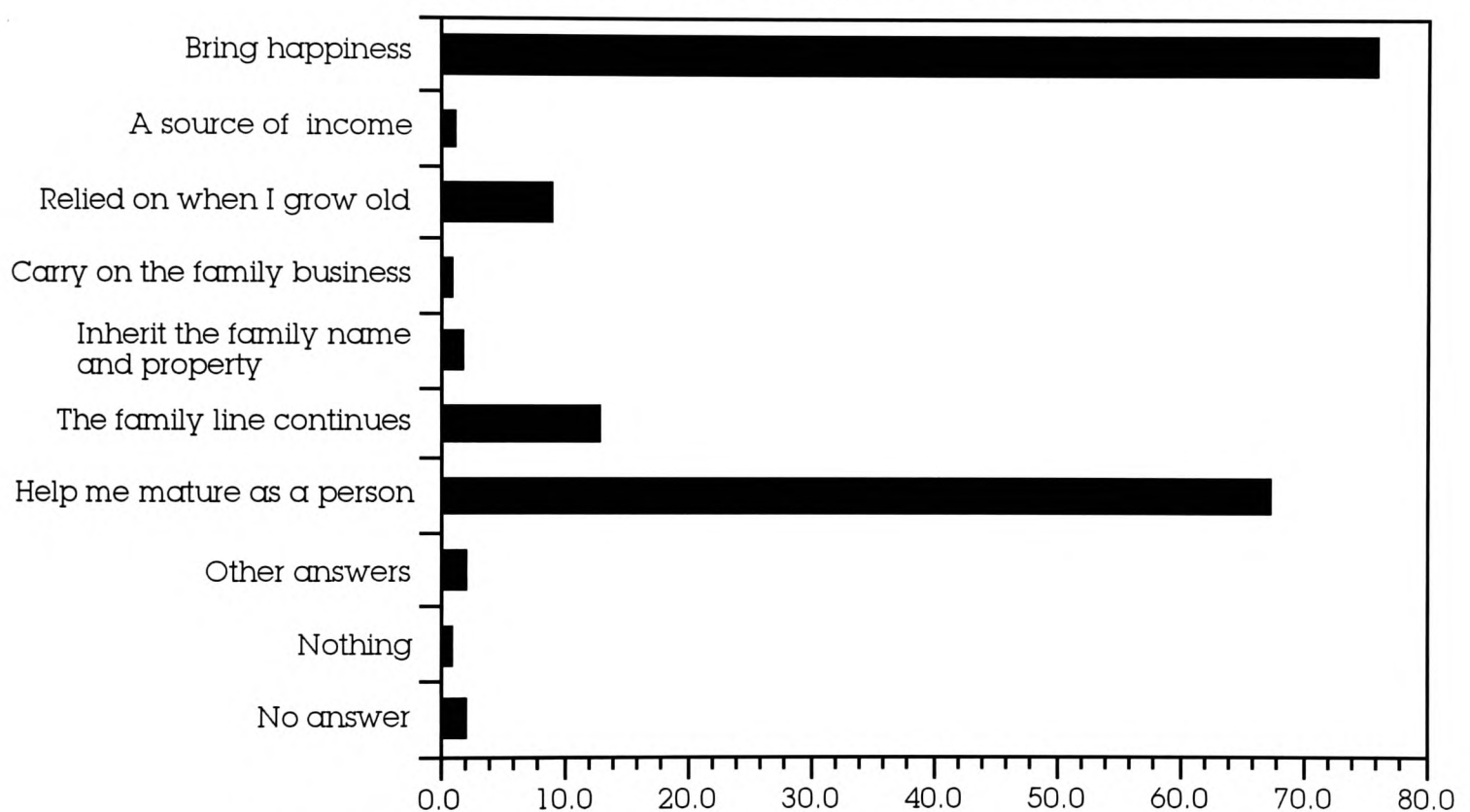


Note: The total number of cases was 1788 (married women only).
 Source: Mainichi Newspaper Company (1994). In Search of the New Family Model.

In addition to this, it is debatable whether children can be regarded as simple consumer goods. One of the most important assumptions in the New Home Economics theory is that, in industrialised countries, having children is identical to consuming other consumer goods in respect of bringing satisfaction to parents (see Chapter 1). However, this assumption

may not be appropriate to Japanese parents, because having children has various meanings to them. As far as Graph 4.4 shows, the percentage of 'bring happiness' stood at 76.0%, which may indicate that many married women think of children as consumable goods. Nevertheless, the percentage of 'help me mature as a person' reached fully 67.3%. Furthermore, the continuation of the family line still commanded 12.9% for women as a reason for having children. This evidence suggests that it is insufficient to analyse Japanese fertility behaviour simply from the viewpoint of regarding children as consumer goods.

Graph 4.4: Benefits of Having Children (Multiple Choice Question)



Note: The total number of cases was 1788 (married women only). (%)
 Source: Mainichi Newspaper Company (1994). In Search of the New Family Model.

In view of the above discussion, we can say that the determinants of recent Japanese fertility behaviour are quite complicated. Both the New Home Economics theory and the ideational (or attitudinal) theory seem plausible as explanations of the decline in Japanese fertility since the 1970s. Japanese socio-economic conditions have shifted in an antinatalist direction. However, at the same time, the attitudes of Japanese people have also changed in such a way as to reduce the level of fertility.

Therefore, we need to examine the determinants of the low fertility rate in socio-economic and attitudinal aspects.

4.3 Analytical Framework

Many comprehensive analytical frameworks have already been presented for fertility behaviour (Bulatao & Lee, 1983a; Davis & Blake, 1956; Easterlin, 1978). Referring to these frameworks, we shall describe the analytical framework in this section. Its overall sketch is plotted in Figure 4.1.

(a) Socio-economic factors

We shall examine the effects of four socio-economic variables on fertility: the wife's educational level; the husband's annual income; the wife's wage rate; and the desired educational level of children.

In terms of female educational background, the received demographic wisdom holds that an increase in women's educational qualification has a negative effect on their level of fertility (Friedlander & Silver, 1967). First of all, a woman with a high level of education has more knowledge about contraception than one with less education. Accordingly, the better-educated women is less likely to have unwanted children caused by the failure of contraception. Secondly, as discussed in the previous section, a high educational qualification enhances a woman's earning power in the labour market, which consequently increases the price of her time spent on childbearing and child-caring. According to the New Home Economics theory, a rise in the price of a woman's time will reduce the level of fertility.

From these two reasons, it may be possible to hypothesise a negative relation between female fertility and education. In fact, Osawa (1988) observed in Japan that a wife's educational qualification had a negative relation to the number of children ever-born. However, this is not

always the case in the relationship between fertility and woman's education. Some studies indicate that the relationship between the two factors is not linear, but U-shaped. For instance, women with a university degree have fractionally more children than those with a secondary diploma in industrialised countries (Andorka, 1978; Coleman & Salt, 1992). Hence, the level of education achieved by women will affect the level of fertility, but the direction of its effect may not be determined *a priori*.

The second variable is the husband's annual income. Several demographic studies have investigated the influence of income on fertility, especially relating to economic development in less developed countries. In most cases, a more or less positive link between fertility and income was found in the results of multiple regression analyses employing territorial cross-sectional and time-series data. Likewise, recent macro-level studies of industrialised countries also reveal a positive relation between the level of fertility and husband income, which indicates that a higher income leads to higher fertility (Butz & Ward, 1979; Ermish, 1970, 1979; Wilkinson, 1973). These results endorse the new home economics theory, for a husband's higher income will increase the motivation to have more children, assuming that children are consumer goods. Thus, we may assume that this variable has a positive effect on fertility.

The third variable is the wife's wage rate, which is as an index of her opportunity cost. For women engaged in paid work outside the home, working and childbearing (and child-rearing) are, in most cases, mutually exclusive, at least for a few years. Admittedly, a high level of welfare support for working mothers makes their working and child-rearing compatible. In Norway and Sweden, a considerable number of mothers having small children are employed outside the home (Hoem, 1990, 1992; Kravdal, 1992). For instance, the labour participation rate for Swedish women having at least one child at ages 0-6 was 85.4% in 1991 (Hoem,

1992). However, owing to a low level of support for working mothers, it is very difficult for women to make working and child-rearing compatible in Japan (see Section 4.2). Hence, the choice between working and childbearing may, in Japan, be affected by the level of female wage rates. In view of this, a wife with a potentially higher wage is very likely to continue working instead of devoting herself to caring for children. Therefore, it is expected that the wife's wage rate is negatively related to the level of fertility.³

The last variable to be examined is the desired level of children's education, which indicates a proxy variable of the quality of children. If there is a strong preference for having children of better quality, married couples will attempt to reduce their number of children and enhance the quality of each child in various ways. In particular, the improvement of their children's educational qualifications is likely to be a mainstream strategy for increasing their quality. Thus, we hypothesise that this variable will have a positive effect on the level of fertility.

(b) Residential factors

The effects of two residential variables on fertility will be tested: the residential arrangement immediately after marriage and the present residential type.

It has been thought that couples living in an extended family show a high fertility rate because their co-residence with parents reduces the economic cost of nursing children, and alleviates the inconvenience of child care. However, preceding studies do not observe consistent evidence supporting this relation between an extended family and fertility. Morgan

³ It may be possible that employment conditions have a significant influence on the level of fertility. For example, the ample provision of parental (or maternal) leave may, *ceteris paribus*, encourage women to have more children. However, examining the relation between working conditions and reproductive pattern requires us to collect detailed data about a respondent's employment history, which is beyond the scope of this research. In this chapter, we therefore focus on the influence of the female wage rate on the level of fertility.

and Rindfuss (1984) point out that the cause of these inconclusive results lies in methodology. According to them, because most of the previous studies employed a residential arrangement at the time of the survey as an explanatory variable, a clear relation was not identified between the two variables. For example, if a couple lived with their parents at the time of the survey, this co-residence may have been started after the couple's children came of age. In this case, the number of children the couple had will bear almost no relation to the co-residence with their parents. Hence, the authors recommend using a residential arrangement immediately after marriage, because this living arrangement exerts a direct influence on the fertility pattern of couples. In the case of Japan, some studies have reported that couples who co-resided with their parents immediately after marriage tended to have more children (Atoh, 1981; Hodge & Ogawa, 1991). Thus, we hypothesise that this variable will have a positive effect on fertility.

In terms of the present residential type, it is expected that a married couple living in an urban area will have fewer children than one living in a rural area, the reason being that the cost of child-rearing is higher in an urban area than in a rural area (Easterlin, 1971). For instance, if parents attempt to provide a single room for each child, the total cost of housing will become higher in an urban region. These economic circumstances will naturally make parents reluctant to have more children.

(c) Value and attitudinal factors

Attitudinal variables employed in this fertility analysis are identical to those used in the analysis of marriage patterns in Chapter 3. We have already classified attitudinal factors into two categories ('progressiveness' and 'individualism'). Along with this classification, it is hypothesised that more progressive and individualistic attitudes will result in a lower level of

fertility.

As discussed earlier, the progressiveness category indicates a level of commitment to traditional values in terms of life-style and the family. In particular, children can be said to be an essential component for the traditional family pattern. For instance, if a commitment to traditional values drives wives to rely on children to care for them in old age, they will be more strongly motivated to have children than wives who are not committed to these same values. Thus, it is expected that a more progressive attitude will lead to a fewer number of children.

On the other hand, the individualism category measures how much respondents commit to the welfare of children and other members of their family, compared with their own self-fulfilment and individual welfare. In this category, as respondents become individualistic, they tend to seek their source of happiness in life from their own self-fulfilment and individual well-being rather than from other members of their family. Since, for these self-oriented people, their primary interest is the attainment of their own goals, their motivation to have children will decrease. Therefore, it is hypothesised that a more individualistic attitude leads to a lower level of fertility.

(d) Other factors

The number of a wife's siblings, marriage types and the duration of marriage are considered in this analysis.

The number of a wife's siblings is expected to exert a positive effect on the level of fertility through biological and sociological channels. First, a wife with many siblings is very likely to have a gene of high fecundity transmitted from her mother, which will result in her own high fertility (Langford & Wilson, 1985). However, this genetic effect may not be so strong if contraception is practised effectively. In the second place, assuming that preference of family size is formed in one's natal household,

wives with many siblings will wish to have more children than those with no siblings (Anderton, Tsuya, Bean, & Mineau, 1987).

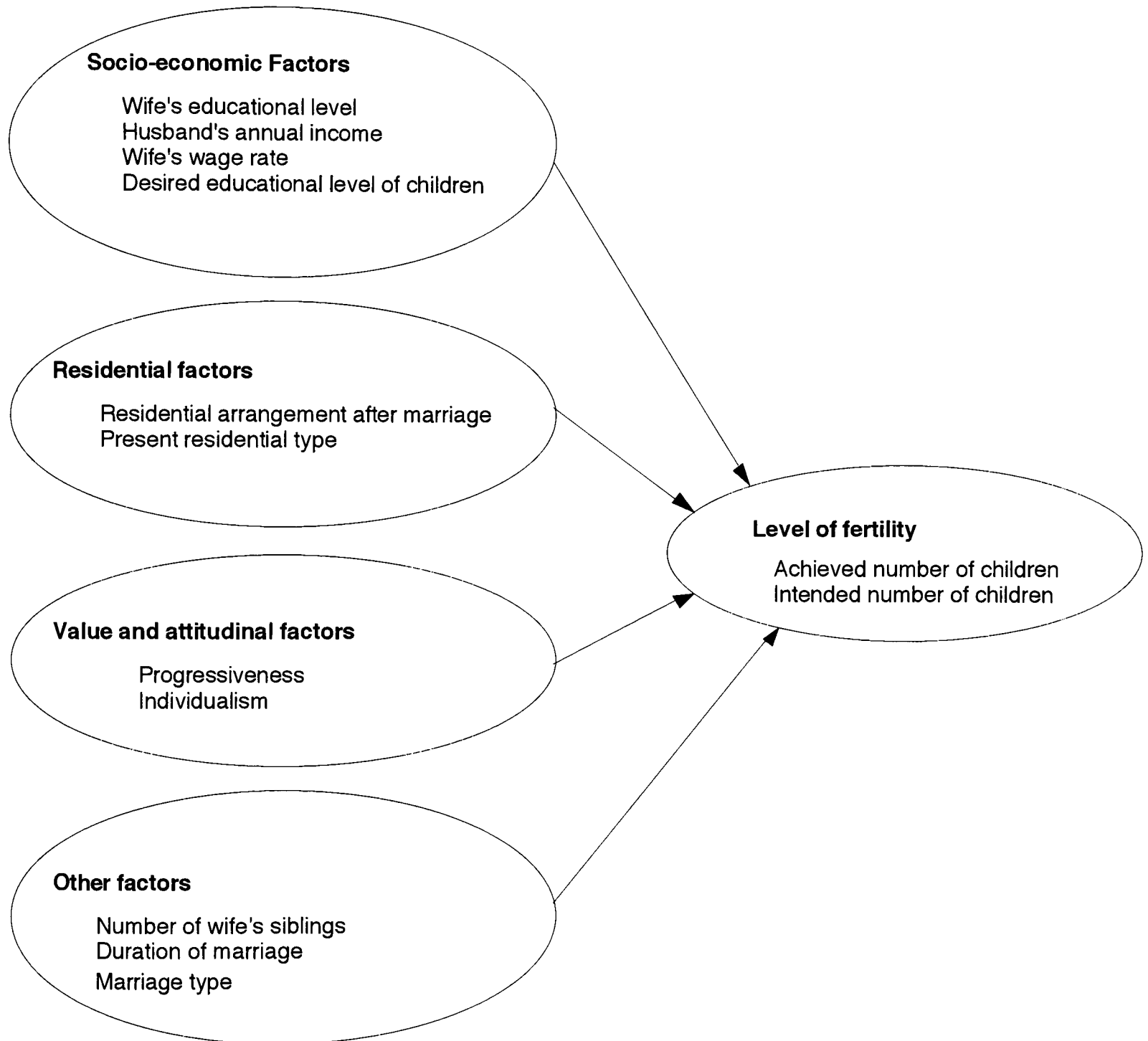
The effect of marriage type, such as arranged marriages and love matches, on the fertility level will be examined in this analysis. The expected effect of marriage type is not determined *a priori*. In a traditional sense, the purpose of an arranged marriage is to establish a connection between two families of the same social stratum. From this viewpoint, an arranged marriage is likely to result in the higher level of fertility, because a couple brought together by an arranged marriage is pressured to solidify the status of the families and secure a family line by producing offspring (Davis, 1955; Morgan & Hiroshima, 1983b). However, as discussed in the previous chapter, an arranged marriage does not always signifies an affiliation between two families of the same social status in contemporary Japan. Rather, an arranged marriage may be made by adults who wished to marry by a certain age but could not meet a suitable partner on their own (Otani, 1991). Of course, most Japanese people would rather marry through a love match,⁴ but they tend to give up on this and make an arranged marriage if they have no chance of making a love match by their target age. Bearing in mind that different means by which couples marry in Japan, we see, however, that there is little difference in their motivation to have children. Both marriage types are expected to reveal no significant difference with regard to couples' fertility pattern.

The duration of marriage is employed as a control variable, and is hypothesised to be linked positively only to the achieved number of children. Assuming that the frequency of coitus and abortions, and the level of fertility control are constant, the number of children will, in the nature of things, rise on a parallel with the duration of marriage. However, when

⁴ According to the tenth Japanese national fertility survey, 65.3% of unmarried men and 70.7% of unmarried women aged 18 to 35 wished to marry by a love match (see Kôsei Sho Jinkô Mondai Kenkyûjo, 1994c).

couples have a definite target number of children and after they realise it, this variable will no longer affect the level of fertility. Thus, it is expected that the duration of marriage has a greater influence on lower-order births than higher-order births.

Figure 4.1: Analytical Framework of the Level of Fertility



4.4 Differences in the Achieved Number of Children

Before exploring the achieved number of children by a multi-variate analysis, we will, in this section, show the results of uni-variate analyses derived from the survey data. In these analyses, we selected never-divorced couples out of the whole respondents of the survey, because the fertility

patterns of divorced respondents are thought to be different from those who had never divorced. Furthermore, we dealt only with couples who had been married for more than ten years. Because, in Japan, the cumulative number of children hardly increases after ten years have elapsed in a married life (Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b), the number of children these couples have can be regarded as a proxy of completed family size.

Table 4.1 displays the mean number of children according to socio-economic variables. As might be expected, a slightly positive connection was observed between the mean number of children and the wife's educational background. The mean of junior or high school graduates (=2.31) was greater by only 0.06 than that of vocational or junior college graduates (=2.25). Furthermore, women who had enjoyed university education had fewer children by 0.08 than those who terminated their education in a vocational school or a junior college.

Concerning a husband's annual income, the average number of children was lowest in the 'less than 3,000' category (=1.98), while the largest figure appeared in the '8,000 or more' category (=2.47). Interestingly, the mean numbers did not increase linearly. For example, the difference between the mean of the '6,000-7,999' group and of the '8,000 or more' group was only 0.02, while the difference between the mean of the "3,000-3,999" group and the '4,000-4,999' group reached 0.14. This positive relation suggests that a rise in a husband's income boosts the level of demand for children. This agrees with the New Home Economics theory.

With reference to the desired educational level of children, the higher qualification the parents wished for their children, the fewer children they had. In particular, the difference of the mean between the lowest and middle categories are very large. For instance, in the case of a daughter's education, compared with 2.84 in the junior or senior high school category,

the vocational school or junior college category was 2.26. On the other hand, the mean of the university or higher group was greater by only 0.15 than that of the vocational group.

In contrast to the husband's income, a negative relation was found concerning a wife's income. In the 'less than 3,000' group to the '6,000-7,999' group, the mean number of children fell as the wife's income rose, suggesting that the wife's opportunity costs had a reducing effect on the level of fertility. However, the relation between the two variables was not a monotonic decrease. Although the mean of children remained at 2.22 from the lowest category (=less than 3,000) to the second lowest category (=3,000-3,999), it thereafter fell gradually down to 2.07 in the second highest category (=6,000-7,999). This evidence suggests that the elasticity of the wife's income to the number of children was not constant. Interestingly, the highest group (=8000 or more) yielded a greater mean number than the second highest group. This reversing phenomenon was probably due to the small number of cases in the highest category.

Table 4.1: The Achieved Number of Children according to Socio-economic Variables

Wife's Education	Mean	Standard Deviation	N	Husband's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
				Less than 3,000	1.98	0.84	51
Junior or Senior High School	2.31	0.95	501	3,000 - 3,999	2.07	0.72	77
				4,000 - 4,999	2.21	0.96	103
Vocational School or Junior College	2.25	0.88	99	5,000 - 5,999	2.34	1.04	128
				6,000 - 7,999	2.45	0.93	154
University or Higher	2.17	1.09	52	8,000 or More	2.47	0.94	129
Total	2.29	0.95	652	Total	2.28	0.95	642

Source: Survey Data

Source: Survey Data

Desired Education	Mean	Standard Deviation	N	Desired Education	Mean	Standard Deviation	N
(Son)				(Daughter)			
Junior or Senior High School	2.90	1.06	49	Junior or Senior High School	2.84	1.03	100
Vocational School or Junior College	2.30	0.89	56	Vocational School or Junior College	2.26	0.64	286
University or Higher	2.24	0.59	545	University or Higher	2.11	0.63	264
Total	2.29	0.95	650	Total	2.29	0.95	650

Source: Survey Data

Wife's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
Less than 3,000	2.22	0.97	310
3,000 - 3,999	2.22	0.91	59
4,000 - 4,999	2.18	0.89	34
5,000 - 5,999	2.17	0.77	26
6,000 - 7,999	2.07	0.91	15
8,000 or More	2.09	1.02	6
Total	2.21	0.95	450

Note: Housewives, students and not working women are excluded.

Source: Survey Data

Next, we will look at the effect of co-residence with parents after marriage in Table 4.2. As might be expected, co-residence with parents increased the number of children born to a couple. The mean of the co-residence category stood at 2.49, whereas the couples who lived without any parents had, on average, 2.20 children. The difference between the two groups was 0.29 children. This result may be explained in two ways. First, because parental support reduces the physical and psychological burden of child-rearing, co-residence with parents raises the level of fertility. Second, conservative couples, who prefer to live with their parents, tend to have more children.

A minor difference was seen with respect to the present residential type (see Table 4.2). While the mean number of children whose parents lived in a rural area was 2.47, those in an urban area reached 2.27. It follows that couples living in rural areas tend to have more children than those in urban areas. Regional differences in fertility patterns within a nation state have gradually disappeared in European countries probably due to the development of universal education and mass communication (Coleman, 1993; Watkins, 1991). As far as the present result shows, regional differences in fertility patterns are small between rural and urban areas in Japan.

Table 4.2: The Achieved Number of Children according to Residential Variables

Residential Arrangement Immediately after Marriage	Mean	Standard Deviation	N	Present Residential Area	Mean	Standard Deviation	N
Lived with own parents or spouse's parents	2.49	1.05	195	Urban	2.27	0.95	518
Neither spouse's nor own parents	2.20	0.58	455	Rural	2.47	0.91	130
Total	2.29	0.95	650	Total	2.29	0.94	648

Source: Survey Data
 Urban : Its administrative unit is a city.
 Rural: Its administrative unite is a town or a village.

Source: Survey Data

Let us turn to the effect of attitudinal factors on the level of fertility. Table 4.3 displays the averages of the achieved number of children according to the respondent's attitudes. Questions A to H fall on the 'progressiveness' category, and Questions I to N on the 'individualism' category.

As far as the progressiveness dimension is concerned, in Questions B (common-law marriage), C (unmarried women with children), and H (co-residence with parents), we found that there was a tendency for more progressive women to have fewer children, although the difference of the

mean between the answering categories varied from question to question. For instance, in Question B, the mean of the number of children in the 'completely acceptable' category reached 1.95, while that of the 'completely unacceptable' category stood at 2.34. The difference between both extreme answers to the question was approximately 0.4 children. In Question C, the mean was 1.57 in the 'completely acceptable' category, and 2.39 in the 'completely unacceptable' category, the difference between the two reaching fully 0.82.

In contrast, any consistent trend was not observed in the remaining questions. For example, in Question F (care of aged parents), the least progressive women, who strongly agreed that aged parents should be cared for aged, had the highest percentage in the number of children (=2.41), while women in the 'disagree strongly' group showed the second highest figure (=2.40). Furthermore, the difference between the two groups was negligible. Likewise, in Question A (never married), the mean of the number of children in the 'unacceptable' group was the second highest (=2.30) among all categories, whereas the highest figure (=2.45) appeared in the 'completely unacceptable' group.

With regard to individualistic attitudes, a systematic trend was observed in Questions I (parents devoted to children over self-interest), K (mother home during infancy years), L (children important) and M (goal-oriented individual), but the remaining two questions did not show a trend. Hence, we may say that the influence of attitudes on the fertility pattern appears more clearly in the questions on the individualism dimension than those on the progressiveness dimension. For instance, in Question I, which is a most direct index of belief in the duty of parents towards children, the highest fertility (=2.45) appeared in the women who strongly agreed with this view. On the other hand, the women who strongly disagreed with it yielded the lowest mean (=1.95). On the other hand, in Question N

(unmarried life for goal-pursuing), the largest mean (=2.48) appeared in the 'disagree strongly' group, whereas the second largest (=2.38) was in the 'agree strongly' group. Because the 'disagree strongly' category in this question included only ten cases, the large mean of this category may have resulted from the small number of cases.

Table 4.3: Relationship Between the Achieved Number of Children and Attitudinal Factors

A: Never getting married throughout life				B: Common-law marriage			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Completely acceptable	1.61	0.83	55	Completely acceptable	1.95	1.15	51
Acceptable	2.30	1.21	107	Acceptable	2.28	0.96	85
Unacceptable	2.28	0.86	284	Unacceptable	2.30	0.97	263
Completely unacceptable	2.45	0.85	203	Completely unacceptable	2.34	0.86	250
D.K. or N.A.	1.41	1.46	4	D.K. or N.A.	1.41	1.46	4
Total	2.29	0.95	653	Total	2.29	0.95	653
C: Unmarried women bearing and rearing children				D: Homosexual relationships			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Completely acceptable	1.57	0.81	51	Completely acceptable	1.72	0.87	17
Acceptable	2.25	0.84	64	Acceptable	2.17	0.75	36
Unacceptable	2.31	1.09	254	Unacceptable	2.39	1.03	111
Completely unacceptable	2.39	0.77	280	Completely unacceptable	2.31	0.94	473
D.K. or N.A.	1.41	1.46	4	D.K. or N.A.	1.41	1.46	4
Total	2.29	0.95	653	Total	2.29	0.95	653

E: A man and a woman love each other, their pre-marital sexual intercourse is permissible.

	Mean	Standard Deviation	N
Agree strongly	2.03	1.04	68
Agree	2.29	0.86	274
Disagree	2.38	1.06	236
Disagree strongly	2.18	0.74	53
D.K. or N.A.	1.98	0.79	22
Total	2.29	0.95	653

G: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

	Mean	Standard Deviation	N
Agree strongly	2.57	1.18	74
Agree	2.32	0.87	290
Disagree	2.14	0.94	192
Disagree strongly	2.37	0.95	91
D.K. or N.A.	1.80	0.81	6
Total	2.29	0.95	653

I: Parents duty is to do their best for their children, at the expense of their own well-being.

	Mean	Standard Deviation	N
Agree strongly	2.45	1.27	81
Agree	2.36	0.86	239
Disagree	2.30	0.93	223
Disagree strongly	1.95	0.79	104
D.K. or N.A.	1.94	0.95	6
Total	2.29	0.95	653

F: It is a child's duty to care for aged parents.

	Mean	Standard Deviation	N
Agree strongly	2.41	1.11	220
Agree	2.26	0.83	375
Disagree	1.81	0.92	37
Disagree strongly	2.40	0.57	5
D.K. or N.A.	1.83	0.79	16
Total	2.29	0.95	653

H: It is better to live with parents after marriage.

	Mean	Standard Deviation	N
Agree strongly	2.55	1.11	43
Agree	2.29	1.12	210
Disagree	2.26	0.81	297
Disagree strongly	2.25	0.85	86
D.K. or N.A.	1.77	0.71	17
Total	2.29	0.95	653

J: When personalities do not match, a divorce is reasonable.

	Mean	Standard Deviation	N
Agree strongly	2.21	1.21	114
Agree	2.36	0.84	175
Disagree	2.29	0.92	271
Disagree strongly	2.42	1.05	70
D.K. or N.A.	1.67	0.63	23
Total	2.29	0.95	653

K: When a child is small, a mother should stay home without working outside the home.

	Mean	Standard Deviation	N
Agree strongly	2.42	1.03	207
Agree	2.26	0.95	322
Disagree	2.14	0.67	82
Disagree strongly	2.09	0.98	26
D.K. or N.A.	1.74	0.72	16
Total	2.29	0.95	653

L: Children are important to a successful marriage.

	Mean	Standard Deviation	N
Agree strongly	2.38	0.94	328
Agree	2.25	0.94	270
Disagree	1.82	0.86	26
Disagree strongly	1.63	0.93	21
D.K. or N.A.	2.14	0.98	8
Total	2.29	0.95	653

M: Even After marriage, one should not sacrifice one's own goals in life for one's family.

	Mean	Standard Deviation	N
Agree strongly	2.11	0.82	78
Agree	2.26	0.86	345
Disagree	2.35	1.15	183
Disagree strongly	2.47	0.62	41
D.K. or N.A.	2.18	0.88	6
Total	2.29	0.95	653

N: It is not essential to get married if it means sacrificing one's own goal in life.

	Mean	Standard Deviation	N
Agree strongly	2.38	0.71	185
Agree	2.24	0.86	349
Disagree	2.33	0.88	89
Disagree strongly	2.48	1.12	10
D.K. or N.A.	1.64	0.87	20
Total	2.29	0.95	653

Note: D.K. or N.A. : do not know or no answer

The inquiring sentence of these questions is "What do you think of the following life styles or views?"

Finally, we will look briefly at the remaining explanatory variables. Table 4.4 displays the relationship between the number of children, the marriage type and the number of wife's siblings. Compared to women who married through an arranged marriage, those through a love match showed a slightly lower mean in the number of children. The former mean reached 2.26, whereas the latter stood at 2.31, their difference being only 0.05. It is seen from the findings that there is no clear difference between the two types of marriage in respect of the level of fertility, which supports the argument that an arranged marriage has been weakening the sense of

affiliation between a groom's and a bride's natal family. This transformation in the characteristics of arranged marriages may be derived from the disappearance of the Japanese 'Ie' system (Otani, 1993). As more people do not feel the necessity of continuing a family line, an arranged marriage will lose the sense of affiliation between a groom's and a bride's natal family. Rather, women who exceed the marriageable age but who desperately want to marry opt for an arranged marriage (Otani, 1986).

With regard to the number of wife's siblings, a salient linear pattern appeared in Table 4.4. The number of children in each category increased on a parallel with a rise in the number of wife's siblings. Women without any siblings, on the average, gave birth to 2.05 children, whereas those with over three siblings had 2.35 children. This suggests that the characteristics of a wife's natal household exerts an influence on her own fertility pattern through a genetic or a socialising channel.

Table 4.4: The Relationship between the Achieved Number of Children, the Marriage Type and the Number of Wife's Siblings

Marriage Type	Mean	Standard Deviation	N	Number of Wife's Siblings	Mean	Standard Deviation	N
Love Match	2.26	0.95	433	None	2.08	0.98	34
Arranged Marriage	2.31	0.96	192	1	2.24	0.88	170
Other	2.14	0.91	28	2	2.29	0.89	220
Total	2.29	0.95	653	3 or More	2.35	0.97	229
				Total	2.29	0.95	653

Source: Survey Data

Source: Survey Data

4.5 Analytical Method of the Number of Children

For the multi-variate analysis of the number of children, logistic regression⁵ was used here to test the hypotheses. This analysis is very suitable for a

⁵ For further details of statistical explanation, see Cox (1970) and Hosmer & Lemeshow (1989).

dichotomous dependent variable. In this model, the dependent variable is the (log) odds ratio, and each regression coefficient represents the additive or multiplicative effect of each independent variable on the dependent variable. The model can be expressed as follows:

$$\left(\frac{P_i}{1-P_i}\right) = e^{\beta_0} e^{\beta_1 x_{i1}} e^{\beta_2 x_{i2}} \dots e^{\beta_k x_{ik}} \quad (\text{Multiplicative formulation})$$

or

$$\log\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + \dots + \beta_k x_{ik} \quad (\text{Additive formulation})$$

where

P_i = The probability that the i th person is in the category of interest on a dichotomous dependent variable

$1-P_i$ = The probability that he or she is in the other category

β_i = A set of K estimated parameters

X_i = A set of K independent variables

Although several analogues to the R^2 of the OLS regression have been proposed for logistic regression, the pseudo R^2 of logistic regression is a useful index to measure the explanatory power of the model (Aldrich & Nelson, 1984). Its formula is expressed as follows:

$$\text{Pseudo } R^2 = \frac{-2\log\left(\frac{L_0}{L_1}\right)}{N-2\log\left(\frac{L_0}{L_1}\right)}$$

where

L_1 = The value of the likelihood function for the full model

L_0 = The maximum value of the likelihood function if all coefficients except the intercept are 0

N = The total number of observations

This measure ranges between 0 and 1, approaching 0 as the goodness-of-fit for a model diminishes, and 1 as it increases. Hence, it provides a good approximation for the OLS regression R^2 , but does not incorporate a penalty for increasing the number of irrelevant independent variables. Hagle and Mitchell (1992) proposes the corrected pseudo R^2 in the same way as in the OLS R^2 , and we here employed it as an index of the explanatory power of a model. This corrected measure is defined as follows:

$$\text{Corrected pseudo } R^2 = 1 - (1 - R^2) \times \frac{(N - 1)}{(N - k)}$$

where

$R^2 =$ Pseudo R^2

$N =$ The total number of observations

$k =$ The number of independent variables including the constant

In our analyses, two separate logistic regressions were carried out in each model. The dependent variable of the first regression was the log odds of couples with no children or one child over those with two or more children, and that of the second regression was the log odds of couples with three or more children over those with two children. As was shown in the previous section, Japanese couples, on average, had about two children. Therefore, we can classify their fertility patterns into three categories: below average parity (=no children or one child), average parity (=two children) and above average parity (=three or more children). The odds of the first regression were prepared to investigate what factors generated the fertility pattern of those couples who had children below the average parity. In addition, because an actual reproductive behaviour has the sequential nature of fertility decision, the second regression attempted to examine the determinants of the fertility pattern of those couples who moved their parity from the average to the over average, by taking up only couples with

two or more children.

For the sake of parsimony, we transformed the husband's annual income and the wife's income into numerical variables in the following way. We first re-coded each of these variables according to the midpoints of the class intervals which were reported in our survey, with the exception of the lowest and highest categories. The open-ended lowest category was valued at 500,000 yen and the open-ended highest category was valued at 12,000,000 yen. Sequentially, we took the natural logarithm of these values concerning the husband's income. If a husband did not work, he scored 0. In terms of the wife's income, we re-coded her weekly working hours in the same way as the annual income. As regards the open-ended categories, 'less than 20 hours' was coded 15 and '60 or more' was coded 65. We thereafter divided the wife's newly coded annual income by the number of her working hours per week. We regarded this value as a proxy of the wife's wage rate and took the natural logarithm of it.

In addition to this, we transformed the attitudinal variables into continuous variables in the same way as in the previous chapter. Hence, it follows that the more progressive a woman is, the higher value she shows on this scale. Likewise, the more individualistic attitude a woman has, the higher her score.

4.6 Results of the Analysis of the Achieved Number of Children

The first model⁶ was provided to examine the effect of explanatory variables except the attitudinal factors, and its results are displayed in Table 4.5. The first column of Table 4.5 exhibits the exponential coefficients and standard errors of logistic regression in terms of the probability of there being no children or one child over two or more children. The second column shows the coefficients and the standard errors regarding the probability of

⁶ As we noted in Chapter 3, the interaction effect of independent variables is not considered in the analyses of this chapter.

there being three or more children over two children.

With regard to the logarithm of the husband's annual income and the logarithm of the wife's wage rate, a statistically significant effect was founded in the two regressions. In the first regression, the husband's income had a negative effect, and the wife's wage rate and the wife's educational attainment had a positive effect on the probability of having no children or one child. The coefficient of the husband's income was 0.956, and a unit increase in this variable reduces the probability of having no children or a child by about 5%. On the other hand, the wife's wage rate had the coefficient of 1.183, which means that the odds ratio of the below average parity over the average parity increases by 18% with a unit increase in this variable. In the second regression, the husband's income was positively, and the wife's wage rate was negatively connected to the dependent variable. More specifically, the result of this regression shows that a unit increase of the husband income enhanced the probability of having three or more children by 1.24 times, and that of the wife's wage rate decreased it by 0.85.

The present results are in agreement with the argument proposed by the New Home Economics theory. As mentioned earlier, the theory holds that the husband's income positively and the wife's wage negatively affect the level of fertility. The coefficients of these two variables in Table 4.5 accord with the prediction of the theory. Hence, it follows that economic factors affect the fertility behaviour of Japanese couples in the way the new home economics theory claims.

Two interesting points are worth noting here. First, the coefficients of the desired educational level of children were significant at the 1% level in both regressions. Compared to the 'none' category of the children's educational level, the 'either' category increased the probability of having no or one child by 1.24 times in the first regression and decreased the

probability of having three or more children by 0.94 in the second model. Likewise, the 'both' category enhanced the odds ratio of none or one child over two or more children by 1.31 times in the first regression, and reduced the odds ratio of there being three or more children over there being two children by 0.94 in the second regression. This evidence suggests that parental motivation for enhancing the quality of children plays a key part in determining the level of fertility.

Secondly, although the coefficients of the wife's education was significant in the first regression, they became insignificant in the second regression. In the first regression, high educational qualification in wives increased the probability of having no children or one child. However, in the second regression, the coefficients of wife's educational qualification did not reveal a significant effect on the probability of having three or more children. These results partly called the traditional theory of fertility into question. Some earlier studies show that the level of female education background is positively linked to the level of fertility regardless of birth order. However, this proposition is not wholly supported by our results. Probably because these studies did not extract a direct effect of women's education by controlling other socio-economic effects such as income, a positive connection may have been observed between female education and fertility (Andorka, 1978). However, since our models controlled such effects in a more accurate way, the influence of the wife's educational attainment became insignificant in the second regression.

Couples who lived with their parents showed a lower probability of having no children or one child, and a greater probability of having three or more children than those who had not lived with their parents. However, the coefficient of this variable was significant in the first regression, but insignificant in the second model. Similarly, an increase in the number of wife's siblings decreased the odds ratio of having none or one child over

having two or more children with statistical significance, but increased the ratio of having three or more children to having two children without statistical significance. In this evidence, it is indicated that these two variables have a significant effect on the probability of progressing to average parity, but no significant effect on that of moving on to over average parity.

The present residential type and the marriage type did not reveal a significant effect in either regression. Although couples who married through an love match tended to have fewer children than those through an arranged marriage, all coefficients of this variable were statistically insignificant with the 5% level. This evidence supports the argument that in contemporary Japan an arranged marriage no longer means an affiliation between two families of the same social status. Likewise, couples living urban areas yielded a greater probability of having fewer children than those living rural areas, but the coefficients of this variable was statistically insignificant. It follows that, in contemporary Japan, residential factors do not affect the level of fertility significantly.

Table 4.5: The Result of Logistic Regression of the First Model (the Achieved Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.956*	.022	1.244*	.110
Logarithm of Wife's Wage Rate	1.183*	.084	.859*	.077
Present Residential Area				
Urban	1.168	.155	.955	.162
(Rural)	1.000		1.000	
Co-residence with parents				
Own or spouse's	.935*	.033	1.121	.235
(Neither spouse's nor own)	1.000		1.000	
Wife's Educational Level				
(High School)	1.000		1.000	
Junior College	1.314*	.108	.955	.162
University	1.426*	.140	.918	.122
Desired Education of Children				
Both	1.311*	.095	.887*	.046
Either	1.243*	.075	.940*	.023
(None)	1.000		1.000	
Number of Wife's Siblings	.925*	.035	1.156	.110
Duration of Marriage	.963**	.017	1.194*	.086
Marriage type				
Love match	1.126	.112	.924	.237
(Arranged marriage)	1.000		1.000	
Number of Cases	951		663	
Corrected Pseudo R Square	0.497		0.489	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: Desired Education of Children

Both: Both sons and daughters are/were desired to go to university.

Either: Either sons or daughters are/were desired to go to university.

None: Neither sons nor daughters are/were desired to go to university.

Wife's Educational Level

High School: Junior or High School

Junior College: Vocational School or Junior College

University: University or Higher

The second model was employed to examine the effects of progressive attitudes on the achieved number of children, and its results are displayed in Table 4.6. This model includes variables showing a significant effect on the first model, and attitudinal variables falling into the 'progressiveness' category (excluding Japanese traditional values) as explanatory variables.

In the first logistic regression, two explanatory variables (QC (unmarried women with children) and QF (husband works/wife at home)) were significant at the 5% level among the six attitudinal variables, and this result indicates that the probability of bearing no children or one child becomes greater in women who are more progressive. For instance, QC's coefficient was 1.22, which means that a unit rise in this attitudinal variable increases the probability of having none or one child by 1.22 times. In contrast, QA (never married), QB (common-law marriage), QD (homosexual relationship) and QE (couple-premarital sex permissible) did not reveal a significant coefficient at the 5% level, but the directions of the coefficients support our hypothesis that more progressive women tend to have below average family size (remaining childless or with one child).

The important point to note is that, even in this regression, the socio-economic variables had a significant effect on the achieved number of children. In concrete terms, the husband's annual income was positively related to the dependent variable, and the wife's wage rate was negatively linked to it. The former coefficient stood at 0.96 and the latter was 1.139. Hence, it follows that, even when controlling the influence of the attitudinal factors, the socio-economic factors affect a couple's fertility behaviour.

In the second regression in Table 4.6, only QF's coefficient was 0.936 at the 5% level of significance. This means that a unit increase in QF decreases the probability of having three or more children by about 6%. However, the remaining attitudinal variables did not exert significant influence on the odds ratio of having three or more children over having two children. Again, the husband's and the wife's economic variable, and the children's quality variable were significantly related to the log odds in second regression. Compared to parents who did not hope that both sons and daughters would go to university, parents who wanted both sons and daughters to go to university reduced their probability of bearing three or

more children by about 10%. Therefore, in the case of higher-order births, socio-economic factors had an effect on the number of children.

Although some attitudinal variables relating 'progressive' attitudes significantly affected the number of children a couple had, the explanatory power of these variables is not great. Regression models including the attitudinal variable relevant to 'progressive' attitudes do not show a substantial improvement in terms of the corrected pseudo R^2 . In the first regression, while the corrected pseudo R^2 of the model without any attitudinal variables was 0.485, that of the full model including all the variables stood at 0.530. Similarly, in the second regression, the corrected pseudo R^2 of the full model was greater only by 0.035 than that of the reduced model. It follows from this evidence that progressive attitudes do not have a powerful impact on the achieved number of children.

Table 4.6: The result of Logistic Regression of the Second Model (the Achieved Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.961*	.019	1.352*	.141
Logarithm of Wife's Wage Rate	1.139*	.059	.868*	.053
Co-residence with parents Own or spouse's (Neither spouse's nor own)	.937* 1.000	.032	1.050 1.000	.152
Wife's Educational Level (High School)	1.000	.072	1.000	
Junior College	1.214*	.112	.956	.167
University	1.365*		.870	.201
Desired Education of Children Both	1.310*	.105	.911*	.036
Either	1.254*	.084	.967*	.013
(None)	1.000		1.000	
Number of Wife's Siblings	.932*	.029	1.149	.148
Duration of Marriage	.919**	.023	1.292*	.109
QA	1.070	.246	.910	.137
QB	1.103	.163	.996	.219
QC	1.222*	.096	.978	.210
QD	1.093	.261	.900	.119
QE	1.116	.127	.940	.258
QF	1.135*	.057	.935*	.031
Number of Cases	951		663	
Corrected Pseudo R Square	0.530		0.502	

Corrected Pseudo R Square (Without attitudinal variables)	0.485		0.467	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QA: Never getting married throughout life
 QB: Common-law marriage
 QC: Unmarried women bearing and rearing children
 QD: Homosexual relationships
 QE: A man and a woman love each other, their pre-marital sexual intercourse is permissible.
 QF: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

The third model was prepared to investigate the influence of individualistic attitudes and its results are displayed in Table 4.7.

Concerning individualism variables, We detected that QH (mother

home during infancy years), QI (children important), and QK (goal-oriented individual) had a significant effect at the 5% level in the first regression, which suggests that, the more individualistic the women, the fewer children they gave birth to. To take a typical case, the coefficient of QK was 1.24 and it enhanced the odds ratio of bearing no children or one child over two or more children by about 1.24 times with a unit increase. On the other hand, QG (divorce), QJ (children important) and QL (unmarried life for goal-pursuing) yielded a small and insignificant coefficient. QG's coefficient, for instance, stood at only 1.03 and was not significant at the 5% level. These coefficients indicate that a strong commitment to self-fulfilment or own well-being does not always result in a lower fertility. Nevertheless, it is noted that this regression produced an improved power of explanation. Compared to the model excluding all attitudinal variables, the full model having these attitudinal variables improved its corrected pseudo R^2 (=0.548) by about 6%.

In the second regression in Table 4.7, a significant effect appeared in QH (mother home during infancy years) and QI (children important) among the six attitudinal variables. In addition, both variables had a reducing effect on the level of fertility. In concrete terms, the coefficient of QH was 0.913 and that of QI was 0.928. Thus, these two variables reduce the probability of having three or more children by 9% and 7% respectively. Like the case of the first regression of this model, the corrected pseudo R^2 of the full model also was greater by 0.59 than that of the reduced model in the second regression.

In view of the above evidence, it can easily be recognised that the achieved number of children is affected by the extent to which attitudes are 'individualistic'. Socio-economic variables such as the husband's income and the wife's wage rate had a significant effect on the dependent variable in both the first and the second regression. However, the explanatory power of

the models was slightly improved when they included the attitudinal variables. This evidence indicates that individualistic factors have a significant but weak influence on Japanese couples' fertility behaviour. In addition, individualistic attitudes have more impact on fertility behaviour than do progressive attitudes. While the increase of the corrected pseudo R^2 caused by including the attitudinal variables was less than 5% in the two regressions of the second model, that reached a more than 5% increase in the two regressions of the third model.

Table 4.7: The result of Logistic Regression of the Third Model (the Achieved Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.910*	.042	1.341*	.132
Logarithm of Wife's Wage Rate	1.124*	.051	.939*	.027
Co-residence with parents Own or spouse's (Neither spouse's nor own)	.920* 1.000	.037	1.154 1.000	.386
Wife's Educational Level (High School)	1.000		1.000	
Junior College	1.175*	.056	.979	.218
University	1.255*	.091	.884	.253
Desired Education of Children Both	1.384*	.114	.861*	.056
Either	1.277*	.100	.972*	.011
(None)	1.000		1.000	
Number of Wife's Siblings	.939*	.030	1.217	.195
Duration of Marriage	.922**	.029	1.232*	.098
QG	1.042	.253	.976	.420
QH	1.358*	.148	.913*	.041
QI	1.279*	.118	.928*	.037
QJ	1.018	.325	.971	.514
QK	1.247*	.109	.963	.289
QL	1.031	.375	.961	.315
Number of Cases	951		663	
Corrected Pseudo R Square	0.548		0.526	

Corrected Pseudo R Square (Without attitudinal variables)	0.485		0.467	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QG: When personalities do not match, a divorce is reasonable.
 QH: When a child is small, a mother should stay home without working outside the home.
 QI: Children are important to a successful marriage.
 QJ: Parents duty is to do their best for their children, at the expense of their own well-being.
 QK: Even After marriage, one should not sacrifice one's own goals in life for one's family.
 QL: It is not essential to get married if it means sacrificing one's own goal in life.

Finally, we will examine the effects of attitudinal variables regarding Japanese traditional values in the fourth model in Table 4.8. This model includes attitudes to aged parents' care and to co-residence with parents

after marriage as explanatory variables.

In terms of the two attitudinal variables, we did not identify a clear effect in both the first and the second regression. Although these two variables, QM (care of aged parents) and QN (co-residence with parents), had a reducing effect on the number of children in both regressions, the variables did not link to their dependent variable significantly. For example, the coefficient of QM was 1.13 in the first regression, which means a unit increase in the variable increased, by 1.13, the probability of having no children or one child. However, its statistical significance was more than 5%. Likewise, although this variable yielded a coefficient which decreases the probability of bearing three or more children (=0.986) in the second regression, the effect of this variable was not, again, significant at the 5% level. Furthermore, the corrected pseudo R^2 of the model with the two attitudinal variables was negligibly greater in the first and second regression than in the model without the variables. More specifically, the two full models increased their R^2 by only 1% in comparison with their reduced model. Thus, it can be argued that Japanese traditional variables have a weak effect on the number of children.

Table 4.8: The result of Logistic Regression of the Fourth Model (the Achieved Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.902*	.044	1.473*	.183
Logarithm of Wife's Wage Rate	1.288*	.107	.935*	.028
Co-residence with parents				
Own or spouse's	.915*	.041	1.252	.275
(Neither spouse's nor own)	1.000		1.000	
Wife's Educational Level				
(High School)	1.000		1.000	.218
Junior College	1.194*	.063	.941	.193
University	1.265*	.088	.899	
Desired Education of Children				
Both	1.398*	.123	.854*	.056
Either	1.309*	.107	.962*	.014
(None)	1.000		1.000	
Number of Wife's Siblings	.947*	.026	1.242	.170
Duration of Marriage	.930**	.025	1.259*	.097
QM	1.133	.148	.986	.158
QN	1.092	.156	.975	.151
Number of Cases	951		663	
Corrected Pseudo R Square	0.496		0.472	

Corrected Pseudo R Square (Without attitudinal variables)	0.485		0.467	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QM : It is a child's duty to care for aged parents.
 QN: It is better to live with parents after marriage.

4.7 The Relation between the Achieved and the Desired Number of Children

The previous analyses attempted to examine the determinants of the achieved number of children. Their results first showed that socio-economic factors such as the husband's annual income, the wife's wage rate and the children's quality played an important part in determining the achieved number of children in contemporary Japan. This suggests that the New Home Economics theory is, to a considerable extent, relevant to explaining the recent Japanese fertility decline. However, it also identified that

attitudinal factors had an influence on the level of fertility. Some attitudinal variables concerning 'progressiveness' and 'individualism' affected the number of children significantly. Therefore, as Blake (1968) points out, children are not simple consumer durables in contemporary Japan, and the prevalence of progressive and individualistic attitudes should be taken into account when explaining the Japanese recent low fertility. In other words, Japanese married couples are not purely materialistic, and their fertility behaviour is not governed only by economic rationality.

However, it seems premature to complete a investigation concerning the influence of socio-economic and attitudinal factors on Japanese fertility behaviour. Observed levels of fertility are not always equal to desired levels of fertility. In fact, only 1.7% of Japanese women wanted to remain childless, but the percentage of women having no children reached 3.1%. By contrast, 1.8% of Japanese women preferred more than four children, while the percentage of women bearing more than four children was 4.8% (Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b). This evidence suggests that couples' achieved levels of fertility do not always follow their fertility intentions. More specifically, where contraception is practised effectively and widely, the achieved fertility is partly a stochastic process, including unwanted births.⁷ Contraceptive failures⁸ bring more children than a couple want to have, if they do not seek abortions. On the other hand, infecandity prevents couples from achieving their desired family size. These factors may disturb the relation between socio-economic factors and the achieved fertility. In addition, respondents of our survey are married women. A couple's decision about how many children they have is, in reality, affected by the attitudes of a husband and wife. Hence, the extent to which a wife's attitude is reflected by her achieved level of fertility is uncertain. Taking these points

⁷ In the case of the U.S., the mean number of unwanted births per women was about 0.40 in 1970 (see Westoff & Ryder, 1977).

⁸ Becker (1960) pointed out that fertility difference among income levels was accounted for by the level of information on contraceptive methods.

into consideration, we will, in the following sections, carry out the analysis of fertility intentions.

In measuring one's intentions as to how many children one wants to have, we can consider two sorts of scales: the ideal number of children and the intended number of children. The first number is, for example, indicated by posing the question, 'What is your ideal number of children?'. In this question, respondents may answer giving the number of children they wish to have, regardless of physiological and economic constraints such as their housing conditions. Therefore, this number of children desired is inflated and may not reflect the actual desire for children. On the other hand, the second number is the sum of living children plus children that a wife (or a husband) plans to have. Obviously the latter (=the intended number of children) signifies the more actual intention of births than the former. Therefore, we can say that the intended number of children is a more accurate index of fertility intention than the ideal number of children. In the following analyses, we will employ the latter type of number and attempt to analyse the intention of fertility.

4.8 Differences in the Intended Number of Children

This section attempts to make a uni-variate analysis of the intended number of children. Only couples who had been married over ten years were dealt with in the uni-variate analyses of the achieved number of children, but we shall here examine the fertility intention of all couples who have not experienced divorce.

Table 4.9 presents the intended number of children according to the socio-economic variables. First of all, only a negligible difference in the overall mean was identified between the intended number and the achieved number of children. The former was about 2.18 and the latter was 2.28 (see Table 4.1). Thus, it follows that Japanese couples practice contraception

successfully. In terms of each socio-economic variable, a consistent trend was observed in the wife's education, the husband's annual income and the desirable level of children's education. More specifically, while the lowest category of the husband's annual income yielded the lowest mean (=1.95), the highest income category showed the greatest mean (=2.33). The intermediate categories revealed that the mean value of the intended number of children increased in tandem with a rise in the husband's income. Similarly, the higher the wife's educational attainment, the smaller the mean of the intended number of the children. In addition, as the desired level of children's education increased, the average of the intended number of children decreased. Interestingly, a rise in the wife's annual income did not cause a monotonic decrease in the mean of the intended number of children. The '3,000-3,999' category was equivalent to the '4,000-4,999' category in the mean of the intended number. Likewise, the fifth (=6,000-7,999) and the sixth (=8,000 or more) category showed the same mean. However, the mean of the intended number of children, in general, decreased in tandem with a rise in the wife's income.

Table 4.9: The Intended Number of Children according to Socio-economic Variables

Wife's Education	Mean	Standard Deviation	N	Husband's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
				Less than 3,000	1.95	0.81	130
Junior or Senior High School	2.20	0.87	652	3,000 - 3,999	2.03	0.78	168
				4,000 - 4,999	2.19	0.75	196
Vocational School or Junior College	2.14	0.84	215	5,000 - 5,999	2.25	0.93	172
				6,000 - 7,999	2.31	0.81	172
University or Higher	2.10	0.78	110	8,000 or More	2.33	0.87	132
				Total	2.18	0.85	970

Source: Survey Data

Source: Survey Data

Desired Education	Mean	Standard Deviation	N	Desired Education	Mean	Standard Deviation	N
(Son)				(Daughter)			
Junior or Senior High School	2.34	1.02	90	Junior or Senior High School	2.37	0.92	155
Vocational School or Junior College	2.19	0.80	69	Vocational School or Junior College	2.21	0.80	418
University or Higher	2.16	0.81	813	University or Higher	2.09	0.81	398
Total	2.18	0.85	972	Total	2.18	0.85	971

Source: Survey Data

Wife's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
Less than 3,000	2.16	0.83	492
3,000 - 3,999	2.15	0.85	60
4,000 - 4,999	2.15	0.94	36
5,000 - 5,999	2.13	0.79	22
6,000 - 7,999	2.08	1.21	19
8,000 or More	2.08	1.32	11
Total	2.15	0.91	640

Source: Survey Data

Note: Students, housewives and not-working women are excluded.

Next, let us look at the relation between the residential factors and the intended number of children in Table 4.10. A considerably large gap appeared in the residential arrangement after marriage. The mean value for the couples living with parents reached to fully 2.30, whereas that for the couples living without their parents was 2.13. This evidence suggests that parental material and psychological support to couple's nursing children affects their decision of having a child. On the other hand, the variation between the means in the urban and rural areas was quite small, the difference being only 0.06. As mentioned before, regional variation in fertility within nation states has fallen in most European countries through

the development of universal education and mass communication (Coleman, 1993; Watkins, 1991). This tendency is also the case in Japan in terms of the intended number of children. In other words, in Japan, the two-children norm is universally shared in urban and rural regions.

Table 4.10: The Intended Number of Children of Residential Variables

Residential Arrangement Immediately after Marriage	Mean	Standard Deviation	N	Present Residential Area	Mean	Standard Deviation	N
Lived with own parents or spouse's parents	2.30	0.90	292	Urban	2.16	0.84	780
Neither spouse's nor own parents	2.13	0.83	683	Rural	2.10	0.85	195
Total	2.18	0.85	975	Total	2.18	0.85	975

Source: Survey Data

Source: Survey Data
 Urban : Its administrative unit is a city.
 Rural; Its administrative unite is a town or a village.

Let us now turn to variations in fertility intention according to attitudinal variables in Table 4. 11. As discussed earlier, we expect from our hypothesis that women with more progressive attitudes will show a lower aspiration to having children. A relation satisfying this expectation was found in Questions B (common-law marriage), C (unmarried women with children), G (husband works/wife at home) and H (co-residence with parents) among the eight questions falling in the 'progressiveness' category. To take an example, the highest average (=2.44) appeared in the 'agree strongly' group in Question G, while the lowest (=2.09) appeared in the 'disagree strongly' category. Furthermore, the mean value increased steadily as the women's attitude became more progressive. Since this question was asked to measure the degree of commitment to the traditional gender role, the evidence indicates that women who adhered to traditional values had a stronger desire for children than those who had a negative attitude to them.

With regard to individualistic variables, it was observed in Questions I (parents devoted to children over self-interest), K (mother home during infancy years), L (children important), and M (goal-oriented individual) that reproductive intentions weakened with a stronger preferences for an individualistic life-style. Particularly noteworthy is the relation between the answering category and the average of the intended number of children in Question I. The mean of the 'agree strongly' group in this question, which indicated the degree of child-centredness in the family, was the greatest (=2.37), and that of the 'agree' group was the second largest (=2.25). In contrast, the lowest mean (=1.94) appeared in the 'disagree strongly' category of the identical question, and the 'disagree' revealed the second lowest mean (=2.12). This evidence supports Ariès's claim that an increase in individualism weakens couples' desire for children (Ariès, 1980).

Table 4.11: Relationship Between the Intended Number of Children and Attitudinal Factors

A: Never getting married throughout life				B: Common-law marriage			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Completely acceptable	1.56	0.91	84	Completely acceptable	1.93	1.15	94
Acceptable	2.24	1.04	171	Acceptable	2.18	0.96	157
Unacceptable	2.19	0.77	421	Unacceptable	2.20	0.97	394
Completely unacceptable	2.31	0.73	301	Completely unacceptable	2.25	0.86	332
D.K. or N.A.	1.44	1.38	5	D.K. or N.A.	1.44	1.38	5
Total	2.18	0.85	982	Total	2.18	0.85	982

C: Unmarried women bearing and rearing children

	Mean	Standard Deviation	N
Completely acceptable	1.53	0.94	81
Acceptable	2.23	0.72	144
Unacceptable	2.27	0.93	375
Completely unacceptable	2.33	0.74	377
D.K. or N.A.	1.41	1.38	5
Total	2.18	0.85	982

D: Homosexual relationships

	Mean	Standard Deviation	N
Completely acceptable	1.70	1.08	35
Acceptable	2.14	0.77	60
Unacceptable	2.23	0.86	207
Completely unacceptable	2.21	0.83	658
D.K. or N.A.	1.71	0.69	22
Total	2.18	0.85	982

E: A man and a woman love each other, their pre-marital sexual intercourse is permissible.

	Mean	Standard Deviation	N
Agree strongly	2.01	0.86	175
Agree	2.23	0.78	445
Disagree	2.23	0.98	271
Disagree strongly	2.10	0.62	63
D.K. or N.A.	1.94	0.76	28
Total	2.18	0.85	982

F: It is a child's duty to care for aged parents.

	Mean	Standard Deviation	N
Agree strongly	2.30	0.88	379
Agree	2.17	0.81	507
Disagree	1.79	0.97	63
Disagree strongly	1.92	0.69	10
D.K. or N.A.	1.76	0.74	23
Total	2.18	0.85	982

G: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

	Mean	Standard Deviation	N
Agree strongly	2.44	1.13	93
Agree	2.23	0.75	425
Disagree	2.12	0.81	303
Disagree strongly	2.09	0.95	130
D.K. or N.A.	1.74	0.78	31
Total	2.18	0.85	982

H: It is better to live with parents after marriage.

	Mean	Standard Deviation	N
Agree strongly	2.52	0.98	47
Agree	2.21	0.93	319
Disagree	2.16	0.78	468
Disagree strongly	2.15	0.81	125
D.K. or N.A.	1.75	0.68	23
Total	2.18	0.85	982

I: Parents duty is to do their best for their children, at the expense of their own well-being.

	Mean	Standard Deviation	N
Agree strongly	2.37	1.01	135
Agree	2.25	0.79	376
Disagree	2.12	0.85	331
Disagree strongly	1.94	0.88	124
D.K. or N.A.	1.93	0.89	16
Total	2.18	0.85	982

J: When personalities do not match, a divorce is reasonable.

	Mean	Standard Deviation	N
Agree strongly	2.16	0.98	130
Agree	2.15	0.82	319
Disagree	2.19	0.79	341
Disagree strongly	2.35	0.99	163
D.K. or N.A.	1.65	0.63	29
Total	2.18	0.85	982

K: When a child is small, a mother should stay home without working outside the home.

	Mean	Standard Deviation	N
Agree strongly	2.31	0.96	275
Agree	2.17	0.81	479
Disagree	2.08	0.66	125
Disagree strongly	1.97	0.96	63
D.K. or N.A.	1.73	0.70	22
Total	2.18	0.85	982

L: Children are important to a successful marriage.

	Mean	Standard Deviation	N
Agree strongly	2.32	0.80	440
Agree	2.18	0.88	411
Disagree	1.76	0.75	66
Disagree strongly	1.60	1.09	50
D.K. or N.A.	2.01	0.77	15
Total	2.18	0.85	982

M: Even After marriage, one should not sacrifice one's own goals in life for one's family.

	Mean	Standard Deviation	N
Agree strongly	2.10	0.75	141
Agree	2.14	0.79	513
Disagree	2.29	0.99	260
Disagree strongly	2.37	0.73	52
D.K. or N.A.	1.98	0.83	16
Total	2.18	0.85	982

N: It is not essential to get married if it means sacrificing one's own goal in life.

	Mean	Standard Deviation	N
Agree strongly	2.28	0.97	285
Agree	2.14	0.79	528
Disagree	2.22	0.76	123
Disagree strongly	2.35	0.70	20
D.K. or N.A.	1.63	0.84	26
Total	2.18	0.95	982

Note: D.K. or N.A. : do not know or no answer

The inquiring sentence of these questions is "What do you think of the following life styles or views?"

Finally, we will look briefly at the remaining variables in Table 4.12. In terms of marriage types, a difference in the average of the intended number of children was negligible. Women who married through a love match, on the average, wished to have 2.18 children, while those through an arranged marriage wanted 2.21. This suggests that the institutional aspect of marriage does not affect a couple's fertility intention to a discernible degree. Moreover, as we have already seen, the arranged marriage group did not differ from the love match group in the achieved number of children. Thus, there is a distinguishable difference between these two groups in terms of the achieved and intended numbers of children, which implies that affiliations between a groom's and a bride's natal family have virtually disappeared from arranged marriages.

On the other hand, a salient linear trend was observed concerning the number of wife's siblings. Wives without siblings, on average, wanted to have 2.03 children, whereas those with three or more siblings wanted as many as 2.23 children. Probably because fertility intention is more influenced by the socialisation of one's natal family than by one's genetic fecundity, this difference suggests that a wife's natal background exerts a considerable influence on her desire for having children.

Table 4.12: The Relationship between the Intended Number of Children, the Marriage Type and the Number of Wife's Siblings

Marriage Type	Mean	Standard Deviation	N	Number of Wife's Siblings	Mean	Standard Deviation	N
Love Match	2.18	0.84	720	None	2.03	0.92	57
Arranged Marriage	2.21	0.87	234	1	2.16	0.80	382
Other	2.00	0.93	28	2	2.20	0.81	284
Total	2.18	0.85	982	3 or More	2.23	0.86	257
				Total	2.18	0.85	982

Source: Survey Data

Source: Survey Data

4.9 Results of the Analysis of the Intended Number of Children

This section will present the results of the analysis of the intended number of children, but a brief description of the models used in the analysis is first provided.

Two separate multi-variate logistic regressions were constructed in each model. The first regression included the odds ratio of couples wishing to have no children or one child over those wishing to have two or more children as a dependent variable. As we have seen in the previous section, Japanese couples, on average, want to have two children. Therefore, this variable was prepared to examine the influence of independent variables on wanting children below the average. The dependent variable of the second regression was the odds ratio of wanting to have three or more children over wanting to have two or fewer ones. This regression aimed to investigate the influence of independent variables on wanting children above the average. The duration of marriage was dropped from a set of independent variables in the following analyses, since the intended number of children was thought to be quite independent of the duration of marriage.

Table 4.13 displays the result of the first model which included all factors but attitudinal factors as independent variables. Overall, the influence of each independent variable was similar to what was seen in the analysis of the achieved number of children. In concrete terms, the husband's income, the co-residence with parents and the wife's siblings had a significant and reducing effect, while the wife's wage rate, her educational level and the desired educational level of children turned out to have a significant and increasing effect on the probability of wanting no children or one child in the first regression. On the other hand, the wife's wage rate and the desired educational level of children were negatively related, and the husband's income was positively related, to the odds ratio of wanting three

or more children over two or fewer children in the second regression. For example, compared to parents who thought that high school was a satisfactory level of education for both sons and daughters, those who wished either sons or daughters to go to university increased the odds ratio by 1.19 times in the first regression. Moreover, parents who wanted to send both their sons and daughters to university increased this ratio by 1.25 times in the same regression. In contrast, compared with the 'none' category in the desired education of children, the 'either' category reduced the probability of wanting three or more children by about 10%, and the 'both' category lowered the probability by about 14%.

Table 4.13: The Result of Logistic Regression of the First Model (the Intended Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 or fewer children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.898*	.035	1.316*	.128
Logarithm of Wife's Wage Rate	1.156*	.065	.886*	.057
Present Residential Area				
Urban	1.139	.164	.922	.154
(Rural)	1.000		1.000	
Co-residence with parents				
Own or spouse's	.920*	.042	1.115	.156
(Neither spouse's nor own)	1.000		1.000	
Wife's Educational Level				
(High School)	1.000		1.000	
Junior College	1.240*	.080	.972	.117
University	1.395*	.113	.951	.127
Desired Education of Children				
Both	1.255*	.091	.862*	.058
Either	1.196*	.071	.898*	.043
(None)	1.000		1.000	
Number of Wife's Siblings	.914*	.043	1.248	.158
Marriage type				
Love match	1.100	.111	.953	.098
(Arranged marriage)	1.000		1.000	
Number of Cases	951		951	
Corrected Pseudo R Square	0.452		0.494	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: Desired Education of Children
Both: Both sons and daughters are/were desired to go to university.
Either: Either sons or daughters are/were desired to go to university.
None: Neither sons nor daughters are/were desired to go to university.
Wife's Educational Level
High School: Junior or High School
Junior College: Vocational School or Junior College
University: University or Higher

In the investigation of the influence of progressive attitudes in Table 4.14, the first point to notice is that the attitudinal variables showed almost the same pattern of effects on the odds ratios in the logistic regressions of the intended fertility as in those of the achieved fertility. More specifically, QA (never married) and QF (husband works/wife at home) were significantly and positively connected to the odds ratio of wishing to have no children or one child over wishing to have two or more children in the first regression. In contrast, only QF significantly reduced the probability of wanting three or more children in the second regression. These findings indicate that the progressive attitudes have a greater influence on a couple's desire for a childless or one-child family than for a three-child family.

We need to notice two points here. First, although these attitudinal variables were significant in determining the couple's fertility intention, the socio-economic variables also yielded a significant effect in the two regressions in Table 4.14. In particular, the husband's income, the wife's wage rate and the desired educational level of children were significant at the 5% level in the regressions. This means that the fertility intention of Japanese couples is determined by both socio-economic and attitudinal variables. Secondly, the effect of attitudinal variables is not so strong. In the first regression, the value of the corrected pseudo R^2 was 0.408 for the reduced-model excluding all attitudinal variables, while that of the full-model including these variables turned out to be 0.442 in the first regression of Table 4.14. This suggests that the full-model has a relatively weak explanatory power, compared with the reduced-model of the first regression.

Likewise, in the second regression, the pseudo R^2 of the reduced-model without any attitudinal variables stood at 0.461, while that of the full-model including the attitudinal variables was 0.043. These findings suggest that adding the attitudinal variables to the regressions does not bring about a drastic improvement in the explanatory power of the models. It therefore follows that these attitudinal variables play an minor role in the probability of wishing to have three or more children as well as of wishing to have one child or no children at all.

Table 4.14: The result of Logistic Regression of the Second Model (the Intended Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 or fewer children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.957*	.057	1.384*	.151
Logarithm of Wife's Wage Rate	1.147*	.067	.870*	.069
Co-residence with parents				
Own or spouse's	.957*	.019	1.028	.198
(Neither spouse's nor own)	1.000		1.000	
Wife's Educational Level				
(High School)	1.000		1.000	
Junior College	1.120*	.039	0.960	.152
University	1.212*	.071	0.881	.203
Desired Education of Children				
Both	1.325*	.111	.938*	.025
Either	1.227*	.083	.968*	.010
(None)	1.000		1.000	
Number of Wife's Siblings	.957*	.021	1.127	.157
QA	1.083	.142	.946	.115
QB	1.141	.107	.943	.126
QC	1.180*	.079	.895	.197
QD	1.076	.139	.950	.126
QE	1.124	.109	.972	.100
QF	1.154*	.065	.959*	.021
Number of Cases	951		951	
Corrected Pseudo R Square	0.442		0.504	

Corrected Pseudo R Square (Without attitudinal variables)	0.408		0.461	

* $p < .05$ ** $p < .01$

Parentheses are reference categories.

Note: QA: Never getting married throughout life
QB: Common-law marriage
QC: Unmarried women bearing and rearing children
QD: Homosexual relationships
QE: A man and a woman love each other, their pre-marital sexual intercourse is permissible.
QF: After marriage, a husband should work outside the home and a wife should devote herself to housework at home.

The third model was prepared to analyse the impact of individualistic attitudes. Its results are displayed in Table 4.15. The overall impression of the results is that these individualistic variables affected fertility pattern in almost the same way as seen in the counterpart of the achieved number of children. In the first regression, QH (mother home during infancy years), QI (children important) and QK (goal-oriented individual) increased the probability of wishing to remain childless or to have one child, whose coefficients were 1.29, 1.17 and 1.25 respectively with the 5% statistical significance. On the other hand, in the second regression of Table 4.15, only the coefficients of QH (=0.94) and QI (=0.96) were significant at the 5% level, both of which reduced the odds ratio of wishing three or more children over wishing two or fewer children by about 5%. It can be argued from these results that more individualistic attitudes lead to lowering the couples' intention of fertility.

In addition, the corrected pseudo R^2 increased when the models included the attitudinal variables. The first regression produced 0.492 and improved its explanatory power by about 9% in comparison with its reduced-model without these attitudinal variables. Likewise, the pseudo R^2 of the second regression reached 0.530 with an increase of approximately 7% for the full-model, compared to that for its reduced model. It follows from these results that individualistic factors exert a secondary effect on couples' intention of fertility.

However, we should not overlook the fact that significant effects appeared in these two regressions with regard to the socio-economic

variables. Specifically, the higher the husband's income, the greater the couple's desired family size. In contrast, as the wife's wage rate rose, more couples wanted to have fewer children. Likewise, a rise in the desired educational level of children resulted in a reduction in the intended number of children. These significant coefficients implies that, even if the effect of attitudinal factors are controlled out, socio-economic factors play a influential role in determining the intended number of children.

Table 4.15: The result of Logistic Regression of the Third Model (the Intended Number of Children)

Explanatory Variables	[1] None or 1 child		[2] 3 or more children	
	2 or more children		2 or fewer children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.965*	.051	1.277*	.111
Logarithm of Wife's Wage Rate	1.095*	.042	.946*	.026
Co-residence with parents Own or spouse's (Neither spouse's nor own)	.937* 1.000	.031	1.131 1.000	.970
Wife's Educational Level (High School)	1.000		1.000	
Junior College	1.160*	.057	.967	.227
University	1.231*	.080	.880	.248
Desired Education of Children Both	1.352*	.115	.879*	.050
Either	1.252*	.089	.950*	.021
(None)	1.000		1.000	
Number of Wife's Siblings	.947*	.026	1.248	.256
QG	1.089	.120	.967	.117
QH	1.290*	.124	.939*	.031
QI	1.174*	.080	.959*	.020
QJ	1.119	.123	.969	.115
QK	1.251*	.056	.989	.238
QL	1.084	.136	.954	.182
Number of Cases	951		951	
Corrected Pseudo R Square	0.492		0.530	

Corrected Pseudo R Square (Without attitudinal variables)	0.408		0.442	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: QG: When personalities do not match, a divorce is reasonable.
QH: When a child is small, a mother should stay home without working outside the home.
QI: Children are important to a successful marriage.
QJ: Parents duty is to do their best for their children, at the expense of their own well-being.
QL: It is not essential to get married if it means sacrificing one's own goal in life.
QK: Even After marriage, one should not sacrifice one's own goals in life for one's family.

Finally, we will explore the influence of Japanese traditional values on the intended number of children in Table 4.16. Both QM (care of aged parents) and QN (co-residence with parents) revealed the effect in agreement with our hypotheses. A unit increase of QM and of QN enhanced the probability of wanting to remain childless or to have one child by 1.27 times and by 1.18 times respectively in the first regression. In contrast, QM and QN had a reducing effect on the odds ratio of desiring three or more children over desiring two or fewer children in the second regression. The coefficient of the former was 0.98 and that of the latter was 0.93. However, none of these coefficients were significant at the 5% level. In addition, the value of the pseudo R^2 did not show a distinguishable improvement in the full-model of each regression, compared to the value of the corresponding reduced-model without these attitudinal variables. More specifically, the full-model of the first regression of Table 4.16 yielded 0.429 of R^2 , which was greater by 0.021 in comparison with its reduced model. Similarly, in the second regression, the R^2 of the full-model including the attitudinal variables stood at 0.469, whose explanatory power was greater by only 2.7% than that of its reduced model. It can be argued from these results that the Japanese traditional variables have only a weak impact on forming a couple's fertility intention.

Table 4.16: The result of Logistic Regression of the Fourth Model (the Intended Number of Children)

Explanatory Variables	[1]		[2]	
	None or 1 child		3 or more children	
	2 or more children		2 or fewer children	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Logarithm of Husband's Annual income	.913*	.045	1.321*	.116
Logarithm of Wife's Wage Rate	1.192*	.081	.957*	.021
Co-residence with parents				
Own or spouse's	.938*	.031	1.248	.255
(Neither spouse's nor own)	1.000		1.000	
Wife's Educational Level				
(High School)	1.000		1.000	
Junior College	1.179*	.066	.954	.191
University	1.241*	.082	.861	.151
Desired Education of Children				
Both	1.274*	.097	.846*	.065
Either	1.195*	.067	.936*	.026
(None)	1.000		1.000	
Number of Wife's Siblings	.885*	.054	1.268	.155
QM	1.265	.134	.978	.133
QN	1.180	.270	.927	.253
Number of Cases	951		951	
Corrected Pseudo R Square	0.429		0.469	

Corrected Pseudo R Square (Without attitudinal variables)	0.408		0.442	

* p<.05 ** p<.01

Parentheses are reference categories.

Note:QM : It is a child's duty to care for aged parents.
QN: It is better to live with parents after marriage.

Conclusion

This chapter examined the determinants of fertility behaviour in Japan. The achieved number and the intended number of children were employed as dependent variables in the analyses. The primary aim of this chapter was to discern whether and to what extent socio-economic and attitudinal factors affected Japanese fertility behaviour. The findings presented in this chapter first suggest that socio-economic factors have an influence on determining both the achieved and intended number of children. Particular important findings were that higher levels in both wife's education and

income led to a lower level of fertility. As shown in Section 4.2, women's wage levels and enrolment rate in colleges and universities have recently risen in Japan. These upward trends should lower the Japanese fertility rate, since our findings show that the levels of both the wife's income and her education are negatively related to her level of fertility. Hence, the economic theory of fertility is not entirely inappropriate as the explanation of Japanese fertility decline. However, it should be bore in mind that attitudinal factors also had a significant influence on determining the achieved and intended number of children at the same time. Therefore, the behavioural model based on economic rationality does not gives a sufficient explanation for the recent fertility decline in Japan. In other words, values and attitudes exert an influence on determining married couples' reproductive behaviour in contemporary Japan. Nevertheless, comparing the socio-economic and attitudinal factors, the former had a more powerful impact on the achieved and intended levels of fertility than the latter.

This chapter clarified the determinants of Japanese reproductive behaviour considerably, but it does not cover all aspects of their behaviour. Only the quantum aspect of fertility behaviour was dealt with in this analysis. We will, in the next chapter, proceed to examine the timing aspect of fertility.

Chapter 5

Analysis of the Timing of Births

Introduction

The purpose of this chapter is to analyse the timing of births after marriage in contemporary Japan. Demographic studies have traditionally paid attention to variations in the quantum aspect of fertility in the TFR or in completed family size. However, the characteristics of fertility behaviour in industrialised countries are not all accounted for in this way. For instance, Ryder (1980b) points out that, compared to the level of fertility, the age at which women give birth to has changed more profoundly across cohorts in the US during the post-war period. In several industrialised countries with a low fertility rate, particularly important changes have been observed in the tempo rather than in the quantum aspect of fertility (Cigno & Ermisch, 1989; De Cooman, Ermisch & Joshi, 1987; Ermisch & Ogawa, 1994; Hoem & Hoem, 1989; Ní Bhrolcháin, 1984, 1986; Ward & Butz, 1980). Hence, the tempo aspect of reproductive behaviour is an important aspect in the demographic study of these countries.

This claim seems true of Japan. As was seen in the previous chapter, the cumulative fertility of Japanese couples who had been married for more than fifteen years has not declined since the 1970s as much as the Japanese TFR. This discrepancy indicates that the period fertility was distorted by the tempo effect of reproductive behaviour, and the recent low TFR in Japan is considerably attributable to a change in the age at which women have their children.

The analysis of the previous chapter examined the quantity aspect of Japanese fertility behaviour from a socio-economic and an attitudinal viewpoint. However, we may recognise that the previous analysis of fertility captures only one aspect of Japanese reproductive patterns and

that the analysis of birth intervals is necessary to understand the whole mechanism of Japanese reproductive behaviour. This chapter will, therefore, explore the tempo aspect of fertility behaviour in Japan.

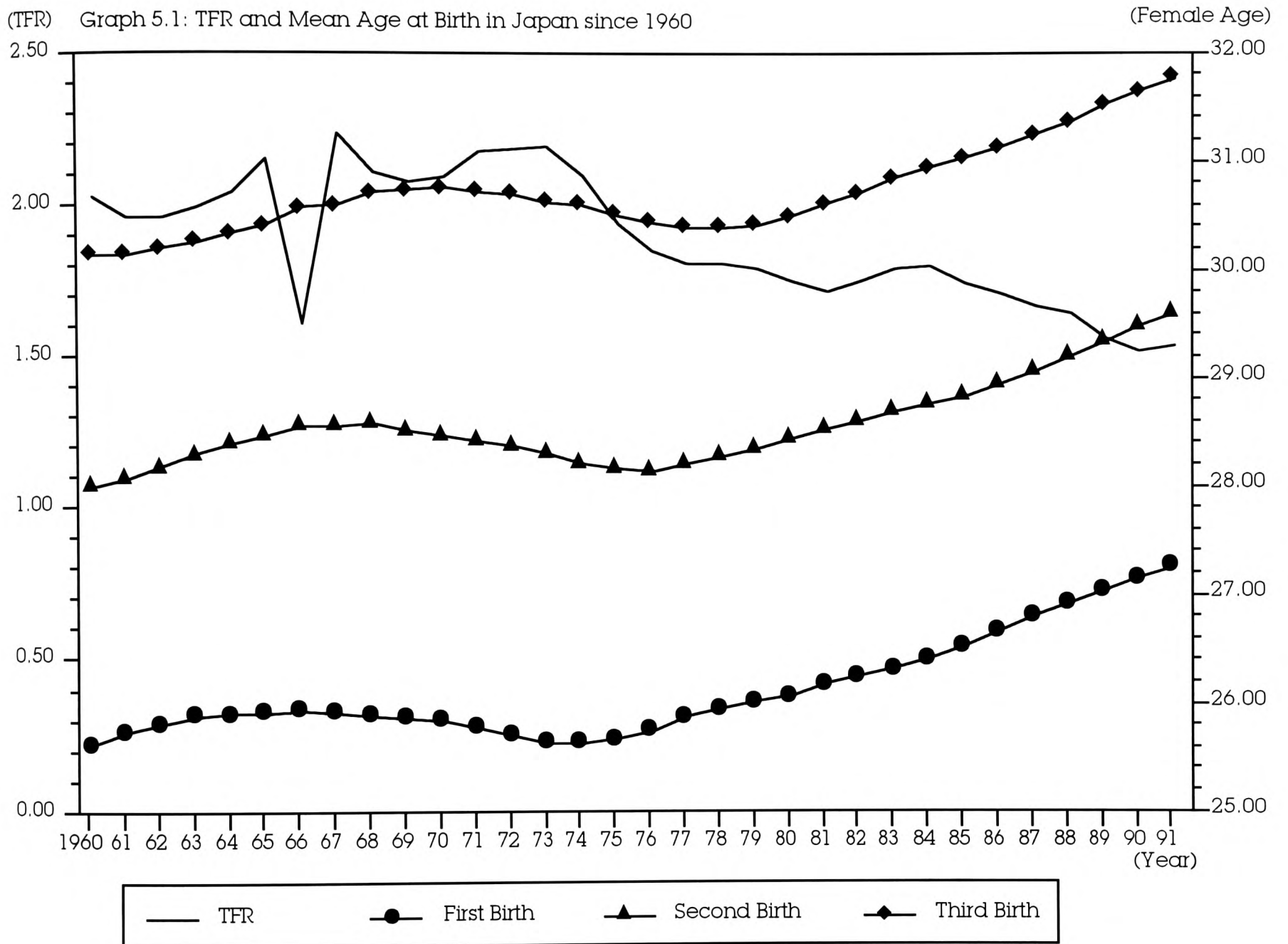
5.1 The Trend of the Timing of Births after Marriage in Japan

Several Western countries have shown the postponement of women's childbearing, coinciding with a decline in their rate of fertility (Coleman, 1992, 1993). Let us turn, now, to the relationship between the period fertility rate and the timing of births after marriage in Japan. Graph 5.1 shows the TFR and mean age of women giving birth since 1960. In Graph 5.1, the mean age by birth order is computed for all births including extra-marital births. If the ratio of extra-marital births over all births is high, the mean age computed for all births cannot be regarded as an appropriate index of the timing of fertility for married couples. Moreover, if pregnancy-dependent marriage occurs frequently, the age at which a woman has her first child is strongly affected by the frequency of conception before marriage. Thus, this age does not properly reflect the couple's birth history after marriage (Hirschman & Rindfuss, 1982). However, since the number of extra-marital and pre-marital births is quite small in Japan¹, the mean age computed for all births can be regarded as an index of the timing of fertility for married couples.

The overall picture of Graph 5.1 shows that the age at which Japanese married women have children has been on a clear upward trend since the middle of the 1970s, coinciding with a decline in the TFR. More specifically, the mean age at first birth remained around 25.5 years of age until 1975, but it rose thereafter to 27.24 in 1991. On the other hand, the TFR fell from 1.91 in 1975 to 1.53 in 1991. Likewise, the age at the second

¹ According to the Tenth Japanese Fertility Survey, the ratio of extra-marital births over all births was 1.1%, and the percent of pre-marital births stood at about 1.4% in 1992 (see Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b).

and third birth rose from 28.15 in 1975 to 29.57 in 1991, and from 30.51 to 31.77 respectively. This evidence indicates that the mean age of women giving birth was delayed during the period when the Japanese TFR fell drastically.



Source: Ministry of Health and Welfare (various years), Vital statistics

As discussed in the previous chapter, the movement of the Japanese TFR was affected by the age at which a woman has children. In spite of this, it is not easy to understand the extent to which the temporary swing of the period fertility rate is distorted by women's age when children are born. Indeed, it is broadly observed that the tempo of fertility is tightly related to the quantum of fertility, and that women who bear children earlier age tend to have larger families than those who bear children later in life. The link

between these two components is due to a difference in desired family size. Women who wish to have more children tend to experience childbearing in a shorter interval after marriage (Marini & Hodsdon, 1981). Nevertheless, women in industrialised countries have much flexibility in the timing of having their children. Better nutrition undoubtedly lowers age at menarche and raises age at menopause, which leads to the extension of female reproductive period. In fact, menarche occurs at the mean age of about 13 years in contemporary developed countries, while it is higher in developing countries (e.g., 13-14 in India and 15.7 in Bangladesh). Moreover, in nineteenth-century Europe, the mean age may have reached as high as 16 years of age (Bongaarts & Potter, 1983). Hence, it is possible for women in industrialised countries to have three children, even if they have their first child at over the age of thirty. On the other hand, childbearing can now be terminated in a woman's twenties through contraception. This allows women to choose to have only one child in the family. These biologically and technologically flexible conditions concerning human reproduction make it possible to postpone childbearing during a relatively unfavourable period and to contain childbearing to relatively favourable periods. Hence, it is debatable whether or not the delay of childbearing will immediately lead to a reduction in family size.

A good method for understanding the connection between the timing and the level of fertility is to decompose the period fertility rate into the component of tempo and of quantum. This is, however, difficult in that relatively recent birth cohorts have not yet completed their fertility. In spite of this difficulty, Ryder (1956, 1980b) invents a measure to separate the two components.² According to his calculation, about a 45% reduction in the period fertility rate from the baby boom to the mid 1970s was contributory to the quantum effect in U.S., whereas 55% of it was due to

² A similar measure is invented by Ward and Butz (1980).

the tempo effect. These findings suggest that the tempo effect is an important driving force behind the movement of the period fertility.

Based on Ryder's method, Otani (1986) carried out the decomposition of the Japanese total marital fertility rate into quantum and tempo components (see Table 5.1). First, the values of $G(t)$, which indicate the effect of the size of a cohort on the period fertility rate, fell from 2.14 in 1967-69 to 2.05 in 1979-81, linked together with a decline in the total marital fertility rate (TMFR). This implies that a change in the magnitude of a cohort negligibly contributes to a reduction in the period fertility rate. Secondly, the tempo factor had a great contribution to a fall in the TMFR until 1975, but the influence of this factor on the TMFR's decreasing became weak after that point. In concrete terms, the percentage of TE rose from 66.4% to 83.5% during the period 1967-75, while the figure remained at around 50% from 1973 to 1981. This evidence suggests that the marital fertility decline until the mid 1970s was mainly caused by a change in the age at which women have their children. Thirdly, the percentage of QE rose after 1973, which indicates that the more recent marital fertility decline was brought about to a great extent by the quantum factor. For example, 16.5% of the reduction of the TMFR from 1970/72 to 1973/75 was due to the quantum effect, whereas this effect contributed to 49.3% of the reduction from 1973/75 to 1976/78. From the evidence, the tempo and the quantum of fertility have changed since the mid 1970s.

Table 5.1: Decomposition of TMFR into Quantum and Tempo Effect in Japan, 1967-1981

Year	TMFR	G (t)	d (t)	Period	The change of TMFR	Contribution of factors	
						QE (%)	TE (%)
1967-69	2.34	2.14	1.09				
				1967/69 - 1970/72	0.06	33.6	66.4
1970-72	2.28	2.12	1.07				
				1970/72 - 1973/75	0.14	16.5	83.5
1973-75	2.14	2.10	1.02				
				1973/75 - 1976/78	0.01	49.3	50.7
1976-78	2.11	2.08	1.01				
				1976/78 - 1979/81	0.08	42.1	57.9
1979-81	2.03	2.05	0.99				

Note: TMFR: Total marital fertility rate
 G (t): Weighted harmonic mean cohort total fertility rate for period t
 d (t): Index of distributional distortion
 $TMFR = G(t) \times d(t)$
 QE: Quantum effect on changes in TMFR
 TE: Tempo effect on changes in TMFR

Source: Otani, K. (1986). 1960 Nendai Ikô Kekkon Kouhôte no Proportional Hazards Model Bunsei.

When examining a change in the timing of fertility, we should notice that a shift in the timing of births after marriage does not necessarily lead to a change in birth interval. For instance, given that a birth interval is constant, late entry to married status will raise the age at which a woman bears her first child. On the other hand, given that marriage age is constant, a woman's age when her children are born may be affected by the lengthening of birth intervals. Graph 5.2 displays the distribution and the mean month of birth intervals according to a marriage cohort in Japan.

In terms of the first interval (=from marriage to a first birth), its mean month showed a downward trend. While the mean month was highest (=19.12 months) in the 1965-69 marriage cohort, the figure fell to 16.82 months in the 1985-89 marriage cohort. This trend is probably due to an increase in the number of pregnancy-dependent marriages.³ In particular, the percentage of 0-6 months from marriage to the first births rose steadily. Only 4% of the births occurred within six months after marriage in the

³ The term 'pregnancy-dependent marriage' can be defined as a marriage in which the bride has conceived before marrying (see Bourgeois-Pichat, 1986).

1965-69 marriage cohort, whereas 12.8% of the children were born within six months after marriage in the 1985-89 marriage cohort. Since most of these births are the product of pre-marital pregnancies, it is inferred that the mean month of the first interval would have become much greater in the later married cohorts if we had dealt with only pregnancy-independent marriages. In fact, compared to the 1970-74 marriage cohort, the 1985-89 cohort includes a small proportion of births that occurred 10-12 months after marriage. In contrast, the percentage of births occurring 19 months after marriage was greater in the latter than in the former cohort. Taking this into consideration, we may say that the interval from marriage to first birth tends to be lengthened for women who did not conceive a child before marrying.

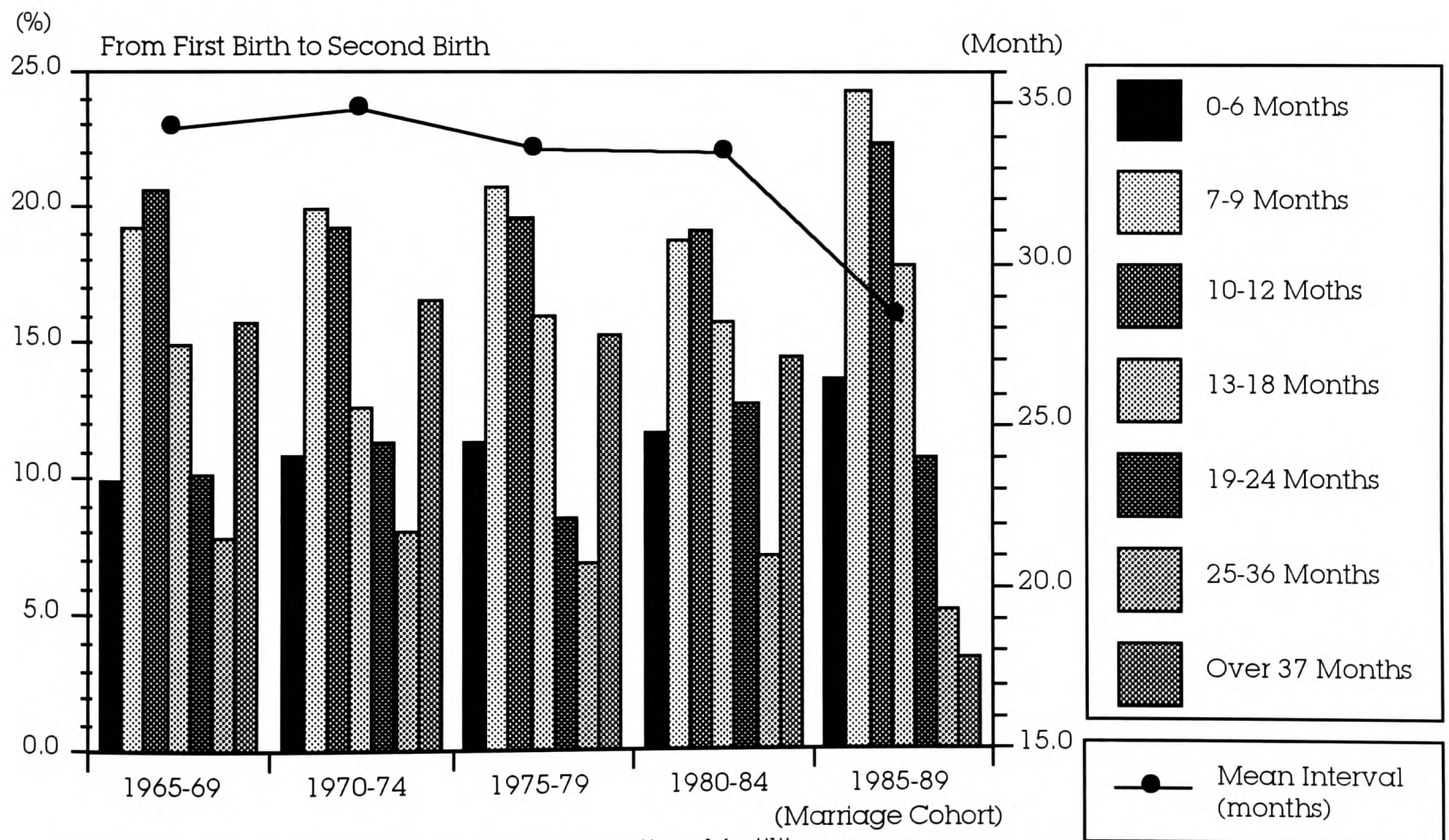
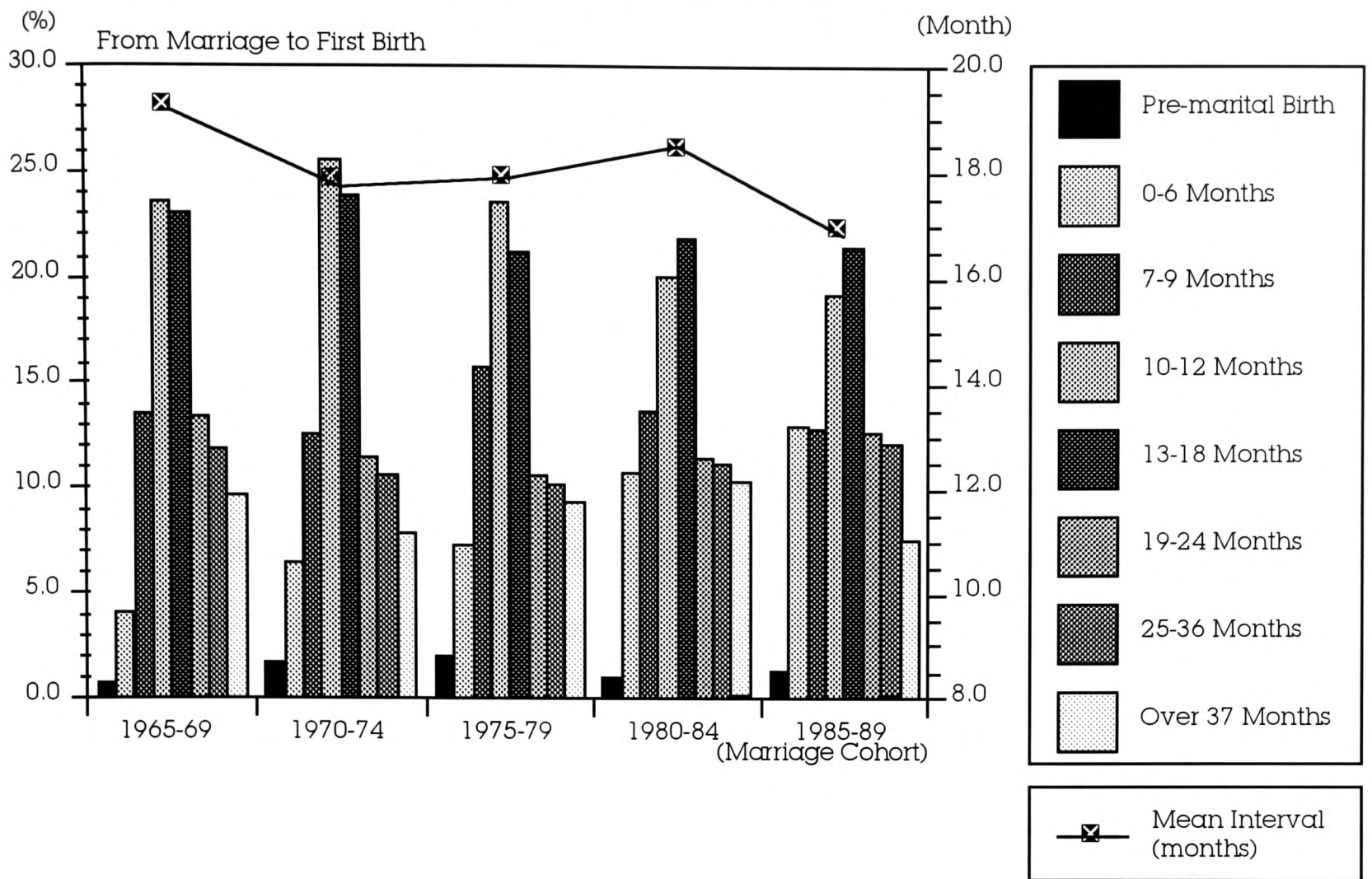
Two points have to be made with regard to the second birth interval (=from a first birth to a second birth). Firstly, the 1985-89 marriage cohort shows a greater concentration than the remaining cohorts regarding the distribution of the second birth interval. 46.5% of couples had their second child between 7 and 12 months after marriage. In Chapter 2, we argued that the pattern of child-bearing age became less compressed between 1970 and 1990, which contradicts the evidence of Graph 5.2. Since recently married couples are censored out in the distribution of the second birth interval, a compressed pattern may have been seen in the 1985-89 marriage cohort of Graph 5.2.

Secondly, the mean of the second birth interval remained at around 34 months from the 1970-74 marriage cohort to the 1980-84 marriage cohort, but a steep fall was seen in the 1985-89 cohort (=28.18 months). The particularly conspicuous feature here is the fact that the percentage of births occurring in 7-9 months after marriage was considerably high in the 1985-89 cohort (=24.2%), lowering the average number of months in this cohort. In contrast, this marriage cohort showed a smaller percentage of

births in the 25-36 months category and the over 37 months category than the other marriage cohort. Probably because several couples in the latest cohort had not given birth to their second child yet at the time of the survey, the second birth interval for these couples is censored out of Graph 5.2. Thus, it is inferred that the mean number of months for the 1985-89 cohort will eventually rise. However, because the proportion of births occurring within 12 months after marriage was substantially large in the 1985-89 cohort, it is unlikely that this cohort will exceed the previous cohorts in the mean for the second birth interval.

If we ignore the influence of pre-marital pregnancy on the mean for the first birth interval, we can argue from the above evidence that the period from marriage to first birth has been extended, but that the period from first birth to second birth has slightly been shortened in Japan. Ní Bhrolcháin (1993a) reports that the duration of both the first interval (=from marriage to first birth) and the second interval (=from first birth to second birth) have increased in Great Britain since the 1970s. The median for the first birth interval rose from 28.9 months in 1961-65 to 30.2 months in 1981-85. Likewise, the median for the second birth interval increased from 27.1 months to 32.4 months during the same period. The Japanese figures show an increase in the duration of the first birth interval, but, conversely, a slight decrease in the duration of the second birth interval.

Graph 5.2: Distribution of Birth Intervals in Japan, by Marriage Cohort



Note: Figures are derived from Japanese national fertility surveys.
 Source: Kōsei Shō Jinko Mondai Kenkyū Jo (1994c) Jinkō Tōkei Shiryō Shū.

5.2 Causes of Changes in Birth Intervals in Japan: Some Implications

Many Western industrialised countries have undergone a noticeable change

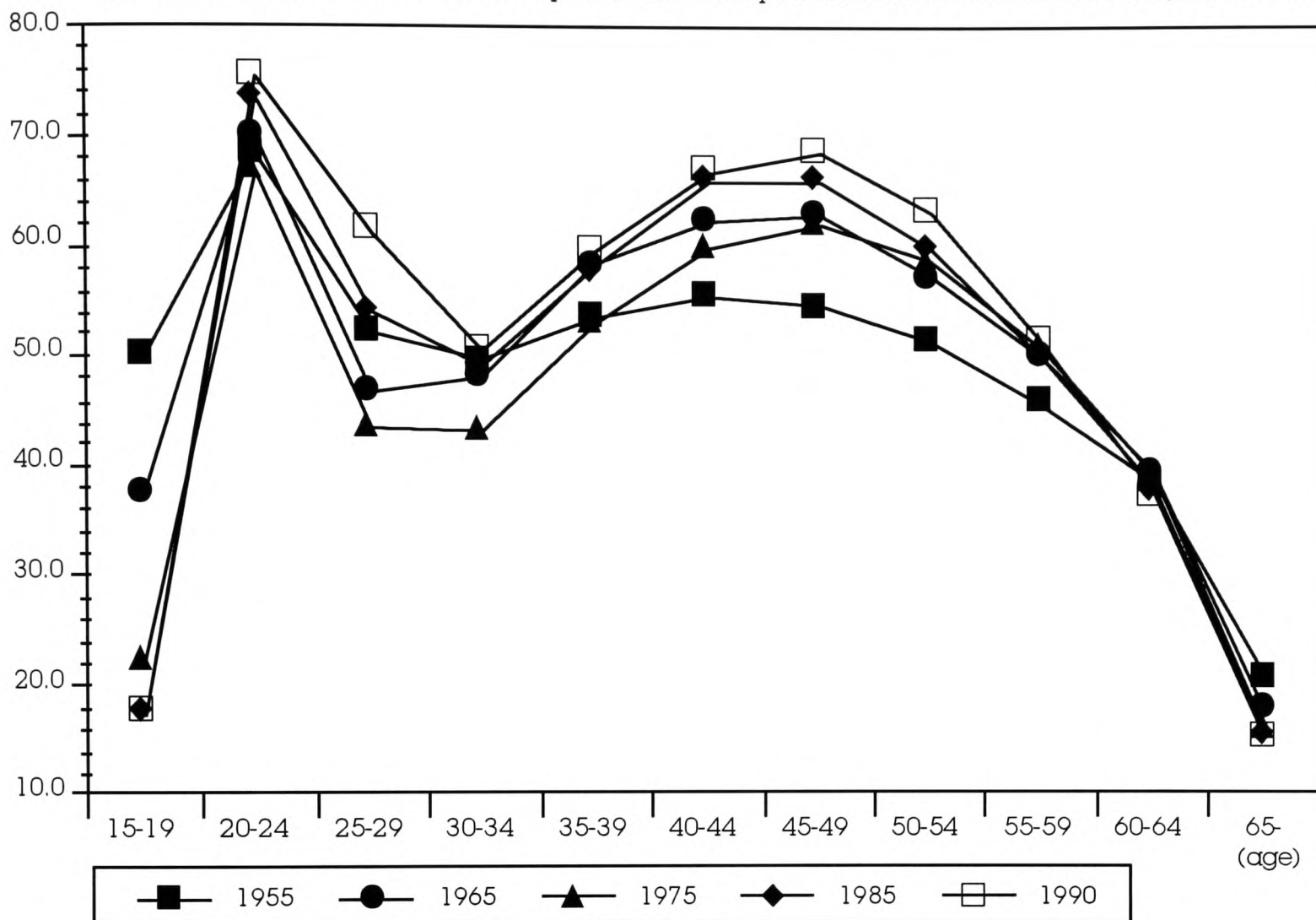
in birth intervals. A growing number of studies have been carried out to search for the causes of changes in the timing of first and subsequent births by employing aggregated and individual data. To take an example, the study of birth intervals by Hoem and Hoem (1989), and by Heckman and Walker (1990) are based on Swedish individual data, and Happel Hill and Low (1984) analyse the timing of first birth after marriage with survey data from the U.S. Similarly, Cigno and Ermisch (1989) investigate the timing of fertility with British survey data. On the other hand, De Cooman, Ermish and Joshi (1987) use the aggregate data of England and Wales in their study. Ward and Butz (1980) employ the U.S. aggregate data in their analysis.

Although these studies employ a different set of socio-economic variables, one of the major arguments proposed by these investigations is that a change in a woman's life cycle is associated with the newly emerging pattern of birth intervals. More specifically, it is argued that a delay in childbearing and the compression of birth intervals are due to the fact that the enhancement of women's earning capacity allows more women to continue to work after marriage or having children.

When looking at Japanese society, we may say that the female life cycle pattern has changed over the decades. Graph 5.3 displays the female labour force participation rate in Japan after the Second World War. The most distinctive feature of the graph is that all years show an M-shaped curve. The labour force participation rate increased until age 20-24 and then declined by 30-34. Thereafter, the rate again rose until age 45-49. This sharp fall in the labour force participation rate suggests that many Japanese women resign from their jobs in their late twenties or early thirties to become wives and mothers. More specifically, in Japan, female employment before marriage is followed by an exit from the labour force after marriage. Re-entry to the labour force occurs after the last child

leaves home (Brinton, 1992). Thus, it can be argued that the female life cycle follows, as a whole, the pattern of 'employment -- marriage -- resignation -- childbearing -- re-employment'.

(%) Graph 5.3: Female Labour Force Participation Rate in Japan after the Second World War (for All Women)

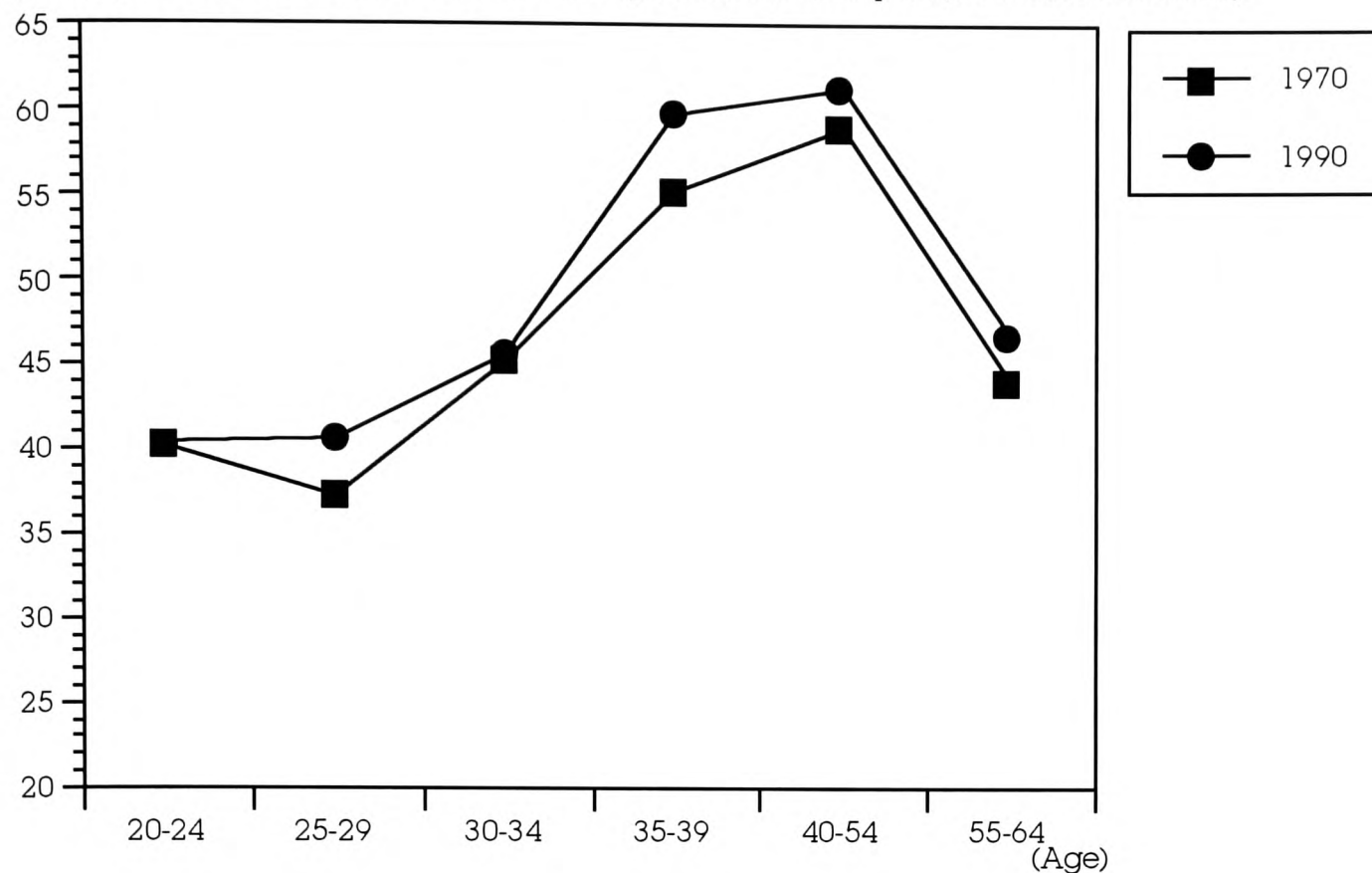


Source: Management and Coordination Agency (various years), Japanese Population Census.

However, this pattern of the female life cycle has recently changed, albeit slightly. Compared with the other four periods, the percentage of women working in their late twenties and early thirties was greater in 1990, as a result of which the concavity of the M-shaped curve became shallower (see Graph 5.3). This trend is more clearly recognised in Graph 5.4. The percentage of married women working at between ages 25-29 rose from 37.2% in 1970 to 40.6% in 1990. It can therefore be argued that, in Japan, more women continue to work after marrying or having children. In addition, the slope of the labour participation rate from the age group 30-34 to 35-39 was greater in 1990 than in 1970, which suggests that more

Japanese married women re-enter the labour force in their late thirties.

(%) Graph 5.4: Female Labour Force Participation Rate in Japan (for Married Women)



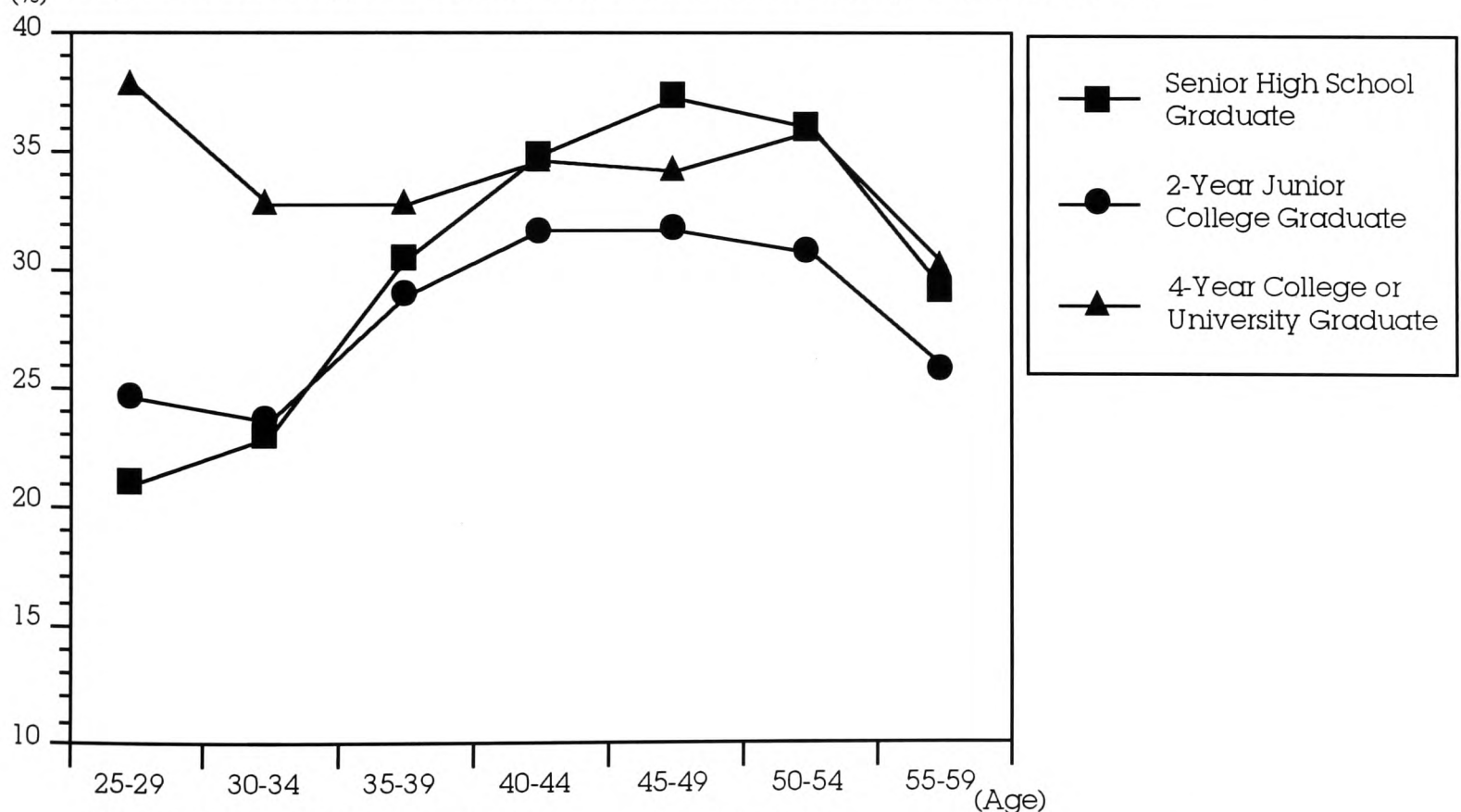
It is reasonable to think that this change in the female life cycle is related to an increase in women's enrolment rate in colleges and universities, since higher education enhances a woman's earning capacity in the labour market through the accumulation of human capital. In fact, the proportion of university students who obtained a job upon graduation rose drastically from 68% in 1955 to 82% in 1991 for women,⁴ whereas the percentage for men rose only slightly from 75% to 82% during the same period (Monbushô, 1991). Furthermore, female high school graduates, on average, drew a starting salary of 151,400 yen a month in 1994, while female university graduates earned a starting salary of 196,500 yen a month (Rôdôshô, 1995).

These differences naturally result in a different pattern of female labour participation. Indeed, compared to women with educational

⁴ It is thought that this change was amplified by an institutional reform for women's employment. Equal opportunity between men and women was legally guaranteed by the promulgation of the Equal Employment Opportunity Law in 1986.

qualifications, those with higher qualifications tend to continue to work after marriage. Graph 5.5 displays the percentage of married working women according to their educational qualification. The impressive point here is that there is a large gap between the university graduate group and the remaining two groups with reference to the percentage in their late twenties and thirties. More than 30% of married women having a university degree were engaged in a full-time job from their twenties to thirties. In contrast, the percentage of married women who finished their education at a senior high school or a two-year junior college remained at less than 25% from the age 25 to 34, which suggests that most of these women leave their jobs after marriage. Moreover, the women in these two groups revealed a steep percentage rise after the age of 35. This evidence clearly shows that women with low educational qualifications rapidly re-enter the labour force in their late thirties.

(%) Graph 5.5: Percentage of Working Married Woman in 1992, by Educational Level



Note: Part-time working married women are excluded.

Source: Management and Coordination Agency (1992), Shûgyô Kôzô Kihonchôsa.

From an economics viewpoint, we can say that a high earning

capacity lies behind the postponement of childbearing and the shortening of birth intervals. Since childbearing and child-rearing are not compatible with working for most women for at least a few years, their gainful employment is interrupted during this period. The amount of income lost by bearing and caring for children will naturally be greater for women who have a large earning capacity or higher educational qualifications than for those who have a small earning capacity or little in the way of educational qualifications. Assuming that fertility behaviour is decided on to minimise any economic loss caused by childbearing and child-caring, women holding higher educational credentials will have their first child later, and shorten birth intervals more than those with lower educational credentials. In fact, by using event history analysis, Ermish and Ogawa (1994) discovered that the period from marriage to first birth is significantly shorter for Japanese women with a university degree than for those with a high school diploma. Therefore, it is likely that a rise in women's educational level triggers a change in the timing of their fertility.

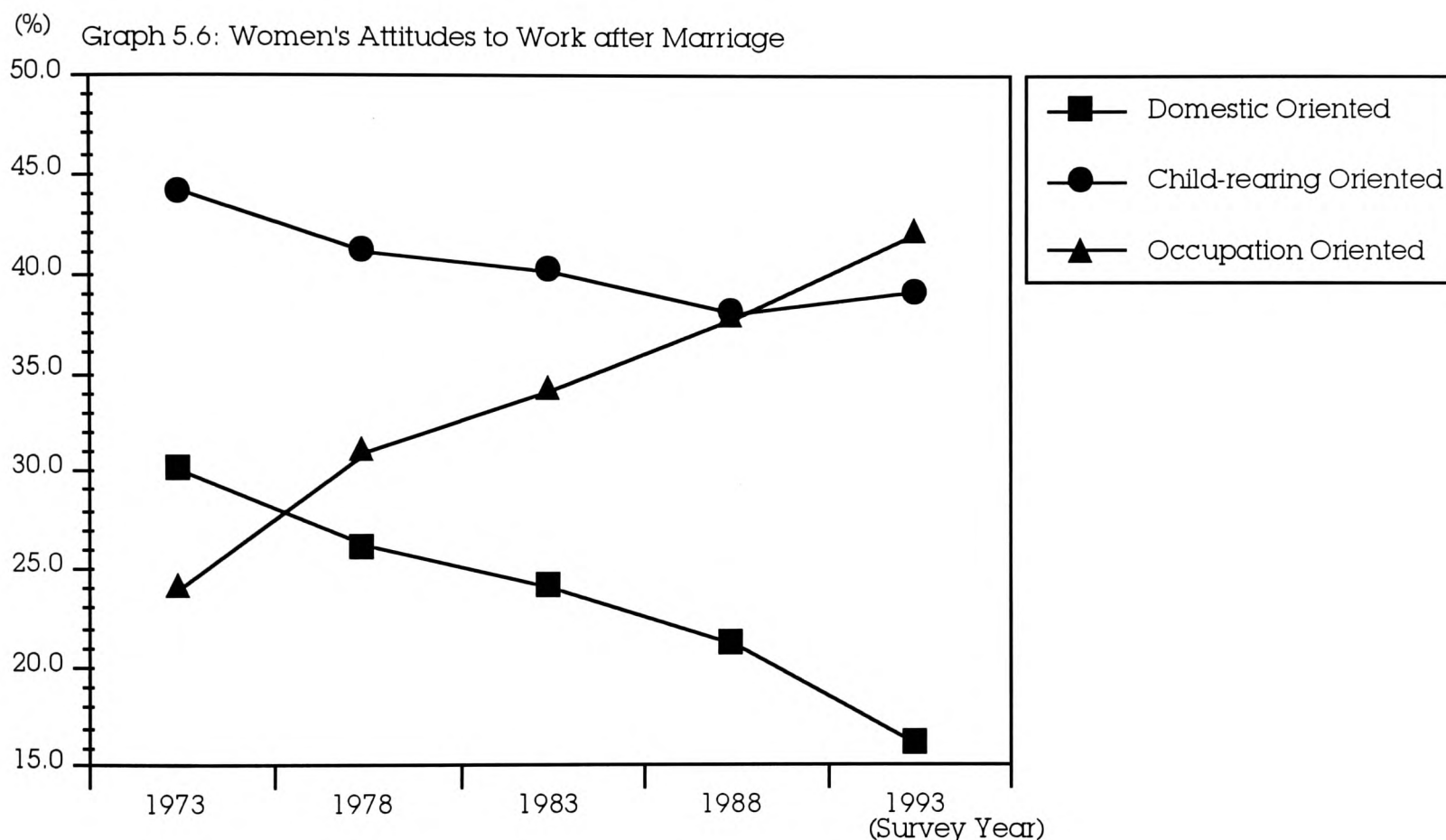
However, the delay of maternity and the compression of birth intervals are not entirely accounted for by socio-economic factors. It is pointed out that cultural factors also affect the timing of births after marriage. For example, Rindfuss, Parnell and Hirschman (1983) show that in Sri Lanka, Indonesia and Malaysia, even after other factors were controlled, Muslim and Hindu women had their first birth about 2.5 to 3 years earlier than women in the Confucian group. These findings suggest that values and attitudes immanent in cultural heritage exert an influence on the age at which women give birth to children.

The comparative study of Morgan, Rindfuss and Parnell (1984) more clearly shows the importance of attitudes and internalised norms in the timing of fertility in Japan. According to their comparative study of Japan and the U.S., socio-economic properties of women such as their level of

schooling, exerted a strong influence on the timing of first birth in the U.S. In concrete terms, the higher the women's educational qualifications the more they delayed in having children. In contrast, these socio-economic attributes had a negligible and insignificant influence on the age at which Japanese women gave birth. Morgan, Rindfuss and Parnell interprets that these contrasting results between the two countries are derived from the fact that Japanese women hold a more child-centred attitude than American women. More specifically, compared to American society, Japanese society places less importance on conjugal companionship, and much more importance on intergenerational ties, which find their roots in Confucianism. Because this cultural particularity heavily underlines the bearing and caring for children as women's primary role, married women in Japan tend to have a child soon after marriage regardless of their socio-economic position. In other words, the contrast between the two countries suggests that the family plays a central role in shaping an individual life course pattern in Japan (Brinton, 1992).

Unfortunately, since Morgan, Rindfuss and Parnell's study deals only with marriage cohorts until 1970, it fails to capture attitudinal changes in Japan since the 1970s. While it remains to be examined whether or not attitudinal factors affect the timing of fertility even in more recent times, it can be recognised that women's attitudes to family and children have drastically changed in Japan over the past decades. Several rounds of opinion surveys indicate that more women have sought self-fulfilment in spheres outside the home rather than bringing up children. This trend is clearly revealed in opinion surveys carried out by the Japan Broadcasting Corporation (NHK Yoron Chôsa Bu, 1991). The results of these surveys, which targeted about 2,000 women aged over 16, revealed that the longitudinal change of women's attitudes towards working after marriage. The most striking feature recognised by the results is that the percentage

of women wanting to devote themselves to housework after marriage declined dramatically between 1973-93. Approximately 30% of women thought it was better to devote themselves to doing housework after marriage in 1973, whereas the figure fell to 16% in 1993. In contrast, the percentage of women wanting to work after marriage rose steeply from about 24% in 1973 to 42% in 1993. Furthermore, the proportion of women whose first priority was child-rearing fell from 44% to 39% during the same period (see Graph 5.6).



Note: The questioning sentence and its answers are as follows.

Question: What do you think that a women continues to work after marriage?

Answers:

Domestic Oriented: It is better to devote herself to do housework.

Child-rearing Oriented: It is better to work until having a child.

Occupation Oriented: It is better to continue to work after having a child.

Source: Department of Public Opinion Survey, the Japan Broadcasting Corporation] (1991). *Gendai Nihonjin no Ishikikôzô*.

Hashimoto, S., & Takahashi, K. (1994). *Nihonjin no Ishiki no 20nen* (1).

These survey results suggest that the influence of Japanese traditional values, which encourage women to be housewives or mothers, has become attenuated as individualistic attitudes have spread in Japan. We may say, then, that contemporary Japanese society is quite different

from what was envisaged by Morgan, Rindfuss and Parnell a few decades ago. Hence, there is every reason to suppose that a weakening in the attitudes that previously characterised Japanese fertility patterns has caused recent changes in the timing of fertility.

5.3 Analytical Framework of Birth Intervals

This section will present the analytical framework of birth intervals, referring to the results of preceding studies on the timing of fertility. The overall picture of our analytical framework is illustrated in Figure 5.1.

(a) Socio-economic factors

The effects of two socio-economic variables⁵ will be examined: a wife's educational level and a husband's annual income.

Some empirical studies have shown that a higher level in a husband's annual income will speed up the timing of first and second births after marriage. Cigno and Ermisch (1989) indicate that an increase in men's wages tends to lower the age at which British women under age 30 give birth to a first and second child. Likewise, Heckman and Walker (1990) report that men's income has a strong hastening effect on the timing of the first birth after marriage, but has a negligible effect on the interval of the transition from a second to a third birth in the case of Swedish longitudinal study.

These results support the argument of the New Home Economics theory. Since this theory claims that the husband's wages raise the demand for children, it will naturally lead to shorter intervals of births. Hence, we expect that the husband's annual income will have a hastening

⁵ It is possible that the level of wives' wages affects their birth intervals. For instance, generously salaried wives may bear their first child later than those earning a low wage. In order to investigate the relation between these factors, we need data concerning respondents' wages at the time they gave birth to children. However, it is quite difficult to collect such data in a survey. Hence, we do not deal with the effect of wives' wages on their birth intervals in this analysis.

effect on the timing of first and second births after marriage.

The second variable is a wife's educational level, which is used as a proxy variable for her earning capacity. The human capital theory assumes that the level of a woman's education is positively related to her earning capacity in the labour market. Accordingly, as the level of a woman's education rises, the opportunity costs of her bearing and rearing children increase, which consequently decreases her willingness to have children. Following this assumption, we expect that women with high educational credentials postpone childbearing more than women with low educational credentials (Razin, 1980). It is, in fact, pointed out that women's educational levels are significant determinants of the timing of births after marriage. More specifically, compared to women with lower educational qualifications, those with higher qualifications tend to delay the birth of their first child (Hirschman & Rindfuss, 1982; Marini & Hodsdon, 1981; Rindfuss & John, 1983; Teachman & Heckert, 1985; Tsui, 1982; Trussell, Martin, Feldman, Palmore, Concepcion & Bakar, 1985).

However, the effect of women's levels of education on birth intervals may not be as simple as the theory holds. Hoem and Hoem (1989) discovered that, in Sweden, women with a high level of education bear their second and third children at shorter intervals than those with a low level of education. This evidence clearly indicates that, in Sweden, the length of time between births is negatively connected to the level of a woman's education. Hoem and Hoem argue that this negative relation is derived from the woman's ability to combine childbearing with labour market participation. Specifically, women with higher educational qualifications can make better use of public child-care and other relevant services than those with lower educational qualifications. Therefore, more highly educated women can better avoid economic losses caused by having children than less educated women. As a result of this, better educated women tend to

have children at shorter intervals. In short, the level of a woman's education indicates not only her opportunity cost, but also her ability to control her circumstances. Therefore, we cannot determine the effect that a wife's educational level has on birth intervals *a priori*.

(b) Value and attitudinal factors

Two kinds of attitudinal factors will be investigated for their effect on birth intervals: individualistic variables and Japanese traditional variables. As was discussed in the previous section, Morgan, Rindfuss and Parnell (1984) suggest that child-centred attitudes derived from Confucianism are important factors in characterising the timing of fertility in Japan. If their argument is relevant in accounting for Japanese reproductive patterns, a change in attitudes to children or Japanese traditional family relationships will affect the timing of births after marriage. In our survey, questions falling into the 'individualism' category measure the respondent's level of commitment to self (or couple)-centred values, and questions regarding Japanese traditional values measure the degree to which respondents accept a traditional style of family relationships. Therefore, it is expected that women who are less committed to Japanese traditional values will delay childbearing and extend the span of birth intervals. It is also likely that women who attach great importance to their own well-being bear children at greater intervals than those who attach little importance to it. However, these variables may not affect the timing of fertility in this manner. In the light of homogeneous Japanese fertility behaviour, most married women have two children, and childless couples (including voluntary and involuntary) are quite few.⁶ This means that the two-child norm is stronger in Japan than in other industrialised countries,⁷ and marriage and

⁶ According to the tenth Japanese National Fertility Survey, only 3.1% of married couples who had been married for 15-19 years had no children, and 56.4 % had two children. (see Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b)

⁷ In many European countries, about 20 % of women remain childless up to their mid-thirties:

parenthood are almost synonymous for Japanese people (Ermisch & Ogawa, 1994). Under these circumstances, instead of delaying their own childbearing, more individualistic women may give birth to two children within a shorter period of time and rear them until they reach a stage when full-time parenting is no longer required of them. Thereafter women may pursue their own goals outside the home. In this case, a strong commitment to child-centred values and Japanese traditional values is expected to compress birth intervals.

(c) Residential factors

We will examine the effects of two residential variables on birth intervals: the residential arrangement immediately after marriage and the present residential type (at the time of the survey). Morgan and Rindfuss (1984) point out that an extended household leads to an earlier tempo of births after marriage. The reason is, first of all, that parental help deriving from postnuptial co-residence with parents reduces the physical and psychological burden of child care for the couple. In the second place, in an extended household, a newly married couple is motivated to have children as soon as possible in order to improve or solidify their status in the family. In fact, it is observed that co-residence with parents immediately after marriage shortens the first and the second birth intervals for Japanese couples (Otani, 1986). We, therefore, hypothesise that co-residence with parents shortens birth intervals.

With reference to the present residential type, it is expected that couples living in urban settings will have their children at shorter intervals than those in rural settings. In Malaysia, South Korea, Taiwan and Thailand, Hirschman and Rindfuss (1982) discovered that, because the scarcity of privacy in rural households inhibits sexual activity, urban

West Germany (20.3%); Austria (19.7%); Finland (19.1%); Netherlands (17.8%); and Switzerland (21.2%) (see Coleman, 1993).

women gave birth to children at shorter intervals after marriage than rural women. However, the case seems to be the reverse in Japan. As is well known, living costs, especially housing costs, are extremely high in urban areas in Japan, which exerts an influence on the reproductive behaviour of Japanese couples (Kono, 1986). If the material conditions of housing affect birth timings after marriage in Japan, parenthood for urban couples will be more delayed than for rural couples. For instance, assuming that the quality of housing conditions which children receive are equal, urban parents will have children later than rural couples, since urban couples need more time to establish an economic basis favourable for raising children than their rural counterparts.

(d) Demographic factors

We will test the effects of two demographic variables: the wife's age at marriage, and the age at which she gives birth to her second child. It has been pointed out that demographic variables are important determinants of birth intervals. Some studies show that a rise in female age at marriage delays the timing of the first birth after marriage (Bumpass, Rindfuss & Janosik, 1978). Similarly, Hoem and Hoem (1989) also report that these demographic factors had a strong impact on birth intervals in the Swedish case. More specifically, they discover that women having a first child at a younger age tend to give birth to a second and third child at a shorter interval. The connection between demographic factors and birth intervals may be due to fecundity. For instance, it is likely that women who married or had their first child in their twenties gave birth to children at shorter intervals than those who married or had their first child in their thirties, because the former married in the most fecund part of their reproductive period. However, of more importance here is the fact that a difference in the desired number of children may create such a relation. As discussed in

Chapter 3, women who desire to have more children tend to marry earlier (Bumpass, 1969; Bumpass & Mburugu, 1977; Busfield, 1972). This may encourage women to bear children at shorter intervals to achieve their desired number of children.

However, it is difficult to determine the effects of these variables on birth intervals *a priori*, because these demographic variables affect fertility patterns in a quite complicated way. In particular, in industrialised countries where the desired number of children has become low, the female reproductive span is long enough to achieve the average desired family size. To clarify this point, let us consider the fertility strategies of women who marry later in life. If women marry late, they may start to bear children soon after their marriages and compress birth intervals to give birth to the number of children they want. However, instead of adopting such a strategy, they may give up childbearing. In the former case, a wife's marriage age will affect the timing of fertility, but not the level of fertility. In the latter case, a wife's marriage age affects only the level of fertility. Moreover, the late start of the first birth after marriage may hasten the timing of subsequent births, or lead to abandoning the idea of having additional children in order to reduce the risk of infertility or medical complications. If women choose the first strategy, the age at which a married woman bears her first child will exert an influence on the intervals of subsequent births. On the other hand, in the case of the second strategy, it is expected that the intervals of second and subsequent births are not affected by the age at which a married woman has her first child.

(e) Marriage type

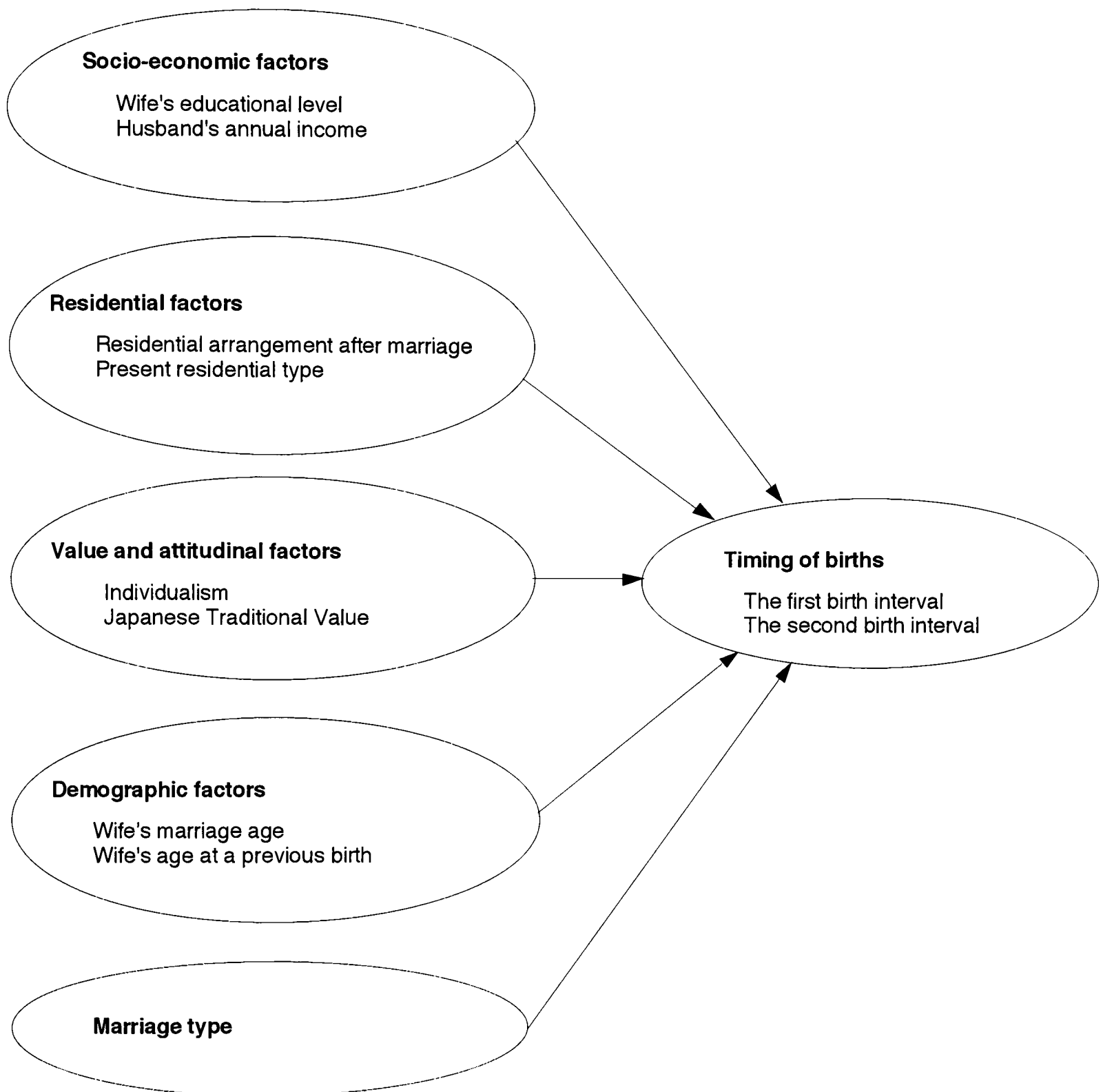
The final variable examined in this analysis is marriage type; that is, whether a marriage is a love match or has been arranged. It has been suggested that marriage type influences a couple's birth intervals. For

instance, Rindfuss and Morgan (1983) report that, because the coital frequency of married couples is affected by marriage type, the interval from marriage to first birth for love match couples was shorter than the interval for arranged marriage couples. This is illustrated in the case of Malaysian, Korean and Taiwanese couples. However, the timing of first and subsequent births after marriage is influenced not only by coital frequency but also by other factors such as the level of contraception. Moreover, we need to pay attention to the reality of what an arranged marriage means in contemporary Japan.⁸ An arranged marriage is, in the strictest sense, a form of marriage in which a bride and bridegroom do not choose their spouse and do not have the power to veto the parents or relatives' selection of their spouse. However, this definition of an arranged marriage hardly reflect the actual picture of arranged marriages in contemporary Japan. In fact, after meeting a potential partner chosen by their parents or relatives, the number of young Japanese people rejecting that selection increased considerably in the 1950s (Dore, 1958). In short, even if a third party offers to arrange meetings with potential partners, a man and woman who meet through such an arrangement hold the power to decide for themselves whether or not they will marry. In other words, in contemporary Japan, such an arrangement merely offers men and women over the socially desirable marriageable age the opportunity to find a future partner. In particular, since many women who exceed this age but who desperately want to marry and have children, opt for an arranged marriage, these women tend to have children at shorter intervals after marriage. In fact, Otani (1986) finds that Japanese women in arranged marriages tend to have children at shorter intervals after marriage in comparison to those who married through a love match. With this evidence in mind, it is expected that arranged marriages will have a compressing effect on birth

⁸ Dore (1958) describes, in detail, the process of Japanese arranged marriage.

intervals after marriage.

Figure 5.1: Analytical Framework of Birth Intervals



5.4 Differences of the First Birth Interval: From Marriage to the First Birth

This section will present differences in the first birth interval (=from marriage to first birth) according to the variables mentioned in the previous section. Taking the influence of marriage interruption caused by divorce on birth intervals into consideration, we excluded re-married couples from the following analyses. Furthermore, in order to remove the influence of pregnancy-dependent marriage on birth intervals, first-married couples who

had their first child within eight months after marriage were also excluded from the analyses.

Table 5.2 shows the first birth interval according to socio-economic variables. Although the month of the first birth interval slightly differed across the categories, a positive relationship was identified between the period from marriage to first birth and the wife's level of education. Married women who terminated their education at junior or senior high school, on average, gave birth to their first child within 17.17 months after marriage, while those who went to a vocational school or a junior college had their first child in 18.36 months. Moreover, the mean birth interval of the 'university or higher' category reached 20.70 months. As discussed in the previous section, since a wife's earning capacity is directly proportional to her educational qualifications, this evidence suggests that considerations relative to a wife's opportunity cost have an influence on first birth interval.

On the other hand, the relation between a husband's annual income and the first birth interval was not a monotonic increase. There was almost no difference in the mean month between the lowest category (=less than 3,000) and the second lowest one (=3,000-3,999). Similarly, a mean difference between the third (=4,000-4,999) and the fourth category (=5,000-5,999), and between the fifth (=6,000-7,999) and the highest group (=8,000 or more) were also quite small. However, it is not appropriate to argue from these findings that a husband's income does not affect the first interval at all. Rather, the findings suggest that the couple's decision on when to have their first child is less sensitive to the husband's annual income. In fact, if we change the classification of the husband's income level, we can recognise more clearly the positive relation between birth interval and a husband's income. For example, let us re-categorise these six groups into three. In this case, the mean of the first group (the 'Less than 3,000' and the '3,000-3,999' groups combined) stands at around 18.6

months. Likewise, the second group (made up of the '4,000-4,999' and the '5,000-5,999' groups) has a mean of about 18.0 months, and the mean of the third group (made up of the '6,000-7,999' and the '8,000 or More' groups) reaches approximately 16.8 months.

Table 5.2: The First Birth Interval according to Socio-economic Variables (Month)

Wife's Education	Mean	Standard Deviation	N	Husband's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
Junior or Senior High School	17.17	7.14	501	Less than 3,000	18.53	7.46	93
				3,000 - 3,999	18.69	9.06	126
Vocational School or Junior College	18.36	7.63	165	4,000 - 4,999	17.97	8.81	161
				5,000 - 5,999	18.04	7.49	147
University or Higher	20.70	6.78	84	6,000 - 7,999	16.89	6.39	121
				8,000 or More	16.75	6.92	102
Total	17.83	7.25	750	Total	17.83	7.25	750

Source: Survey Data

Next, we will look at the relation between the attitudinal variables and the first birth interval in Table 5.3.⁹ Questions A to E indicate respondents' attitudes to self-centred values, and Questions G and H their attitudes to Japanese traditional values.

As far as self-centred values are concerned, Questions A (parents devoted to children over self-interest), D (children important) and E (goal-oriented individual) revealed a consistent trend. In these questions, the more individualistic the wives, the later they bore their first child. For example, the wives in the 'Agree strongly' group in Question D, on average, gave birth to their first child in 17.51 months after marriage, and those in the 'Agree' group had their first child in 17.74 months. On the other hand, the mean birth interval of the 'Disagree' category was 19.75 months, and

⁹ The mean of the D.K. or N.A. category in each attitudinal question was exceptionally low. This is probably due to the fact that respondents who answered the D.K or N.A. were not supportive of this survey, and gave unreliable answers.

that of the 'Disagree strongly' category reached fully 19.81 months. In contrast, a consistent relationship between the individualistic attitudes and the birth interval was not identified in Questions B, C and F. Question B is a typical example. The longest mean interval (=18.39 months) appeared in the 'Agree' category and the second longest mean interval (=17.90) was observed in the 'Disagree strongly' category. On the other hand, the average month of the 'Agree' category was the shortest (=17.26), and that of the 'Disagree' category was the second shortest (=17.73). Likewise, in Question C, the 'Agree' group yielded the shortest mean (=17.61), and the 'Disagree' group showed the longest mean (=19.09).

With regard to Japanese traditional values, we observed in only Question G that the first birth interval became shorter as wives showed more affirmative attitudes to the Japanese traditional family relationship. In concrete terms, the 'Agree strongly' group revealed the shortest mean (=15.96 months), and the second shortest mean (=17.10) was observed in the 'Agree' group. By contrast, the wives who had strongly disagreed with this view had their first child at the longest interval (=19.14), and those that had disagreed with it bore their first child at the second longest interval (=18.41).

Table 5.3: Relationship Between Attitudinal Factors and the First Birth Interval (Month)

A: Parents duty is to do their best for their children, at the expense of their own well-being.				B: When personalities do not match, a divorce is reasonable.			
	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Agree strongly	16.16	6.29	113	Agree strongly	17.26	7.56	92
Agree	17.76	7.31	289	Agree	18.39	7.43	240
Disagree	18.59	7.16	243	Disagree	17.73	7.02	275
Disagree strongly	19.01	8.54	90	Disagree strongly	17.90	5.89	124
D.K. or N.A.	12.28	5.17	15	D.K. or N.A.	14.73	4.56	19
Total	17.83	7.25	750	Total	17.83	7.25	750

C: When a child is small, a mother should stay home without working outside the home.

	Mean	Standard Deviation	N
Agree strongly	17.87	7.27	210
Agree	17.61	7.17	370
Disagree	19.09	7.90	100
Disagree strongly	18.41	6.83	55
D.K. or N.A.	12.11	4.21	15
Total	17.83	7.25	750

D: Children are important to a successful marriage.

	Mean	Standard Deviation	N
Agree strongly	17.51	7.31	334
Agree	17.74	7.18	301
Disagree	19.75	6.59	59
Disagree strongly	19.81	5.47	45
D.K. or N.A.	12.09	4.61	11
Total	17.83	7.25	750

E: Even After marriage, one should not sacrifice one's own goals in life for one's family.

	Mean	Standard Deviation	N
Agree strongly	16.96	6.66	112
Agree	17.97	7.02	390
Disagree	18.19	6.69	189
Disagree strongly	18.68	5.79	48
D.K. or N.A.	12.11	4.21	11
Total	17.83	7.25	750

F: It is not essential to get married if it means sacrificing one's own goal in life.

	Mean	Standard Deviation	N
Agree strongly	18.29	6.93	215
Agree	17.84	7.39	400
Disagree	17.91	7.06	101
Disagree strongly	16.14	5.04	19
D.K. or N.A.	12.49	5.65	15
Total	17.83	7.25	750

G: It is better to live with parents after marriage.

	Mean	Standard Deviation	N
Agree strongly	15.96	5.35	35
Agree	17.10	6.73	246
Disagree	18.41	7.57	365
Disagree strongly	19.14	7.50	91
D.K. or N.A.	11.35	4.37	13
Total	17.83	7.25	750

H: It is a child's duty to care for aged parents.

	Mean	Standard Deviation	N
Agree strongly	17.97	7.26	291
Agree	18.13	7.25	387
Disagree	16.84	7.85	49
Disagree strongly	15.51	5.87	8
D.K. or N.A.	12.05	6.15	15
Total	17.83	7.25	750

Note: D.K. or N.A. : do not know or no answer

The inquiring sentence of these questions is "What do you think of the following life styles or views?"

Let us turn to residential factors. Table 5.4 displays birth intervals

according to postnuptial living arrangements and the present residential type. Both factors yielded a salient difference in terms of the interval between marriage and first birth. To begin with, the average month from marriage to a first birth was 16.14 months for couples who lived with their parents immediately after marriage, whereas the figure stood at 18.56 months for couples who lived without parents. The difference between the two groups was about 2.42 months, from which we can recognise that co-residence with parents tends to shorten the length of time from marriage to first birth. Secondly, the mean for couples living in rural regions was 15.78 months, while for couples living in urban regions, this figure reached 18.35 months. It therefore follows that rural couples gave birth to their first child about 2.5 months earlier than urban couples. Although we could not identify a distinguishable regional difference in terms of the number of children in the previous chapter, the present results suggest that a regional variation exists with reference to the first birth interval. Interestingly, the standard deviation was also smaller in the rural category than in the urban category, which suggests that the timing of the first birth is more homogeneous in rural than urban couples.

Table 5.4: The First Birth Interval according to Residential Variables

Residential Arrangement Immediately after Marriage	Mean	Standard Deviation	N	Present Residential Are	Mean	Standard Deviation	N
Lived with own parents or spouse's parents	16.14	6.37	225	Urban	18.35	7.48	598
Neither spouse's nor own parents	18.56	7.47	525	Rural	15.78	5.35	150
Total	17.83	7.25	750	Total	17.83	7.25	748

Source: Survey Data
 Urban : Its administrative unit is a city.
 Rural: Its administrative unite is a town or a village.

Finally, we will look at the relationship between the first birth

interval, marriage type and the wife's marriage age in Table 5.5. The mean of the first birth interval clearly differed in the 'Love Match' and the 'Arranged Marriage' groups. Women in an arranged marriage, on average, bore their first child within 16.91 months of their marriage, whereas those in the 'Love match' marriage category reached 18.20 months. Women in the love match category gave birth to their first child about 1.3 months later than those in the arranged marriage category.

On the other hand, a consistent relation was not observed between first birth interval and a wife's marriage age. As a wife's marriage age rose, the average interval from marriage to first birth slightly increased from 18.01 months in the first group (=less than 23) to 18.04 months in the second group (=23-24). However, the mean fell to 17.01 months in the third group (=25-26), and thereafter rose again to 19.30 months in the last group (=29 or More). Nevertheless, we might say that the first birth interval shows, on the whole, a U-shaped curve regarding a wife's marriage age . In fact, the average length of the first birth interval was around 18 months for women who married under the age of 24, and the mean birth interval stood at approximately 17 months for women who married between the ages 25 and 28. Moreover, women whose age at marriage was over 29, on average, gave birth to their first child within 19 months of their marriage.

Table 5.5: Relationship between the First Birth Interval, Demographic Variable, and Marriage Type (Month)

Marriage Type	Mean	Standard Deviation	N	Wife's Marriage Age	Mean	Standard Deviation	N
Love Match	18.20	7.59	550	Less than 23	18.01	7.58	145
Arranged Marriage	16.91	6.61	180	23 - 24	18.04	6.68	252
				25 - 26	17.01	8.09	148
Other	16.21	4.69	20	27 - 28	17.11	6.21	117
Total	17.83	7.25	750	29 or More	19.30	7.35	88
				Total	17.83	7.25	750

Source: Survey Data

Since this section provided only the description of the relationship between first birth interval and explanatory variables, we need to carry out a further investigation with regard to factors that playing a critical role in determining the timing of the first birth. Thus, we will attempt a multivariate analysis in the following section.

5.5 Results of the Analysis of the First Birth Interval

The proportional hazard model (=Cox Regression) was employed to test the hypothesis about the determinants of first birth interval. As in the previous section, we dealt with couples married for the first time for whom the interval between marriage and first birth was over eight months. In our analysis, the hazard function of the model was the probability of a couple having their first child at month t from the point of marriage. All models used in this analysis included marriage cohorts as a covariate. When using Cox Regression, we encounter the problem of heterogeneity (see Chapter 3). If we fail to capture heterogeneity in the population under study with a set of covariates included in the model, estimated parameters will be biased by the effect of unobserved heterogeneity. Nevertheless, it is difficult to determine *a priori* whether or not the heterogeneity of our data is incorporated in the model with the set of explanatory variables presented in the analytical framework. In particular, each marriage cohort may have a specific pattern of birth intervals. For instance, women who married during a period of recession may attempt to delay having a child until the economy picks up. Therefore, in order to produce more accurate parameters, we included the marriage cohorts in our model as a covariate.

Table 5.6 displays the result of the first model¹⁰, which included all covariates except the attitudinal factors. To begin with, the regression

¹⁰ As we noted in Chapter 3, the interaction effect of independent variables is not considered in the analyses of this chapter.

coefficient differed across the levels of a wife's education. The coefficient of the 'Junior College' category revealed a coefficient of 0.9042, and decreased the hazard rate of having a first child by 10% in comparison with the 'High School' category. The coefficient of the 'University' category was 0.8417, and the women in this category had a 15% lower probability of bearing a first child than those in the 'High School' category. Furthermore both coefficients were significant at the 5% level. Since a wife's earning capacity in the labour market is positively related to her educational level, this evidence indicates that considerations relative to the opportunity cost play a significant role in determining first birth interval. The economic theory of fertility assumes that the level of a wife's human capital is negatively related to birth timings, and the present results are in accord with this proposition. On the other hand, the influence of a husband's annual income on first birth interval is not as simple as that of a wife's educational level. As far as the coefficients show, the higher the husband's income was, the shorter the birth interval became. Specifically, the '4,000-7.999' category was about 7%, and the '8,000 or more' category was about 12% greater than the 'Less than 4,000' category with regard to the probability of having a first child. On the other hand, the coefficient of the highest income group (=8,000 or more) was significant, but that of the middle group (4,000-7,999) was not significant at the 5% level. These findings suggest that the lowest income group does not differ from the middle group, but significantly differs from the largest group in terms of the hazard rate of bearing a first child. In other words, as long as a husband's income does not exceed 8,000,000 yen, the timing of his wife having the first child does not depend on his income. But if a husband earns over 8,000,000 yen, his wife's will bear her first child within a significantly shorter period after marriage. Hence, a rise in the husband's annual income, as the New Home Economics theory holds, shortens the first birth interval, but this effect is limited to the cluster of

husbands who earn a considerable income.

With regard to residential factors, all covariates revealed results meeting our expectations. Couples living in urban regions had a 10% lower probability of a first birth by comparison with those living in rural regions, from which it can be argued that urban couples become parents later than rural ones. On the other hand, the hazard rate of bearing a first child was about 10% higher for married couples who lived with their parents immediately after marriage than for those who lived without parents. This suggests that co-residence with parents lessens the burden of bringing up children. Interestingly, we could not identify a significant effect of present residential variables on the level of fertility in the previous chapter, but these variables exerted a significant effect on the birth interval in this present analysis. Hence, residential type plays a more important role in the timing than in the level of fertility.

Marriage type also yielded a significant coefficient. The 'Arranged marriage' group increased the hazard rate of bearing the first child by about 16%. It therefore follows that wives in an arranged marriage bear their first child at a more rapid pace than those in a love match. As mentioned earlier, Otani (1986) finds that the length of time from marriage to first birth is shorter for Japanese wives in an arranged marriage than for those in a love match. Our results are in agreement with these findings. As in the case of the present residential type, marriage type did not have a significant effect on the level of fertility, but exerted a significant effect on the timing of fertility.

Compared to women who married under the age of 24, those who married over the age of 29 had a 21% lower probability of bearing a first child. Furthermore, the coefficient of this category (=over age 29) was significant at the 5% level. On the other hand, although women who married between the ages of 25 and 28 showed a slightly greater probability

of her bearing a first child, the coefficient of this category was not statistically significant. Thus, if women get married by their twenty-eighth birthday, their marriage age does not significantly affect the timing of the first birth. However, in women married after the age of 29, the length of the interval from their marriage to their first birth increased substantially.

The interesting point is that the marriage cohort had a significant effect on the hazard rate of wives having their first birth. The younger marriage cohort revealed a longer interval between marriage and first birth than the older cohort. In concrete terms, the hazard rate was lower by about 6% for the marriage cohort from 1976 to 1985, and by about 13% for the cohort after 1985 than for the cohort before 1975. These results suggest that, even if the influence of the other covariates are controlled out, the marriage cohort still affects the first birth interval significantly. In other words, the marriage cohort itself has a lengthening effect on the birth interval.

Table 5.6: The result of Cox Regression of the First Model (the First Birth Interval)

Explanatory Variables	Exponential Regression Coefficients	Standard Error
Wife's Educational Level		
(High School)	1.0000	
Junior College	.9042*	.0669
University	.8417*	.0409
Husband's Annual Income		
(Less than 4,000)	1.0000	
4,000 - 7,999	1.0664	.0596
8,000 or more	1.1207*	.0579
Present Residential Area		
Urban	.9005*	.0509
(Rural)	1.0000	
Co-residence with Parents after Marriage		
Own or spouse's	1.1237*	.0461
(Neither spouse's nor own)	1.0000	
Marriage Type		
(Love match)	1.0000	
Arranged marriage	1.1627*	.0652
Wife's Marriage Age		
(- 24)	1.0000	
25 - 28	1.0869	.0581
29 -	.7891*	.0812
Marriage Cohort		
(- 1975)	1.0000	
1976 - 1985	.9475**	.0174
1985 -	.8774**	.0353
Number of Cases	729	
Degree of Freedom	11	
-2 log-likelihood	2534.634**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: Wife's Educational Level
 High School: Junior or Senior High School
 Junior College: Vocational School or Junior College
 University: University or Higher

The second model was carried out to examine the effect of individualistic attitudes on the first interval. The central problem explored by this model is whether or not the 'Individualism Attitude' covariate has an influence on determining the first birth interval. If this variable is not significant in the model, the change of the attitude will not affect the length of period from marriage to first birth. On the contrary, if the variable affects the birth interval significantly, the change of the attitude will be crucial to determine the duration from marriage to first birth.

Numeric values were assigned to each answering category of

attitudinal questions concerning individualism in the same way as was used in the analysis of the previous chapter. More specifically, the degree of a respondent's individualistic attitude was the sum of numeric values that was assigned to reflect the categorical ranking of the six Likert-scale questions. Therefore, the more individualistic the respondent, the greater her score is.

Table 5.7 displays the result of the second model. The 'Individualism Attitude' covariate had a lengthening effect on the first interval, which indicates that women give birth to their first child later in direct relation to the importance they place on their well-being. In concrete terms, its coefficient was 0.9616, and significant at the 10% level. This means that one unit increase in this covariate decreased the risk of bearing the first birth by 4%. Furthermore, the value of -2 log-likelihood (the log-likelihood multiplied by -2) was 2534.634 for the reduced model excluding the attitudinal covariate, whereas that of the full model including the attitudinal covariate reached 2531.596. The difference between the two likelihoods was 3.038, being statistically significant at the 10% level by the chi-square test with one degree of freedom. This result indicates that the full-model only slightly improves the goodness of fit. It therefore follows that individualistic attitudes play a minor role in determining the timing of the first birth after marriage.

However, we should, at the same time, notice that the two significant socio-economic covariates in the first model were still significant in the full model of the second analysis. Specifically, a rise in the level of a wife's education decreased the risk of having a first birth significantly, while a greater husband's income also increased the risk. This evidence suggests that even when the influence of a individualistic attitude is controlled out, a wife's education and a husband's annual income exert a significant effect on determining first birth interval.

Interestingly, the level of significance for the marriage cohorts changed from 1% in the reduced model to 5% in the full model. This decrease is due to the fact that including the attitudinal covariate in the regression model weakened the effect of the marriage cohorts on the birth interval. More specifically, compared with the women in the older marriage cohort, those in the younger cohort, as a whole, had more individualistic attitudes. Owing to this tendency, the full model displayed the great significance of the effect of the marriage cohort on the birth interval. However, since this tendency was controlled out in the reduced model, the degree of significance for the marriage cohorts fell to the 5% level. In short, the pattern of first birth interval that each marriage cohort showed is, to some extent, accounted for by this attitudinal factor.

Table 5.7: The result of Cox Regression of the Second Model (the First Birth Interval)

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Wife's Educational Level (HighSchool)	1.0000		1.0000	
JuniorCollege	.9250*	.0302	.9042*	.0669
University	.8802*	.0512	.8417*	.0409
Husband's Annual Income (Less than 4,000)	1.0000		1.0000	
4,000 - 7,999	1.0744	.0557	1.0664	.0596
8,000 or more	1.1038*	.0381	1.1207*	.0579
Present Residential Area Urban	.9327*	.0344	.9005*	.0509
(Rural)	1.0000		1.0000	
Co-residence with Parents after Marriage Own or spouse's	1.0975*	.0465	1.1237*	.0461
(Neither spouse's nor own)	1.0000		1.0000	
Marriage Type (Lovematch)	1.0000		1.0000	
Arrangedmarriage	.8783*	.0655	.8600*	.0652
Wife's Marriage Age (- 24)	1.0000		1.0000	
25 - 28	1.0806	.0558	1.0869	.0581
29 -	.8004*	.0915	.7891*	.0812
Marriage Cohort (- 1975)	1.0000		1.0000	
1976 - 1985	.9500*	.0232	.9475**	.0174
1985 -	.8942*	.0044	.8774**	.0353
Individualism Attitude	.9616#	.0244		
Number of Cases	717		729	
Degree of Freedom	12		11	
-2 log-like likelihood	2531.596**		2534.634**	

p<.10 * p<.05 ** p<.01

Parentheses are reference categories.

Note:

Individualism Attitude: the sum of marks that a respondent obtained for the six Likert-scale attitudinal questions.

Finally, we will examine the effect of attitudes to Japanese traditional values in Table 5.8. The extent of the respondent's attitude to Japanese traditional attitudes was transformed into the sum of two Likert-scale questions in the same manner as in the second model.

To begin with, the coefficients of the full model including the attitudinal covariate is similar to that of the reduced model without the covariate. In particular, the direction and magnitude of each coefficient concerning the socio-economic covariates was almost the same in the two

models. The probability of bearing the first child declined as the level of the wife's education increased. On the other hand, a higher husband's income resulted in a shorter duration from marriage to first birth. Thus, it can be argued from these findings that these covariates were still crucial to determining the timing of the first birth after marriage, even when the influence of the Japanese attitudinal factor was controlled

As far as the influence of the attitudinal covariate (the attitude to Japanese traditional values) is concerned, its coefficient was significant at the 10% level. In concrete terms, the value of the coefficient was 0,9502, and one unit increase of this covariate reduces the risk of having the first birth by 5%. This means that married women who are less committed to Japanese traditional values give birth to their first child later than those who are more committed to these values. In addition, compared to the reduced model, the full model increased the log likelihood by 3.536, and this figure was significant at the 10% level by the chi-square test with one degree of freedom.

These findings partly support the argument posited by Morgan, Rindfuss and Parnell (1984). As mentioned earlier, they suggest that social values peculiar to Japanese society characterise the fertility pattern of couples in Japan. More specifically, the values encourage married women to become mothers soon after marriage. Our results show that women who place less importance upon Japanese traditional values significantly delay bearing their first child. This is in agreement with the findings of Morgan, Rindfuss and Parnell. However, the level of significance for this attitudinal variable is 10%. Thus, we can say that the influence of Japanese traditional factors on the timing of first birth is mild.

Table 5.8: The result of Cox Regression of the Third Model (the First Birth Interval)

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Wife's Educational Level				
(High School)	1.0000		1.0000	
Junior College	.9389*	.0302	.9042*	.0669
University	.8631*	.0512	.8417*	.0409
Husband's Annual Income				
(Less than 4,000)	1.0000		1.0000	
4,000 - 7,999	1.0810	.0581	1.0664	.0596
8,000 or more	1.1021*	.0476	1.1207*	.0579
Present Residential Area				
Urban	.9247*	.0387	.9005*	.0509
(Rural)	1.0000		1.0000	
Co-residence with Parents after Marriage				
Own or spouse's	1.0994*	.0423	1.1237*	.0461
(Neither spouse's nor own)	1.0000		1.0000	
Marriage Type				
(Love match)	1.0000		1.0000	
Arranged marriage	.8634*	.0651	.8600*	.0652
Wife's Marriage Age				
(- 24)	1.0000		1.0000	
25 - 28	1.0700	.0578	1.0869	.0581
29 -	.8148*	.0907	.7891*	.0812
Marriage Cohort				
(- 1975)	1.0000		1.0000	
1976 - 1985	.9374*	.0245	.9475**	.0174
1985 -	.8754*	.0053	.8774**	.0353
Japanese Traditional Attitude	.9502#	.0279		
Number of Cases	717		729	
Degree of Freedom	12		11	
-2 log-likelihood	2531.098**		2534.634**	

p<.10 * p<.05 ** p<.01

Parentheses are reference categories.

Note:

Japanese Traditional Attitude: the sum of marks that a respondent obtained for the two Likert-scale attitudinal questions.

5.6 The Importance of the Second Birth Timing

The analyses of the previous section focused on the first birth interval and investigated its determinants by using multi-variate analysis. More specifically, the primary purpose of the analyses was to examine whether the timing of the first birth after marriage is decided by socio-economic or attitudinal factors. The results of the previous section suggest that the level of a wife's education and a husband's income play an important role in

determining the interval from marriage to a first birth. Wives with high educational qualifications bore their first child later than those with low educational qualifications. On the other hand, a rise in a husband's annual income prolonged the first birth interval. The results, however, indicate that attitudinal factors also affect the timing of the first birth after marriage. As women attached greater weight to their own well-being, they delayed childbearing. Similarly, a rise in the extent of commitment to Japanese traditional values prolonged the period from marriage to a first birth.

As previously shown, the age at which Japanese married women bear their first child has risen considerably in the past couple of decades (see Graph 5.1). This delay in childbearing does not necessarily mean, however, that Japanese women will terminate their reproductive process with only one child. As several survey results show, most of the couples had or desired to have two children (see Chapter 4). Only a small proportion of couples felt satisfied with having one child and very few women wished to be childless at the end of their reproductive period. To put it another way, this evidence indicates that the two-child norm is predominantly shared by Japanese people. Most of the women in Japan who have completed their fertility have at least two children, although the future is less clear.

In view of this situation, the analysis of first birth intervals brings about only a partial understanding of the temporal aspect of Japanese fertility behaviour. Since a great majority of Japanese couples have (or want to have) two children, the timing of a second birth is undoubtedly central to their concerns. Hence, it is likely that the socio-economic and attitudinal changes discussed in Section 5.2 exert an influence on Japanese married couples' decision about the timing of a second birth as well as the timing of a first birth. In the following section, we will examine determinants of the second birth interval.

5.7 Differences of the Second Birth Interval: From the First Birth to the Second Birth

As in the case of the first birth interval, we will, in this section, show variations in the second birth interval according to the explanatory variables presented in our analytical framework. We dealt with only first-married couples in the following analysis.

We will, firstly, examine differences in second birth interval according to the socio-economic variables in Table 5.9. In terms of a wife's educational level, it is observed that the mean of the second birth interval became greater as the level of a wife's education rose. The mean for wives with a university degree reached 34.29 months, being 0.4 months longer than that of those who terminated their education at vocational school or junior college. Moreover, the mean of wives in the 'Junior or Senior High School' group stood at 33.44 months, being about 0.7 months longer than that of wives with a university degree.

In contrast, the mean of the second birth interval did not differ across husband's income groups so clearly. Although the highest income category (=8,000 or more) revealed the shortest birth interval (=31.92 months), the remaining five categories had almost the same mean. These five categories ranged in mean only from 33.76 to 34.12 months. In addition, the mean did not rise in proportion to the level of the husband's annual income. For example, the average duration from first to second birth was 34.06 months in the '3,000-3,900' category, and rose to 34.12 months in the '4,000-4,900' category. However, the mean fell to 33.76 months in the '5,000-5,999' category, and again rose to 33.98 months in the '6,000-7,999' category. As far as this evidence shows, there is not a consistent relation between the second birth interval and the husband's annual income.

Table 5.9: The Second Birth Interval according to Socio-economic Variables (Month)

Wife's Education	Mean	Standard Deviation	N	Husband's Annual Income (in Thousand Yen)	Mean	Standard Deviation	N
Junior or Senior High School	33.44	11.79	409	Less than 3,000	33.92	8.45	50
				3,000 - 3,999	34.06	12.95	90
Vocational School or Junior College	33.90	12.46	107	4,000 - 4,999	34.12	12.90	113
				5,000 - 5,999	33.76	9.23	118
University or Higher	34.29	10.76	71	6,000 - 7,999	33.98	12.72	117
				8,000 or More	31.92	11.92	100
Total	33.62	11.77	587	Total	33.62	11.77	588

Source: Survey Data

Next, we will look at the relation between attitudinal factors and the second interval in Table 5.10. As in the case of first birth interval, Questions A to E indicate respondents' attitudes to self-centred values, and Questions G and H reflect their attitudes to Japanese traditional values.

With regard to self-centred values, we observed in Questions A (parents devoted to children over self-interest) and D (children important) that the length of the period from first to second birth increased as wives placed more importance on their own well-being. For example, in Question A, wives in the 'Agree strongly' group, on average, bore their second child in 29.86 months after their first birth, and those in the 'Agree' had their second child in 33.03 months. In contrast, the average of the second birth interval was 35.01 months in the 'Disagree' group and 36.09 months in the 'Disagree strongly' group. Likewise, Question D showed a clear relation between the mean birth interval and the answering category. The highest mean (=35.50 months) appeared in the 'Disagree strongly' category and the lowest mean (=32.89 months) appeared in the 'Agree strongly' category. Furthermore, in the two intermediate categories, the length of the second birth interval increased gradually as wives became more individualistic. On the other hand, Questions B (divorce), C (mother home during infancy years), E (goal-

oriented individual) and F (unmarried life for goal-pursuing) did not reveal a systematic connection between the wife's attitude and the birth interval. To exemplify, the lowest mean (=31.96 months) was discovered in the 'Disagree strongly' group in Question E, but the second lowest mean (=32.99 months) appeared in the 'Agree strongly' group. In contrast, the mean was the highest (=33.92 months) in the 'Agree' group, and the second highest (=33.85 month) in the 'Disagree' group.

In terms of Japanese traditional values, the mean of second birth interval steadily rose only in Question G (co-residence with parents), as wives showed a less affirmative attitude to these values. In concrete terms, wives in the 'Agreed strongly' category who wished to live with parents after marriage had, on average, their second child within 31.34 months of their first birth, while those in the 'Agree' category bore their second child in 33.44 months. On the other hand, the average of the interval from the first to the second birth was 33.78 months in the 'Disagree' category and 34.44 months in the 'Disagree strongly' category. In contrast, since the 'Disagree strongly' group had a lower mean than the 'Agree' group, the consistency of the relation between the second birth interval and the four answering categories was not achieved in Question H. However, much caution is necessary in the interpretation of these results. Since the marginal frequency of the 'Disagree strongly' category was quite small, the mean for this category may be unreliable. If we ignore the mean of the 'Disagree strongly' group, we may say that there is a consistent relation between the second birth interval and the answering category in Question H.

Table 5.10: Relationship Between Attitudinal Factors and the Second Birth Interval

(Month)

A: Parents duty is to do their best for their children, at the expense of their own well-being.

B: When personalities do not match, a divorce is reasonable.

	Mean	Standard Deviation	N
Agree strongly	29.86	10.75	88
Agree	33.03	11.70	223
Disagree	35.01	12.39	192
Disagree strongly	36.09	13.94	74
D.K. or N.A.	35.29	11.21	11
Total	33.62	11.77	588

	Mean	Standard Deviation	N
Agree strongly	33.43	10.17	83
Agree	35.08	12.47	191
Disagree	33.42	11.71	215
Disagree strongly	31.35	10.63	90
D.K. or N.A.	32.50	10.93	9
Total	33.62	11.77	588

C: When a child is small, a mother should stay home without working outside the home.

D: Children are important to a successful marriage.

	Mean	Standard Deviation	N
Agree strongly	34.26	13.26	184
Agree	33.17	11.26	285
Disagree	33.09	10.41	81
Disagree strongly	35.47	12.99	30
D.K. or N.A.	33.76	11.59	8
Total	33.62	11.77	588

	Mean	Standard Deviation	N
Agree strongly	32.89	11.66	280
Agree	34.26	11.39	216
Disagree	34.84	12.94	41
Disagree strongly	35.50	9.94	35
D.K. or N.A.	30.66	10.91	16
Total	33.62	11.77	588

E: Even After marriage, one should not sacrifice one's own goals in life for one's family.

F: It is not essential to get married if it means sacrificing one's own goal in life.

	Mean	Standard Deviation	N
Agree strongly	32.99	10.84	84
Agree	33.92	12.74	305
Disagree	33.85	10.28	152
Disagree strongly	31.96	9.84	37
D.K. or N.A.	32.34	11.15	10
Total	33.62	11.77	588

	Mean	Standard Deviation	N
Agree strongly	32.58	10.06	176
Agree	34.42	12.17	315
Disagree	33.14	12.85	77
Disagree strongly	32.38	9.05	11
D.K. or N.A.	31.48	11.84	9
Total	33.62	11.77	588

G: It is better to live with parents after marriage.

H: It is a child's duty to care for aged parents.

	Mean	Standard Deviation	N		Mean	Standard Deviation	N
Agree strongly	31.34	10.35	30	Agree strongly	34.28	12.21	217
Agree	33.42	13.44	171	Agree	33.38	11.86	316
Disagree	33.78	10.93	296	Disagree	32.39	10.12	41
Disagree strongly	34.44	11.03	82	Disagree strongly	33.35	8.21	6
D.K. or N.A.	32.40	10.88	9	D.K. or N.A.	31.71	11.60	8
Total	33.62	11.77	588	Total	33.62	11.77	588

Note: D.K. or N.A. : do not know or no answer

The inquiring sentence of these questions is "What do you think of the following life styles or views?"

Let us turn to the relation between the second interval and residential factors. Table 5.11 displays a variation in the second interval according to residential arrangements and present residential type.

A clear difference in the birth interval was identified between the two types of postnuptial living arrangements. Married couples who had lived with their parents immediately after marriage, on average, gave birth to their second child within 32.47 months of their first birth, while those who had not lived with their parents had their second child in 34.09 months. The mean difference between the two groups was about 1.5 months. However, this difference is smaller than that of the first birth interval. In Table 5.4, we found that couples who had lived with their parents after marriage bore their first child about 1.4 months earlier than those who had not lived with their parents. It is therefore argued from these findings that co-residence with parents has a greater influence on the timing of the first birth than on that of the second birth.

In contrast to living arrangements, present residential type yielded a negligible difference in terms of the second birth interval. Compared to the couples living in rural regions, those in urban regions bore their second child only 0.8 months later. Moreover, the difference between the urban and

rural group is smaller in the second birth interval than in the first birth interval. The mean difference between the two groups reached fully 1.57 months in the first birth interval (see Table 5.4). Hence, there is no distinctive difference between urban and rural residents with reference to the second birth interval.

Table 5.11: The Second Birth Interval according to Residential Variables (Month)

Residential Arrangement Immediately after Marriage	Mean	Standard Deviation	N	Present Residential Area	Mean	Standard Deviation	N
Lived with own parents or spouse's parents	32.47	11.46	169	Urban	33.82	12.31	461
Neither spouse's nor own parents	34.09	12.11	419	Rural	33.01	11.65	124
Total	33.62	11.77	588	Total	33.64	11.75	585

Source: Survey Data
 Urban : Its administrative unit is a city.
 Rural: Its administrative unite is a town or a village.

Finally, we will look at the relation between marriage type, a woman's age at first birth and the second birth interval in Table 5.12.

To begin with, couples in an arranged marriage had their second child at a slightly shorter interval than those who married in a love match. In concrete terms, the mean from first birth to second birth was 33.23 months in the 'Arranged Marriage' group, while it stood at 33.68 months in the 'Love Match' group. Nevertheless, the difference between the figures for the two groups was only 0.45 months. Therefore, it can be argued that marriage type has almost no influence on the interval from the first to the second birth.

On the other hand, the length of the period from first to second birth was systematically connected to the age at which a wife bore her first child. The highest mean (=34.22 months) appeared in the category of wives who bore their first child at the age of less than 24, whereas the lowest mean

(=32.97 months) was seen in the category of wives whose age at first birth was 31 or over. In addition, the mean birth interval in the intermediate three groups increased in tandem with a rise in the age at the first birth. This evidence suggests that the later the wives bore their first child, the more they shortened the interval from first to second birth.

Table 5.12: Relationship between the First Birth Interval, Demographic Variable, and Marriage Type (Month)

Marriage Type	Mean	Standard Deviation	N	Wife's Age of First Birth	Mean	Standard Deviation	N
Love Match	33.68	11.82	413	Less than 24	34.22	12.62	89
Arranged Marriage	33.23	10.92	158	24 - 26	33.83	10.76	130
Other	34.32	15.79	16	27 - 28	33.54	11.60	159
Total	33.57	11.74	587	29 - 30	33.51	12.00	116
				31 or More	32.97	12.61	94
				Total	33.62	11.77	588

Source: Survey Data

5.8 Results of the Analysis of the Second Birth Interval

In the previous section, we showed variations in second birth interval, according to explanatory variables depicted in our analytical framework. In this section, we will develop Cox regression in order to examine determinants of second birth interval in detail. The hazard function of the regression is the risk of having a second child at month t from the point of the first birth. As in the case of the regression analysis of first birth interval, the model included the marriage cohort as a covariate in order to avoid the risk of parameters being biased.

We will, firstly, examine the effect of covariates except attitudinal factors on second birth interval in the first model, the results of which are displayed in Table 5.13. With regard to the level of a wife's education, the interval between her first and second birth becomes greater as the level of the wives' education increases. Compared to wives in the 'High School'

group those in the 'Junior College' group had a 4% lower hazard rate of having a second child, and those in the 'University' group showed an 8% lower hazard rate. Nevertheless, only the regression coefficient of the 'University' category was significant at the 5% level. It therefore follows that wives who had graduated only from high school showed a significantly shorter second birth interval than wives who had graduated from university. They did not, however, display a significantly different interval from wives who had graduated from vocational school or junior college.

These results are different from those in Sweden. Hoem and Hoem (1989) found that Swedish women with high educational qualifications had a shorter interval from a first to second birth than those with low educational qualifications. In contrast, Japanese women with higher educational qualifications bore their second child after a longer interval of time from their first birth than those with low qualifications. This contrast between the figures from the two countries is probably due to differences in their levels of welfare. As mentioned earlier, Sweden's welfare policies support working mothers more than those of Japan. For example, the percentage of children enrolled in publicly funded day-care institutions reached fully 79% in Sweden, while the figure was only 21% in Japan (Gauthier, 1991). In a country having ample provision for child care, a difference in the woman's ability to combine childbearing with labour market participation is likely to play an important role in determining when she has the second child. Hence, as seen in Sweden, well-educated women, who can make better use of public child-care and other relevant services, will more easily bear their second child at a short interval than those with low educational credentials. However, if provision for child care is quite poor, the degree to which a woman can successfully combine childbearing with labour market participation will hardly be influential to the timing of her second birth. In this case, considerations concerning the earnings foregone by a woman who

could have devoted her time to paid work instead of bearing and caring for a child will play a more important role in determining the timing of her second birth. Therefore, as was observed in Table 5.13, the wife's educational level was positively related to the length of time between the first and second birth in Japan.

On the other hand, as far as the coefficients of the full model in Table 5.13 shows, a greater husband's annual income led to a shorter duration from the first birth to the second birth. More specifically, with reference to the hazard rate of having a second child, the highest income category (=8,000 or more) was greater by about 20% and the middle category (4,000-7,999) was by 3% than the lowest category (=less than 4,000). In spite of this, no coefficient of the husband's income was significant at the 5% level. It is argued from these findings that the level of the husband's annual income does not have a statistically significant effect on the length of period from the first to the second birth.

With regard to living arrangements, couples who had lived with their parents showed an approximately 10% greater probability of bearing a second child than those who had not lived with their parents. Furthermore, the coefficient of the 'Own or spouse's' category was significant at the 5% level. This result indicates that physical and psychological support derived from co-residence with parents results in a shorter interval from a first birth to a second birth. As suggested by Morgan and Rindfuss (1984), the burden of caring for children plays a important role in determining the timing of a second birth in Japan. On the other hand, the present residential type did not have a statistically significant effect on the hazard rate of having a second birth, although the coefficient of the 'Urban' category indicates that couples living in urban regions decrease the hazard rate of urban couples by 5% in comparison to those living in rural regions.

Marriage type also did not reveal a significant effect on the second

birth interval. Compared to married couples in a love match, those in an arranged marriage increased the hazard rate by 9%. However, the coefficient of the 'Arranged marriage' category was not statistically significant. It therefore follows that the timing of the second birth does not differ between the two groups.

The important point to note is that the wife's age at the first birth had a powerful influence on the second birth interval. Compared with wives who had borne their first child under the age of 25, wives who had borne their first child between the ages 26 and 29 increased the hazard rate of experiencing a second birth by 6% ,and wives whose age at first birth was over 30 increased the hazard rate by 11%. In addition, all coefficients of the wife's age at first birth were significant at the 1% level. These findings show that the interval from first to second birth becomes shorter, as wives bear their first child later. In the analysis of the first birth interval, we found that the socio-economic covariates (the wife's educational level and the husband's annual income) exerted a very strong effect on determining the timing of having a first child. On the other hand, the influence of these variables weakens when it comes to the timing of a second birth. In particular, no significant coefficients were observed in terms of the relation between the husband's annual income and the second birth interval. Hence, it is argued from the evidence that socio-economic variables significantly determine the timing of the first birth, and this demographic factor, in turn, affects the timing of the second birth. In other words, the influence of socio-economic variables on the timing of the second birth is not direct, but indirect through the wife's age at first birth.

This relatively weak impact of socio-economic variables on the second birth interval may be due to the strong 'two-child' norm. A considerable number of Japanese couples want to have two children (see Graph 6.4). This desire probably drives couples to have their second child at

a similar interval, regardless of their socio-economic circumstances. Furthermore, careful consideration for the health of a mother and her children may also contribute to this weak connection. According to the Tenth Japanese National Fertility Survey, 29.6% of couples gave up having an additional child, in order to avoid late childbearing (Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b). This biological consideration may lead to the weak impact of socio-economic factors on the timing of having a second child.

For the sake of assessing the goodness of fit for the first regression, the second column of Table 5.13 presents the result of the reduced model excluding the three insignificant variables (the husband's annual income, the present residential type and the marriage type). The value of -2 log-likelihood (-2 times log likelihood) was 3110.957 for the reduced model, whereas that of the full model including all covariates was 3103.285. The difference between the two log-likelihoods stood at 7.69, which was not significant even at the 10% level by the chi-square test with four degrees of freedom. Hence, the inclusion of these three variables does not contribute to the improvement of explanatory power for the first regression.

Table 5.13: The result of Cox Regression of the First Model (the Second Birth Interval)

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Wife's Educational Level				
(High School)	1.0000		1.0000	
Junior College	.9600	.0960	.9510	.0748
University	.9227*	.0321	.9106*	.0409
Husband's Annual Income				
(Less than 4,000)	1.0000			
4,000 - 7,999	1.0325	.0321		
8,000 or more	1.1944	.0989		
Present Residential Area				
Urban	.9505	.0494		
(Rural)	1.0000			
Co-residence with Parents after Marriage				
Own or spouse's	1.1206*	.0541	1.1406*	.0591
(Neither spouse's nor own)	1.0000		1.0000	
Marriage Type				
(Love match)	1.0000			
Arranged marriage	1.0956	.0667		
Wife's Age of First Birth				
(- 25)	1.0000		1.0000	
26 - 29	1.0684**	.0216	1.1030**	.0377
30 -	1.1146**	.0516	1.1345**	.0480
Marriage Cohort				
(- 1975)	1.0000		1.0000	
1976 - 1985	1.0388*	.0186	1.0468*	.0215
1985 -	1.0588*	.0285	1.0672*	.0289
Number of Cases	571		571	
Degree of Freedom	11		7	
-2 log-likelihood	3103.285**		3110.957**	

* p<.05 ** p<.01

Parentheses are reference categories.

Note: Wife's Educational Level
 High School: Junior or Senior High School
 Junior College: Vocational School or Junior College
 University: University or Higher

The second model was carried out to test the effect of individualistic attitudes on the second birth interval. As in the case of the second model of the first birth interval, the primary interest of this model is whether or not the 'Individualism Attitude' covariate has an influence on determining the second birth interval. The extent to which a respondent places importance on her own well-being was quantified in the same way as in the analysis of the first birth interval. Specifically, the individualistic attitude of each respondent was expressed as the sum of marks she obtained for six Likert-

scale attitudinal questions.

Table 5.14 displays the results of the second model. The overall impression is that the results of this model were similar to those of the first model in terms of the effects of all covariates but the attitudinal covariate. More specifically, compared to wives whose age at first birth was under 25, wives who had borne their first child between the ages of 26 and 29 significantly increased their risk of having the second child by 5%, and wives whose age at the first birth was over 30 increased their risk by 12%. Likewise, compared to the wives who had terminated their education at junior or senior high school, those with a university degree revealed a 7% lower probability of bearing a second child. Furthermore, the hazard rate of having the second child for couples who lived with their parents after marriage was greater by 13% than that for the couples who did not live with their parents after marriage. Hence, it follows that, even when the effect of the attitudinal factor was controlled out, these covariates had a significant effect on the timing of having a second child. On the other hand, the husband's annual income, present residential type and marriage type did not show a significant effect on the second birth interval.

The attitudinal covariate had a lengthening effect on the second birth interval. The coefficient of the 'Individualism Attitude' was 0.9687 for the full model and was 0.9606 for the reduced model of the second regression, which means that the risk of having the second child declines by about 4% with one unit increase in this covariate. Thus, it is argued that the length of period from a first birth to a second birth becomes longer as the wives attracts more importance to their own well-being. However, the coefficient of this variable was significant at the 10% level in the full and the reduced model. In addition, the value of -2 log-likelihood (-2 times the log likelihood) shows that this attitudinal covariate is an important factor of the second birth interval. The difference of -2 log-likelihood between the full model of

the first regression and that of second regression reached 3.581. This figure was statistically significant at the 10% level by the chi-square test with a degree of freedom. Similarly, the result of chi-square test between the reduced model of the first regression and that of the second regression also revealed significance at the 10% level with a degree of freedom. From these results we can conclude that the model including the 'Individualism Attitude' covariate shows only a slight improvement in explanatory power, compared with the model without the attitudinal covariate. Therefore, the duration from a first to a second birth is weakly affected by attitudinal factors.

Table 5.14: The result of Cox Regression of the Second Model (the Second Birth Interval)

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Wife's Educational Level				
(HighSchool)	1.0000		1.0000	
JuniorCollege	.9800	.0969	.9784	.0958
University	.9362*	.0324	.9355*	.0312
Husband's Annual Income				
(Less than 4,000)	1.0000			
4,000 - 7,999	1.0258	.0488		
8,000 or more	1.2016	.0845		
Present Residential Area				
Urban	.9600	.0498		
(Rural)	1.0000			
Co-residence with Parents after Marriage				
Own or spouse's	1.1363*	.0546	1.1323*	.0534
(Neither spouse's nor own)	1.0000		1.0000	
Marriage Type				
(Lovematch)	1.0000			
Arrangedmarriage	1.0984	.0665		
Wife's Age of First Birth				
(- 25)	1.0000		1.0000	
26 - 29	1.0581**	.0208	1.0821**	.0291
30 -	1.1238**	.0451	1.1457**	.0518
Marriage Cohort				
(- 1975)	1.0000		1.0000	
1976 - 1985	1.0214*	.0102	1.0356*	.0176
1985 -	1.0365*	.0157	1.0510*	.0242
Individualism Attitude				
	.9687#	.0189	.9606#	.0218
Number of Cases				
	571		571	
Degree of Freedom				
	12		8	
-2 log-likelihood				
	3099.704**		3107.560**	

p<.10 * p<.05 ** p<.01

Parentheses are reference categories.

Note:

Individualism Attitude: the sum of marks that a respondent obtained for the six Likert-scale attitudinal questions.

Finally, let us examine the effect of attitudes to Japanese traditional values on the second birth interval in Table 5.15. In the third model of the second birth interval as well as of the first birth interval, the degree to which each respondent accepts Japanese traditional values was expressed as the sum of marks she obtained for two Likert-scale attitudinal questions. Hence, the less affirmative attitude toward the values the respondent shows, the greater her score is.

The attitudinal covariate, or the 'Japanese Traditional Attitude', had

a reducing influence on the hazard rate of having the second birth in both the full model and the reduced model of the third regression. The coefficient of this covariate was 0.9803 for the full model, which means that a unit increase in the covariate decreases the hazard by 2%. On the other hand, this covariate yielded a coefficient of 0.9731 in the reduced model, showing that the hazard rate declines by about 3 % with a unit increase in the covariate. It can, therefore, be argued that a lower commitment to Japanese traditional values delays a second birth. Nevertheless, the effect of this attitudinal covariate on the second birth interval is not great. This variable was significant at the 10% level in the full and the reduced model of the third regression. Furthermore, compared to the full model in Table 5.13, that of the third regression reduced the value of -2 log-likelihood by 3.766. Similarly, the difference between the reduced model of the first regression and of the third regression reached 3.167 in terms of the log likelihood. Both differences in the log-likelihood were significant at the 10% level by chi-square test with a degree of freedom, which indicates that including the attitudinal covariate in the model improves explanatory power slightly.

As in the case of the first birth interval, this evidence partly supports the argument proposed by Morgan, Rindfuss and Parnell (1984). According to them, Japanese traditional values underline bearing and caring for children as the woman's primary role which is an important factor in characterising the fertility pattern of Japanese women. Our findings reveal that the duration from a first to a second birth is lengthened as women show a weaker commitment to the traditional relationship of the Japanese family. In other words, a less affirmative attitude toward Japanese traditional values leads to a longer interval from first to second birth. However, this attitudinal covariate is significant at the 10 % level, which indicates that the influence of Japanese attitudinal factors is not great.

In terms of the effects of the remaining covariates on the second

birth interval, the third model was similar to the previous two models. The wife's level of education, the postnuptial living arrangements, and the wife's age at the first birth revealed a significant effect on the second interval, which suggests that these factors are still crucial determinants to the timing of bearing a second child, even when the influence of the attitudinal variable concerning Japanese traditional values is controlled. In contrast, no significant coefficient was observed in the husband's annual income, the present residential type and the marriage type. It is particular worth noting that the wife's age at first birth was significant at the 1% level in the full and the reduced model of the third regression. The strong effect of this covariate may be derived from the fact that Japanese women tend to avoid giving birth at an older age. For instance, approximately 30% of Japanese wives had fewer children than they actually wanted, because they avoided childbearing at an advanced age.(Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994b). Hence, wives bearing their first child later may show a shorter interval between first and second birth.

Table 5.15: The result of Cox Regression of the Third Model (the Second Birth Interval)

Explanatory Variables	Full Model		Reduced Model	
	Exponential Regression Coefficients	Standard Error	Exponential Regression Coefficients	Standard Error
Wife's Educational Level				
(HighSchool)	1.0000		1.0000	
JuniorCollege	.9816	.0960	.9796	.0961
University	.9309*	.0332	.9287*	.0352
Husband's Annual Income				
(Less than 4,000)	1.0000			
4,000 - 7,999	1.0467	.0478		
8,000 or more	1.2100	.0741		
Present Residential Area				
Urban	.9550	.0663		
(Rural)	1.0000			
Co-residence with Parents after Marriage				
Own or spouse's	1.1125*	.0537	1.1045*	.0437
(Neither spouse's nor own)	1.0000		1.0000	
Marriage Type				
(Lovematch)	1.0000			
Arrangedmarriage	1.1045	.0663		
Wife's Age of First Birth				
(- 25)	1.0000		1.0000	
26 - 29	1.0493**	.0178	1.0507**	.0188
30 -	1.1307**	.0435	1.1206**	.0441
Marriage Cohort				
(- 1975)	1.0000		1.0000	
1976 - 1985	1.0184*	.0093	1.0271*	.0126
1985 -	1.0385*	.0184	1.0491*	.0235
Japanese Traditional Attitude	.9803#	.0114	.9731#	.0161
Number of Cases	571		571	
Degree of Freedom	12		8	
-2 log-likelihood	3099.519**		3107.790**	

p<.10 * p<.05 ** p<.01

Parentheses are reference categories.

Note:

Japanese Traditional Attitude: the sum of marks that a respondent obtained for the two Likert-scale attitudinal questions.

Conclusion

This chapter examined determinants of the timing of births after marriage. In particular, the main focus of this chapter was whether or not socio-economic and attitudinal factors exert an influence on the timing of births after marriage. For this purpose, the analysis of this chapter focused on first and second birth intervals in Japanese married couples.

The results of this chapter, firstly, suggest that socio-economic factors affect the timing of births after marriage. More specially, the higher

the wife's educational level, the longer the interval from marriage to a first birth was. In contrast, Japanese couples had their first child at a shorter interval after marriage as the husband's annual income increased. However, these two factors had a different effect on the timing of bearing a second child. Wives with high educational qualifications bore their second child at a shorter interval after the first birth than those with low educational qualifications. However, the husband's annual income did not show a statistically significant effect on the length of time from a first to a second birth. This evidence suggests that the earnings foregone by a wife who could have devoted her time to paid work instead of child-rearing (=a wife's opportunity cost) play a crucial role in determining the timing of having her first and second child. However, the findings indicate that the timing of having a first child is affected by the level of a husband's annual income, but it has no effect on the timing of having a second child. It is therefore argued that, in Japan, the influence of a husband's income on the timing of births after marriage is not so uniform and simple as is assumed by the New Home Economics theory.

Secondly, the results of this chapter indicate that a wife's age at first birth significantly affects the timing of the second birth. The length of time from a first to a second birth became shorter as the age at which a wife bore her second child increased. The socio-economic variables exerted a significant effect on the timing of the first birth, but the influence of these variables became relatively weak in the timing of the second birth. In particular, a husband's annual income was significant in the analysis of the first birth interval, but was not significant in the analysis of the second birth interval. Instead, the wife's age at first birth played an important role in determining the timing of the second birth.

Finally, our findings suggests that attitudinal factors also have a weak influence on the timing of first and second births. Wives who placed

more importance on their own well-being, bore their first and second child later than those who did not so. Similarly, a lower commitment to Japanese traditional values resulted in a lengthening of first and second birth intervals. However, these attitudinal factors were significant to the timing of childbearing at the 10% level. Therefore, we can conclude that attitudinal factors play a secondary role in determining the tempo of fertility behaviour in Japan.

Chapter 6

Time-series Analysis of Marriage and Fertility

Introduction

In this chapter, we attempt to analyse trends in the marriage and fertility pattern of post-war Japan. As is well known, Japanese demographic patterns have drastically changed during this period. After the short baby boom, lasting only three years, a decline in the birth rate followed, and the Japanese total fertility rate (TFR) remained at around two from the mid-1950s until 1973. However, the TFR thereafter began to fall again, reaching 1.43 in 1995. In parallel with this drastic change in the fertility rate, Japanese marriage patterns also changed. The particular distinctive change is that female age at marriage has been increasing since the 1970s. The female mean age at marriage rose from 24.7 in 1973 to 27.3 in 1995. Since consensual unions are quite rare¹ in Japan, this rise does not mean that legally unauthorised *de facto* marriages increase in number, but that a growing number of Japanese women delay entry to marriage.

As discussed in Chapter 1, two types of method are possible for analysing the demographic pattern of a country or a region: cross-sectional and time-series analysis. In the cross-sectional analysis, based on survey data, we can collect and utilise various kinds of information according to our research objects. On the other hand, in the time-series analysis, we often encounter various difficulties in the availability of information. Since data employed in the time-series analysis is, in general, officially published as an aggregate of regional units, we can obtain limited information from data of this kind. Thus, it often happens that a set of data which a researcher wants to use for his or her analysis is not available.

¹ According to the result of the Tenth Japanese Fertility Survey, only about 1.1% of men and women aged from 18 to 50 were cohabiting (see Kôsei Shô Jinkô Mondai Kenkyû Jo, 1994a).

Despite great flexibility in data availability, cross-sectional analysis is not always an appropriate strategy in demographic studies. Even if the analysis of data collected by a single survey shows a certain relation between variables at the time of the survey, there is no guarantee that this connection is valid at other points in time. For instance, even if the level of fertility is significantly affected by the level of female wages at one point in time, that may not hold true for the situation of ten years ago. Thus, a cross-sectional analysis gives a partial understanding of the demographic situation that a researcher is interested in. In other words, both cross-sectional and time-series analyses are essential to understand the mechanism of demographic behaviour thoroughly.

Taking the point into account, we will, in this chapter, carry out the time-series analysis of Japanese demographic behaviour since the 1950s. In this chapter, we will first review the time-series analyses of marriage and fertility for Western countries and Japan. Next, the influence of socio-economic factors on Japanese marriage and fertility pattern will be examined. Finally, we will investigate the relation between marriage and fertility pattern, and attitudinal factors in Japan.

6.1 Two Competing Theories of the Post-war Demographic Swings: Countercyclical or Procyclical?

The post-war demographic pictures of industrialised countries have shown marked features in terms of marriage and fertility, and continued to provoke much research interest among social scientists including demographers.

The drastic upward swing of the baby boom in Western countries from the early 1950s until the late 1960s added millions of births to the number that would have occurred if fertility had remained at the level of the early 1950s. The following downward phase of the 'baby bust' has finally

plunged these countries into below-replacement fertility. In addition to this fertility swing, marriage has also transformed its timing and form. Late marriage and cohabitation have become notable since the 1960s. For instance, mean age at marriage in Britain had risen by about three years for bachelors (from 25.1 in 1965 to 28.0 in 1993), and for spinsters (from 22.6 in 1965 to 25.8 in 1993). Admittedly, the postponement of marriage had long been practised in Western Europe before the First World War. Victorian bachelors and spinsters married at 28 and 26 years of age respectively (Hajnal, 1965, 1983; Wrigley & Schofield, 1989). However, this marriage pattern, or the so-called 'West European marriage pattern', was thought to have gradually disappeared from the late 1930s since the mean age at marriage fell (Coale, 1969). Therefore, a rise in age at marriage from the 1960s has been a quite unexpected development.

These changes have caught many scholars by surprise and have, in due course, led demographers to devote their main energies to explaining a trend in the marriage and fertility pattern of industrialised countries. In particular, two models, that of Easterlin and of Becker, are most influential in the time-series analysis of demographic pattern. Admittedly different models have been proposed to account for human demographic behaviour. For example, in the wealth flow theory, Caldwell (1982) argues the association between inter-generational relationship and fertility. Furthermore, Murphy (1993a; 1993b) claims the influence of contraceptive methods on British fertility trends, although his explanation is superficial. However, as for the time-series analysis of marriage and fertility, most studies since the 1960s have followed Becker's and Easterlin's models. In short, the post-war demographic trend in industrialised countries has been the primary testing ground between two rival approaches (Sanderson, 1976; Willis, 1987). Therefore, these two theories can be regarded as a dominant framework of time-series analysis. We will, in this section,

provide an overview of these two models, focusing on their explanation for the post-war trend of marriage and fertility.

(1) Becker's Model (=New Home Economics theory or Chicago School)

The important feature of Becker's model is that fertility decline from the baby boom to the subsequent baby bust is explained as a countercyclical movement resulting from economic development (Butz & Ward, 1979; McDonald, 1983). Accordingly, it is supposed in this model that an upsurge of fertility like that of the baby boom will never occur again in the near future.

This explanation is underpinned by two assumptions: the children's quality-quantity interaction and the female cost of time. Firstly, as discussed in Chapter 1, this approach holds that children in industrialised countries are regarded as consumer goods bringing non-material satisfactions to their parents. Therefore, it is expected that the level of fertility has, *ceteris paribus*, a positive relation to the level of household income (Becker, 1960). However, owing to the quality-quantity interaction (Becker & Lewis, 1973), a rise in household income does not always lead to a larger family size. More specifically, since the parents' marginal utility caused by an enhancement in the quality of children is greater than that caused by an increase in the number of children, a rise in household income will be related to an increase in the expenditure spent on a single child rather than to an increase in the number of children. The same pattern of behaviour can be found in the relationship between income and other consumer goods: an increase in income leads a consumer to shift from an economy car to a luxury car rather than increasing the number of cars. Because of this effect, a rise in the level of income caused by economic development encourages parents to have fewer children of better quality.

Secondly, the female cost of time has a negative effect on fertility.

Since child-rearing is a relatively more intensive use of a mother's time than are non-child-related household activities, the choice for most women at least for a few years is whether to work outside the home and rear children. During a child-rearing period, a woman is compelled to give up the income that she could have earned if she had remained childless. In the New Home Economics theory, it is assumed that fertility is determined by the husband's income and the wife's opportunity cost (the income foregone by a wife who could have devoted her time to paid work instead of child-rearing). In concrete terms, when a wife does not work outside the home, the number of children a couple (want to) have is determined by the level of the husband's income. On the other hand, when the wife works outside the home, the number of children is determined by the interaction between the positive effect of a husband's income and the negative effect of a wife's income (Willis, 1973). Therefore, as long as the number of women working outside the home increases with the rise of their wages, fertility continues to decline.

In this approach, the recent unpopularity of marriage seen in industrialised countries is also regarded as a countercyclical trend caused by economic development. As was discussed in Chapter 3, this approach explains the change of marriage pattern from the viewpoint of utility maximisation (Becker, 1973; 1974). More specifically, if there is a large comparative advantage between a man and a woman in terms of market activities and domestic activities, it is better for them to create a new organisation (a marital unit), and to specialise in their advantageous activity. This division of labour increases the sum of their utilities. For instance, given that a single man has a relative advantage over a single woman in market activities, a marital relation will be established between them: the husband specialises in market production and the wife in domestic production. In this marital union, the wife trades part of her

domestic product (including childbearing and child-rearing) to the husband in exchange for part of the his income. This maximises their gains from marriage. However, as the comparative advantage between a man and a woman diminishes, such division of labour in the marital union does not bring the maximisation of their utility. This will naturally lead to a low propensity to marry. As is seen in most industrialised countries, a increase in a woman's earning capacity in the labour market critically reduces the gains from marriage. Hence, in the marriage theory of this school, the recent unpopularity of marriage in industrialised countries is thought to be an unavoidable consequence caused by economic development.

(2) Easterlin's Model (=Pennsylvania School)

In contrast to Becker's model, the post-war demographic trends of industrialised countries are, in Easterlin's model, regarded as a procyclical movement. For instance, Easterlin² (1973) writes: "It seems unlikely that over the next decade age-specific birth rate of young persons will decline much below the level at the beginning of the decade. If a sustained economic boom were to take place ... a rise in this rate is possible" (pp. 212-216). Likewise, Wachter (1975) suggests that "a new upswing in the rate of growth in real wages could cause a new 'baby boom' as relative wages increase" (p. 623). Furthermore, Lee (1976) predicts, based on the relative income hypothesis, that "the current U.S. fertility is only temporarily low, and an upturn should occur after five or ten years" (p. 467). Although their optimistic predictions have not been fulfilled yet, it is certain that members of this school envisage a future reversion of the demographic trend³. In other words, the proponents of this theory think that any fundamental change has not occurred with respect to the attractiveness of marrying and

² Easterlin (1961) draws an analogy between the American fertility swings and Kuznets Cycles.

³ Easterlin (1976) changed his view, and predicted a continued fertility decline from the late 1970s.

having children.

The grounds of their claiming the procyclical movement are based on the “intergenerational relative economic status” hypothesis. As argued in Chapter 1, Easterlin’s theory holds that human demographic behaviour is decided by the economic circumstances of young adults. Easterlin (1961; 1980) challenges the stable and fixed utility of an individual proposed by the New Home Economics theory. He claims that an individual utility is affected by economic circumstances. More specifically, an individual utility depends on the relative economic status of young adults who enter the age of marrying or childbearing.

The relative economic status is an index of relative affluence. This is defined as a ratio between the earning potential of a young adults and the level of their material aspirations shaped by their natal household. Easterlin (1980) assumes that young adults who grew up in families having high living standards have similar high material aspirations in their adulthood, while those grew up in families with low living standards have similarly low material expectations. Accordingly, if the present earnings of young adults is high relative to their material aspirations, their relative economic status is better. In contrast, if the present capacity of young adults is low relative to their aspirations, their relative economic status is worse.

Based on these assumptions, the theory explains that demographic pattern is determined by the relative economic status. When the relative economic status of young adults is better, they will have more children. In contrast, if their relative economic status is worse, they will have fewer children. The same hold true for marriage behaviour. Better economic circumstances in young adults encourage them to marry earlier. On the other hand, worse economic circumstances in young adults delay their entry to the married status. Therefore, it is predicted in Easterlin’s theory that

the demographic trends of industrialised countries will be reversed in the near future if the relative economic status of young adults is improved.

For the sake of empirical analysis, various kinds of surrogate indicator for intergenerational economic status have been contrived. For example, the relative cohort size, or the ratio of men aged 35-64 over those aged 15-34, is employed as an indirect measure of this economic status (Easterlin, 1973; Easterlin & Condran, 1976). It is presumed in this index that, compared to individuals in a large cohort, those in a small cohort earn a relatively higher income, since the latter are in more favourable conditions in the labour market than the former. In addition, more direct measures are contrived regarding this economic status. Easterlin (1973) calculates the ratio of a son's wage over a hypothetical father's wage as an index of relative economic status. In this index, the son's wage in year t is defined as the average of his wage over the previous seven years, whereas the father's wage is computed as the average of his wage over ten years preceding $t-5$ year. Likewise, Wachter (1975) proposed another index of relative economic status by using desired living standards. He defines the relative economic status as the ratio of men's real wages in year t over the desired living standard. In his index, the desired living standard is computed as a moving average of male real wages over ten years prior to year t . Furthermore, Oppenheimer (1976) insists that a mother's economic contribution to the living standards of one's natal household should be taken into consideration. She employs the total income of the father and mother as an index of their child's material aspirations. It is worth noting that a numerical estimation of relative economic status is very difficult. The strength of the relation between fertility pattern and relative economic status substantially hinges on the type of index for this status.

Although several empirical studies have carried out by using these

two models, their findings are still inconclusive. With regard to the Easterlin model, it is observed in Belgium, England and Wales, France, Finland and Italy that the relative cohort size has an effect on the movement of the TFR from the 1950s (Wright, 1989). Similarly, Baird (1987) finds that the fertility trend during the period 1950-1981 is accounted for by the relative cohort size in the U.S. and France, but not in England and Wales and Sweden. In contrast, the movement of the TFR from 1940 to 1970 is fitted to the change of the relative cohort size in the U.S., Australia and Canada, but not in England and Wales (Easterlin & Condran, 1976). Likewise, in the analysis of micro-data, Behrman and Taubman (1989) discover that, in the U.S of the early 1970s, the relative income did not exert an influence on the number of children a couple had.

On the other hand, the results of Becker's model are also inconclusive. Butz and Ward (1979) discover the evidence supporting this model with reference to the post-war fertility trend of the U.S. They suggest that the rise of female wages substantially contributed to a fall in the TFR of the U.S. Likewise, Ermisch (1979) observes that male wages were positively, and female wages negatively, connected to the British fertility rate for the period 1951-1975. In addition, a similar relation is identified regarding the Swedish fertility rate from 1870 to 1965 (Wilkinson, 1973). However, when analyzing German time-series data in the same manner as carried out for British data, Ermisch (1970) discovers that women's wages are insignificantly and positively connected to the German TFR from 1957 to 1977.

Inconsistent empirical findings are reported with respect to the analysis of marriage pattern as well. When analysing age at first marriage for men who graduated from high schools of Wisconsin in 1957, MacDonald and Rindfuss (1981) do not find evidence supporting Easterlin's theory. More specifically, in terms of age at marriage, there was only a negligible

difference between the male graduates who thought that their present income was higher than their parents' income and those who did not think so. Furthermore, Ermisch (1981a) discovers that post-war swings of the marriage rates in England and Wales were better accounted for by Becker's marriage model than by the Easterlin's model. According to his findings, an increase in women's earning capacity tended to reduce the marriage rates from 1952 to 1970. Similarly, in the study of 11 European countries in the 1950-1970 period, Winegarden (1984) finds that greater woman's real wages reduced the proportion of women marrying. Moreover, Freiden (1974) also observes that the ratio of male wages to female wages had a positive effect on the proportion of married women in the case of cross-sectional analysis of the U.S. census data in the early 1960s. These findings support Becker's theory about marriage. However, in the micro-analysis of the U.S. survey data in 1985, Anzo (1989c) detects that female age at marriage was significantly affected by the relative economic status.

Since the contradictory findings are reported in terms of nuptiality and fertility, it is impossible to decide which of the two models is more apt to explain a trend in the demographic patterns of Western industrialised countries. These inconclusive results may be derived from the difference of the data type used by each study. Some studies are based on aggregated macro-data; others employ micro-data. Rather, the important suggestion derived from these results is firstly that the post-war demographic movements of industrialised countries have been affected by country-specific factors. Most industrialised countries have shown a downward trend of fertility and an upward trend of mean age at marriage since the late 1960s. Superficially, the shape of these demographic patterns hardly differs among the countries. In spite of this similarity, the demographic pattern of each country is not entirely accounted for by causes common to all countries. For example, although Ermisch (1970, 1979) applies the

same model to Britain and Germany, the obtained results from the two countries are different. Female wages are negatively connected to British fertility, but positively related to German fertility. Hence, in analyzing a long-term demographic change of a country, its specific situations and particular causes must be taken into consideration.

Secondly, these studies do not explicitly examine the continuation and change of the post-war demographic movements. Roughly speaking, the post-war fertility of industrial countries consists of three characteristic phases: the baby-boom, the baby-bust and the subsequent below-replacement. In spite of this, empirical studies have regarded the post-war demographic swings as a continuous process, examining the influence of socio-economic factors on demographic patterns. In other words, enough attention has not been paid to a structural break in the relation between the factors and the patterns. Admittedly, socio-economic factors have exerted an influence on the long-term change of demographic patterns in industrialised countries. However, there is no guarantee that the influence of these factors has kept dominant throughout the post-war period. For instance, the ideational theory put more emphasis on the influence of attitudinal factors than socio-economic factors with regard to the demographic change of industrialised countries after the late 1960s. Therefore, it is necessary to consider a structural change in the relation between socio-economic factors and demographic patterns.

6.2 The Japanese Post-war Demographic Trend and its Explanations

Japan's demographic experience over the past several decades is intriguing to demographers. This is mainly because Japan is the first non-Western country to experience the so-called 'fertility transition' and achieved modern economic development. Motivated by such interesting conditions, many studies have been carried out in terms of Japanese marriage and fertility.

We will, in this section, provide a brief review of studies on the post-war demographic trends of Japan.

Historically, most Western countries have experienced a long-term downward trend in fertility since the turn of the century. Although such a decline started in Japan in the 1920s, it is in the post-war period that a fully-fledged downward trend appeared. This trend can be easily seen in Table 6.1. The Japanese TFR fell from 5.11 in 1925 to 4.12 in 1940 by about 20%, whereas the figure declined to 2.00 by 51% for the following twenty years. As a result, Japan fell below other Western countries in terms of the fertility rate. For instance, the TFR of 1960 was 2.68 (England and Wales), 2.73 (France) and 2.25 (Sweden).

Table 6.1: Japanese Demographic Trends, 1920-1990

Year	Percentage of Singles				Singulate Mean Age at Marriage		Total Fertility Rate	Mean Age of Childbearing
	Male		Female		Male	Female		
	20-29	45-49	20-29	45-49				
1920	49.9	2.3	21.2	1.9	25.021	21.163	5.11*	30.12
1930	55.8	1.8	24.1	1.6	25.769	21.827	4.72	30.34
1940	67.3	1.5	34.3	1.5	27.187	23.326	4.12	30.86
1950	62.4	1.3	36.7	1.5	26.209	23.594	3.65	29.65
1960	69.0	1.4	45.2	2.1	27.441	24.963	2.00	28.02
1970	70.0	1.9	47.0	4.0	27.469	24.654	2.13	27.32
1980	72.0	3.1	48.8	4.4	28.674	25.108	1.75	27.83
1990	78.9	6.7	63.5	5.8	30.349	26.869	1.54	28.60

* The figure of 1925

Source: Ministry of Health and Welfare (various years). Vital Statistics.

Management and Coordination Agency (various years). Japanese Population Census.

It is certain that this decline is a source of interest in Japanese demographic patterns, because Japan was the first non-Western country

to experience the fertility transition. Affected by this situation, whether or not Japanese demographic change can be explained by theories invented in a Western context has remained the central issue in demographic studies on Japan. In other words, efforts have been dedicated to the examination of similarities and dissimilarities between Japan and Western countries. For instance, Taeuber (1960a) points out that, although the pattern of Japanese fertility transition is, in a broad sense, the same as that of European countries, the Japanese experience is, in a strict sense, different from the European experience. On the other hand, Davis (1963) suggests that the Japanese fertility transition is completely identical to the European transition, and Japan and European countries have been moving in the same direction with regard to fertility pattern. This research tendency, on the empirical side, manifests itself in the application of Western analytical frameworks to the Japanese demographic pattern. In particular, the fertility change from the 1950s to the 1970s has offered practical tests to the models of the Chicago school and the Pennsylvania school.

The empirical results of several tests for these models are not conclusive. In terms of connection between fertility and female wages, Osawa (1988) finds that the wife's wage rate had a negative impact on the Japanese TFR from 1960 to 1980, which supports Becker's model. Likewise, Ogawa and Mason (1986) observe that the wife's wage rate significantly reduced the TFR during 1966-1984. In contrast, Ohbuchi (1982) discovers that women's wages was positively related to the TFR for 1948-1980. On the other hand, as far as Easterlin's model is concerned, it is pointed out that, although the relative cohort size was not fitted to the trend of the post-war TFR, the relative economic incomes of Easterlin's and Wachter's type traced the movement of TFR during the period 1954-1980 (Ohbuchi, 1982).

Similar inconclusive findings are reported in terms of female marriage pattern. Anzo (1989b) observes that relative income was positively connected to male and female age at first marriage from the 1960s, although the magnitude of its effect was stronger in the male age than the female. This result supports Easterlin's theory. In contrast, Ogura and Dekle (1992) find that the proportion of married women was caused by a rise in female wages since the 1970s, which is consistent with the argument on marriage proposed by Becker.

These contradictory findings may be derived from the fact that different types of data are used in each study. For instance, Osawa (1988) dealt with the TFR from 1960 to 1980, whereas Ohbuchi (1982) analysed the TFR for the period 1948-1980. Nevertheless, this inconsistency calls into question the validity of explaining the post-war Japanese demographic trend with Becker's and Easterlin's model. In fact, other crucial factors have been pointed out as a cause of the demographic change, especially of the fertility.

It is firstly argued that the legalisation of abortion and the spread of cheap contraception methods contributed to the rapid post-war fertility decline through the reduction of unwanted births (Matsumoto, Koizumi, & Nohara, 1972; Muramatsu, 1960). After the end of the Second World War, the Japanese government established birth control clinics, which disseminated knowledge about contraceptive devices and enabled women to undergo abortion at low cost (Mosk, 1979). Probably the most influential factor is the National Eugenic Law of 1948. This law allows abortion in order to prevent the increase of inferior descendants and to protect women whose pregnancy would involve severe health hazards.

As far as the abortion ratio (=the number of abortions per 1,000 live births) shows, an increase in the number of induced abortions is likely to have contributed considerable to the fertility decline of the 1950s. The

abortion ratio rose steeply from 38 in 1949 to 716 in 1957. The figure thereafter fell to 405 in 1968, and remained at around 300 in the 1970s. Moreover, the percentage of couples practising contraception rapidly increased throughout Japan in the early 1950s (see Table 6.2). Between 1952 and 1955, contraception prevailed more in the six big cities, but its increase rate was greater in the rural areas than in the big cities. In 1952, more than one in each five couples in the rural areas reported current contraceptive practice, whereas a third of the couples had practised contraception at some time in the past. On the other hand, more than 30% of the couples in the rural areas said that they were practising contraception in 1955, while about 50% of them had practised contraception at some time.

Table 6.2: The Percentage of Couples Practicing Contraception in 1950, 1952 and 1955

Area	Percentage of Couples Present Practicing			Percentage of Couples Ever Practiced		
	1950	1952	1955	1950	1952	1955
All Japan	19.5	26.3	33.6	29.1	40.2	52.5
Six big cities	23.7	34.8	37.7	35.7	52.0	56.6
Other cities	23.6	31.1	34.0	32.9	46.0	52.9
Rural	17.4	22.1	31.9	26.6	34.6	50.8

Source: Traueuber, I. B. (1958). The population of Japan.

This explanation is appropriate to the fertility decline in the 1950s. Nohara (1977) calculates the effects of the marriage rate and the marital fertility rate on the Japanese fertility decline. According to his findings, 73.0% of the fertility decline from 1920 to 1940 was attributed to a reduction in the marriage rate, while 27.0% was derived from a fall in the marital fertility rate. This suggests that the pre-war fertility decline was due to not the Malthusian control, but the neo-Malthusian control (Coale,

1969). On the other hand, 22.0% of the fertility decline from 1950 to 1960 was caused by a reduction in the marriage rate, while 88.0% was due to a fall in the marital fertility rate. In fact, the percentage of single women from age 20 to 29 rose from 21.2% in 1920 to 34.3% in 1940. In addition, the female singulate mean age at first marriage (=SMAM) also rose from 21.16 to 23.32 during the same period. In contrast, from 1950 to 1960, the percentage of single women from age 20 to 29 increased by only about 9%, and the rise of female SMAM was about one year (see Table 6.1). These figures suggest that the major determinant of the fertility decline during the pre-war period was the change of marriage. To put it another way, fertility was not so effectively controlled within marriage in pre-war Japan (Hashimoto, 1980; Ohbuchi, 1976).

It should, however, be borne in mind that the availability of induced abortion and contraception plays only a secondary role in determining family size. Admittedly, the increase of induced abortions and the spread of more effective contraceptive methods may show a positive correlation with the level of fertility. However, such a relation cannot completely account for the underlying causes of a fertility decline. The more fundamental thing is the reason why people reduce the number of children they have, by getting an abortion and using contraceptive devices.

The second point to be considered is the effect of parental aspirations for children's education on the post-war fertility decline. In Becker's terms, the interaction between quality and quantity of children may be an important driving force of the decline.⁴ Yamamura and Hanley (1975) argue that the post-war fertility decline was caused by the strong motivation of parents to bestow better education upon their children. According to their study, this motivation of Japanese parents has been underpinned by two components. One is that better education brings high

⁴ This hypothesis was an important part of Becker's early writings, but it has become less emphasised after the emergency of Butz-Ward model.

economic (=monetary) returns to children. The other is that having better educated children, especially graduates of elite universities, is socially prestigious to their parents, because they tend to become executive officers of large firms and higher civil servants. These factors may motivate Japanese parents to have fewer children having a higher educational qualification. Indeed, it is certain that educational background plays a major role in determining one's earnings in Japan. Table 6.3 displays the average monthly salary according to educational background. In 1970, the average salary for the male university graduates stood at 39,900 yen, being about 1.25 times greater than that for the male senior high school graduates. Furthermore, there is not the tendency of the wage gap between the two groups to become narrow. The wage ratio of the senior high school graduates over the university graduates was still 1.24 in 1985. This is the same for women. The wage ratio of the female senior high school graduates over the university ones was 1.28 in 1970 and 1.26 in 1985.

Table 6.3: The Average of Monthly Starting Salary for New School Graduates, 1970-1985 (Yen)

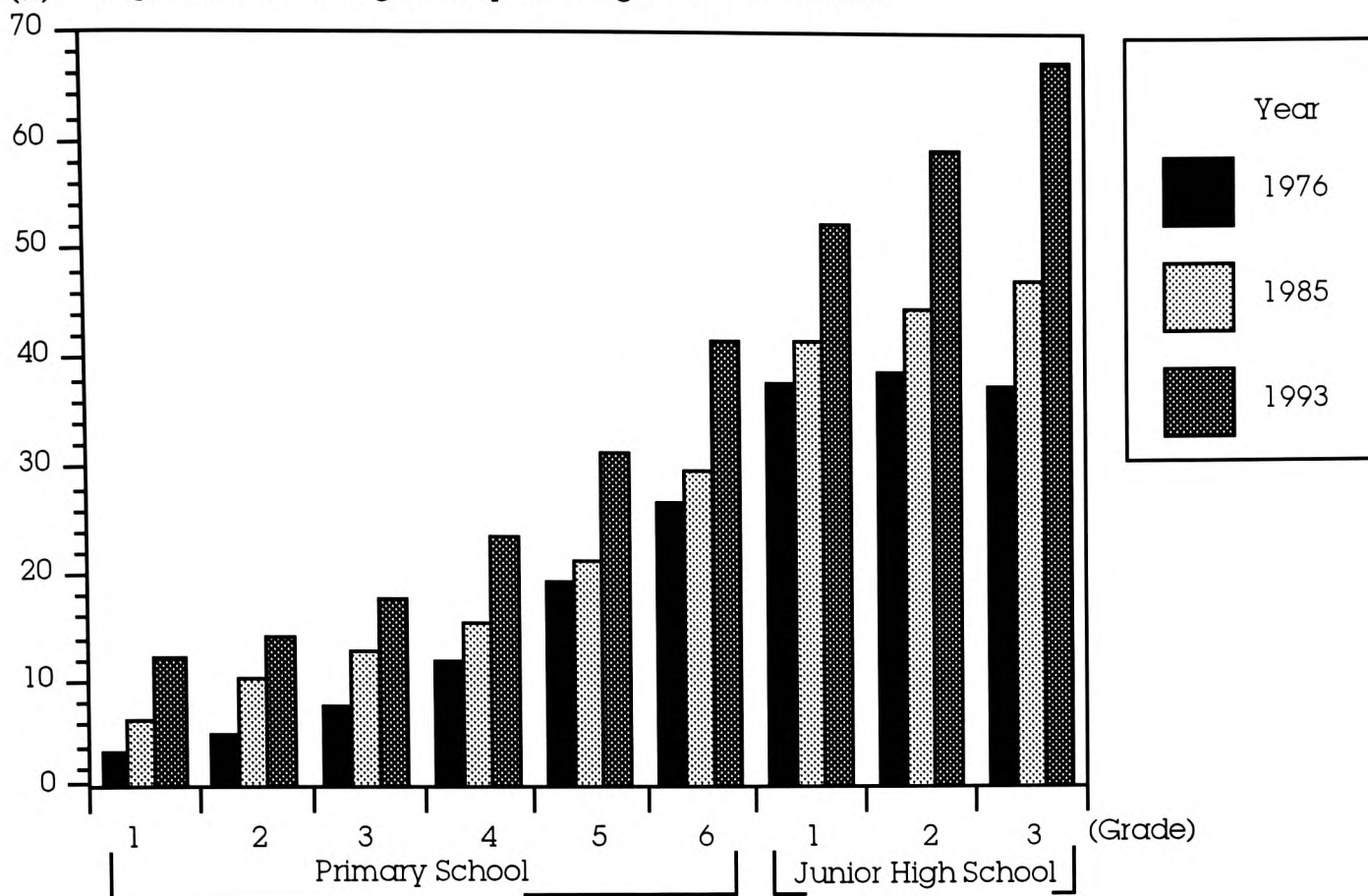
	Year	Junior High Schools	Senior High Schools	Higher Professional School and Junior Colleges	Universities
Male					
	1970	25,500	31,700	35,500	39,900
	1975	59,800	74,900	81,700	89,300
	1980	81,100	92,800	100,700	114,500
	1985	96,200	112,200	123,600	140,000
Female					
	1970	24,600	28,500	31,300	36,500
	1975	57,000	69,900	75,400	81,300
	1980	73,200	88,300	97,400	108,700
	1985	91,700	106,200	117,000	133,500

Note: Figures are deflated by the consumer's price index.

Source: Ministry of Labour] (various years). Basic Survey on Wage Structure.

Since an educational qualification exerts a substantial influence on the level of wages earned, most Japanese parents attempt to enhance the chance of their children being admitted to an elite university, by putting them in after-school cram schools. This tendency is clearly seen in Graph 6.1. For instance, 67% of the pupils in the third grade of junior high schools, who were fifteen years old in 1993, went to a cram school, while as many as 12% of the pupils in the first grade of primary schools (at six years of age) went to a cram school. Moreover, the percentage shows an increasing trend in all grades. In particular, the percentage rises more steeply in the latter stage of school education. For example, the percentage in the first grade of junior high schools rose from 37% in 1976 to 52% in 1993, whereas that in the third grade jumped from 37% to 67% in the same period.

(%) Graph 6.1: Percentage of Pupils Going to a Cram School



In this situation, it is reasonable for parents to spend a great deal of money on their children's education. This may consequently lead to the decline of Japanese fertility. In fact, empirical findings suggest that the level of education, especially a wife's education, was negatively connected to the fertility rate of the post-war Japan (Hashimoto, 1974, 1980). However, it is important to bear in mind that education affects fertility through various channels. Firstly, education indicates the quality of children. Hence, a higher level of education will result in low fertility through a rise in the quality of children. Secondly, since the amount of knowledge about birth control increases in proportion to the level of education, it is negatively related to fertility. Thirdly, an educational level is taken as a proxy for wages in the labour market, which have a negative effect on fertility by raising the opportunity cost of children (Herr, 1966). These points taken into consideration, Hashimoto's findings do not always mean that a rise in the level of children's education caused the Japanese fertility decline.

The third point to note is the relation between family structure and

the post-war demographic pattern. Mosk (1979, 1983) explains the Japanese fertility change from this viewpoint. He firstly regards the Japanese household as a patriarchal system in which a patriarch holds a strong power over other members of the family and behaves so as to maximise his utility. Secondly, it is assumed in Mosk's theory that the pre-industrial Japan was a self-sufficient peasant society where no external labour market existed and necessary agricultural workers were supplied from a patriarch's family. Based on these assumptions, Mosk argues that Japanese pre-industrial fertility was determined by the demand of agricultural labour force on a patriarch's own land. More specifically, in this demographic regime, a patriarch controlled the level of fertility to accommodate the demand for his agricultural workforce. A patriarch decided the age at which his children would marry, taking account of the level of mortality and of natural fertility. Accordingly, in a region where the level of mortality was relatively high, a patriarch made his children get married as soon as possible.

Mosk argues that the development of secondary and tertiary industries after the Meiji Restoration gradually eroded the underpinnings of this patriarchal household strategy in Japanese peasant society. In particular, the development of non-agricultural industries reduced the value of children as agricultural workers on a patriarch's land. Owing to this change, the number of children was no longer decided on the basis of demand for an agricultural labour force on a patriarch's land. In addition, a fall in the mortality rate alleviated the pressure for an early marriage (Mosk, 1980). As a result of these socio-economic changes, age at marriage rose and the level of fertility declined. In fact, Mosk (1983) observes from the prefectural cross-sectional data of 1925 that the infant mortality rate had a negative effect on female age at marriage, and that the proportion of labourers engaged in the primary industry (=a surrogate variable of demand

for the agrarian labour force was positively correlated to the fertility rate. However, these connections gradually disappeared in the cross-sectional analysis of 1950 and 1960.

Although Mosk's theory is superficially sophisticated, it is debatable whether the process of Japanese fertility decline is, in reality, explained by his theory. The reason is, firstly, that pre-industrial Japanese society was not a self-sufficient peasant society having no external labour market (Saito, 1984). According to studies on Japanese historical demography, it is demonstrated that, even in the Tokugawa period, a number of rural young unmarried men and women migrated to cities, especially Tokyo and Osaka, to be engaged in commercial jobs (Hayami, 1992; 1973). Some of them got married in the cities, and lived there permanently by establishing their own households (Saito, 1987). Others returned to their rural homeland when their natal household needed the extra agricultural labour force (Saito, 1985). This means that pre-industrial Japanese society was not a self-sufficient peasant society. Hence, the patriarch's strategy Mosk assumes does not reflect the reality of pre-industrial Japan.

Secondly, it is debatable whether the development of non-agricultural industries affected the level of fertility in pre-war Japan. The level of Japanese couples' fertility began to decline from the 1925-34 marriage cohort in all social classes (Saito, 1996b). For women whose husband was engaged in agriculture, their number of children ever-born fell 5.95 in the 1915-1924 marriage cohort to 5.16 in the 1925-1934 cohort. On the other hand, women in the non-agriculture group, on average, had 4.50 children in the 1915-1924 marriage cohort, whereas women in the 1925-1934 cohort bore 4.20 children (Watanabe, 1992). If the demand for an agricultural labour force had played a crucial role in determining a couple's level of fertility, the agricultural and the non-agricultural classes would have started to reduce their levels of fertility at a different time.

In addition, the relation between the demand for a workforce on a patriarch's agricultural land and the number of his children is not as simple as Mosk assumes. If Mosk's assumption is correct, the number of children a couple has will be directly proportional to the area of their cultivating land.⁵ However, such a relation is not observed in Table 6.4. As was seen in Table 6.3, since contraception had already spread in rural areas during the 1950s, the figures in Table 6.4 should reflect the demand for children in agricultural households. Although the number of children was greatest in the category having the most cultivating land (=4.45), the smallest mean (=3.91) was seen not in the category having the least land, but in having the second largest amount of land. These findings suggest that the level of fertility in agricultural households is not entirely accounted for by the demand for agricultural workers.

Table 6.4: The Number of Children Ever-born in Agricultural Households, 1962

Area of Cultivating Land	The Mean Number of Children Ever-born	Number of Couples
Blow 0.4 Chô	4.02	53
0.5-0.9 Chô	4.25	173
1.0-1.4 Chô	3.91	165
Over 1.5 Chô	4.45	203
Total	4.21	594

Note: 1 Chô is about 9,900 square meter.
Couples were married over 20 years.

Source: Aoki, H., & Nakano, E. (1967). *Dai 1-4 ji Shussanryoku Chô Kekka no Yôyaku*.

Since this review does not deal with all preceding studies on the change of marriage and fertility in Japan, it is impossible to determine

⁵ Even if the level of fertility is directly proportional to the area of cultivated land, this may be due not to the demand for agricultural workers, but to the demand for children as consumer goods.

which factor played a crucial role in changing the Japanese marriage and fertility pattern. However, we can, from this review, derive important suggestions regarding the long-term demographic movement of post-war Japan. The first point is whether or not the post-war demographic trend can be accounted for by either Becker's or Easterlin's model. As was discussed in this review, the contradictory empirical results indicate that the trend is not sufficiently explained by only the factors proposed in these models. Therefore, we need to take other factors than wage levels and the relative economic status into consideration when analyzing the post-war trend of marriage and fertility.

The second point is whether or not we can regard the post-war demographic trend as a single continuation. For example, if the spread of contraception had a critical influence on fertility decline until the end of the 1950s, this factor may have lost its influence over the level of fertility in the 1970s. Mosk (1983) points out a structural break in the Japanese demographic system. Specifically he suggests that, after the Japanese patriarchal system broke down, by the end of the 1960s, a new demographic regime came into being. Although he does not present a clear picture of this new regime, it is likely that the determinants of demographic behaviour are different between the period before 1970 and after 1970. This point is particularly important in considering the resumption of fertility decline after 1973.

6.3 Analytical Framework of Changes in Marriage and Fertility

We discussed the major studies on the Japanese demographic trend in the previous section. Referring to the discussion, we will, in this section, present the analytical framework of marriage and fertility. Its overall picture is plotted in Figure 6.1.

Nuptiality Model

(a) Economic factors

As mentioned in the previous section, economic factors were regarded as important determinants of marriage pattern in Becker's and Easterlin's models. Hence, we will examine two economic variables by following these models.

The first variable is the relative income, which is used for testing Easterlin's model. Although Easterlin originally defines the ratio of a parent's cohort to a young adult's cohort (=the relative cohort size) as a proxy for the relative economic situation between the two generations, it is doubtful whether this index properly reflects this relative situation. Indeed, Ohbuchi (1988a) finds that the relative cohort size is not an appropriate index of the relative economic status between young adults and their parents, and that the fertility trend of post-war Japan cannot be traced by this index at all. When we computed the correlation between the relative cohort size and the relative income in the same way as Ohbuchi did, the correlation coefficient obtained from our data was 0.395 and insignificant at the 10% level. Hence, we will use a more direct index of the relative economic status, or the ratio of men's wages over the desired standard of living (we denote it as 'relative income').

The Easterlin model assumes that desired living standards are determined by the past living standards of one's natal household. Although a wife's and husband's wage affect the level of living standards in their household, it considerably depends on the level of a husband's real wage. Hence, Wachter (1975) uses men's real wages as an index of living standards. Following Wachter's method, we will employ men's wages as an index of living standards. Some correction is, however, necessary with regard to men's wages, because not all labour force participants can find a job. With this point in mind, we defined men's wages as their average

monthly earnings (excluding bonuses twice a year) deflated by the consumer price index, and adjusted by multiplying by the percentage of employment (=the complement of the unemployment rate). Furthermore, we generated a series of the desired standard of living by calculating the mean of the men's wages for seven years prior to each year t . Based on Easterlin's theory, we expect that more men and women will enter married status as the relative income becomes greater.

The second variable is the ratio of women's average wages over men's wages. This is a proxy index for the gains of marriage proposed in Becker's nuptiality model. These two types of wages were deflated in the same way as done for the relative income. Becker's theory assumes that one of the couple with a larger earning capacity specialises in paid work and the other with a smaller earning capacity is engaged in domestic activities in order to maximise the gains from marriage. Hence, as the ratio of women's wages to men's wages approaches one, entry into marriage is expected to become less advantageous.

(b) Sex ratio

The numerical imbalance (=marriage squeeze) between marriageable men and women affects marriage pattern. Historically, the supply of eligible partners had an influence on age at marriage. A greater imbalance between men and women in the marriage market tended to postpone the timing of marriage (Anderson, 1976; Hinde, 1989; Woods & Hinde, 1985). Likewise, Carter and Glick (1976) point out that, because the sudden surge in the birth rate following the Second World War increased the imbalance of the sex ratio (a shortage of males), female age at marriage rose in the U.S. until 1970. However, it remains an open question whether or not the recent change in the marriage pattern of industrialised countries is due to an imbalance in the sex ratio. Coleman (1988) suggests that a change in the

marriage pattern in England after 1972 is attributable to socio-economic factors. Indeed, Ermisch (1981a) does not find, in England and Wales, a simple causal relation between marriage age and a sex ratio during the period 1953-1976.

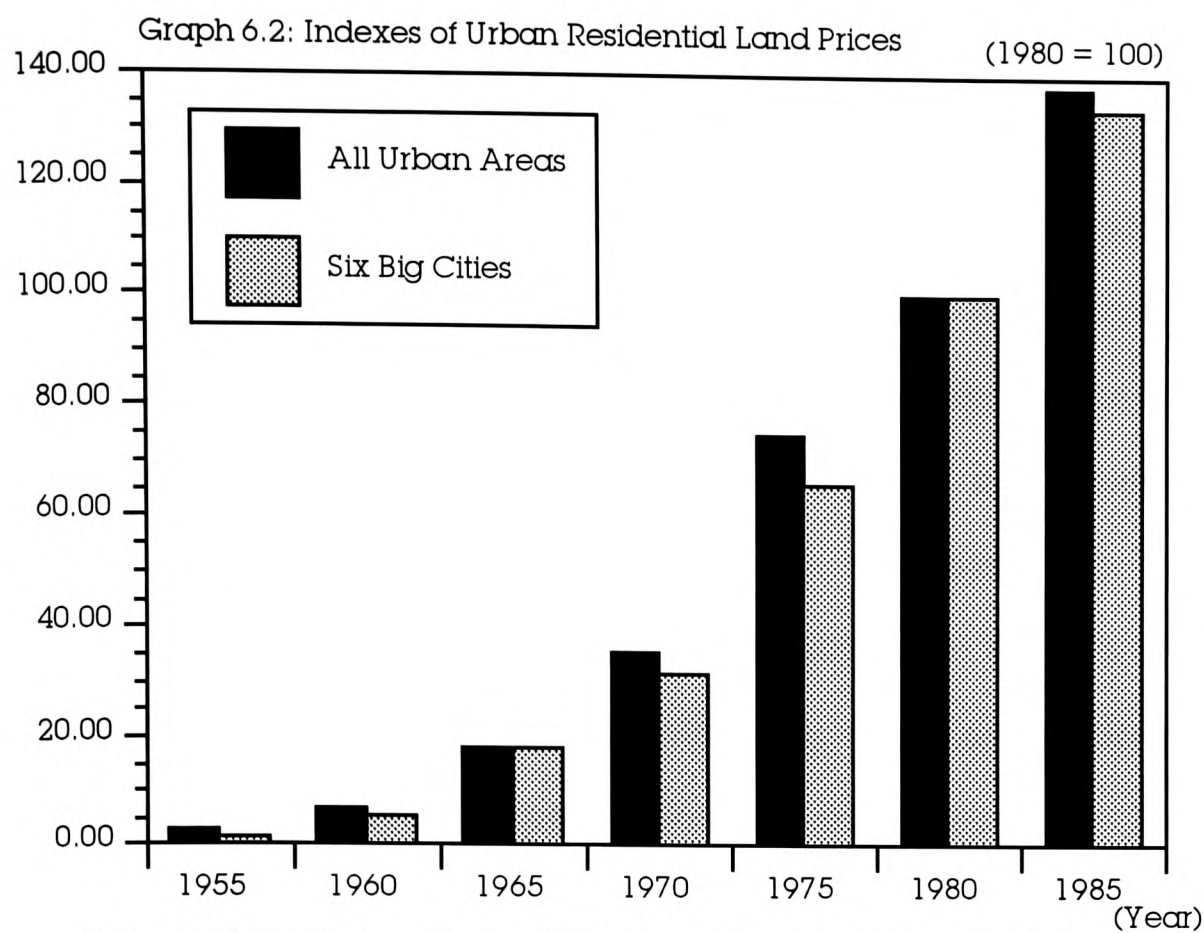
According to the Japanese vital statistics of 1993, since approximately 70% of the men's and 80% of the women's first marriages occurred between the ages 20 and 29, this age range can be regarded as marriageable age. We will, therefore, employ the sex ratio of men over women aged 20 to 29 in order to examine the influence of marriage squeeze on marriage pattern.

(c) Housing cost

Housing cost is an important determinant of marriage in Britain (Coleman & Salt, 1992; Murphy & Sullivan, 1985; Murphy, 1987). Where 'neo-local household formation' rules are favoured, the difficulty of establishing a new household upon marriage affects the age at which men and women marry. The rapid rise of housing costs delays marriage.

It is argued that housing cost affects recent marriage behaviour in Japan. In particular, the delay of marriage is due to extremely costly housing⁶ mainly derived from expensive land prices (Kono, 1986). In fact, land prices for residence have continuously increased throughout the post-war period (see Graph 6.2). The land prices in all urban areas in 1975 were twice as high as in 1970, and four times higher than in 1965. Likewise, in the six big cities, the land prices in 1975 were 2.8 times as high as in 1965.

⁶ In 1993, the average purchase price of an apartment with 70 square meters in Tokyo was 5.8 times as much as the average annual income of Japanese people.



Note: Six big cities are Tokyo, Yokohama, Nagoya, Osaka, Kyoto, Kobe.
 The indexes are calculated on the basis of real prices.
 Source: The National Land Agency (various years). The assessed value of land.

However, compared to other industrialised countries, Japan has a relatively large number of three-generation households. Although an extended family household composed of grandparents, parents and children has become less popular, about 18% of all households fell under this household category in 1990 (this figure was half as many as that in 1955). In this situation, housing costs may not affect marriage behaviour, because a rise in housing costs results in an increase in the number of couples living with their parents. To examine the effect of housing costs on marriage pattern, we will use the average of monthly housing expenditure per household deflated by the consumer price index.

(d) Divorce rate

We will use the crude divorce rate (the number of divorces per 1,000 persons) as an index of the risk of divorce. Marriage is an adventure with considerable uncertainty, and divorce is thought of as the correcting process for an unsatisfactory marriage. Japanese couples divorce usually by

mutual consent ('Kyogi Rikon'), while divorces granted by the court are quite rare. The percentage of the former case was 90.5% in 1994 (Kôsei Shô Jinkô Mondai Kenkyû Jo, 1995). Nevertheless, divorce accompanies a kind of cost. For instance, couples may pay the due psychological cost of divorce. Monetary compensation may be needed to pay for dissolving a conjugal relationship. Indeed, when marriages are dissolved in Japan, a couple's common property is divided between the two, mainly by negotiation. Furthermore, when a wife obtains a divorce from her husband on the grounds of matrimonial offences such as adultery and domestic violence, he is obliged to pay monetary compensation. It may, hence, be expected that an increase in the risk of divorce weakens an incentive to marry in order to avoid the cost of divorce. However, the relation between marriage and divorce may be inverse. If the divorce rate indicates the easiness of dissolving marital relationship, a rise in the divorce rate may increase an incentive to marry, because the correction of an unsatisfactory marriage is made more easily. Therefore, we cannot hypothesise the effect of divorce on marriage *a priori*.

(e) Educational level

The percentage of women who go to 2-year junior colleges and 4-year universities will be included as an independent variable of the marriage model. The reason is, firstly, that a rise in the female enrolment rate in colleges and universities will raise their marriage age, when student marriages are rare and most women marry shortly after graduating from college or university. Secondly, since the level of education is regarded as an index of a woman's earning capacity in the labour market, their gains from marriage will decrease in tandem with the increase of their educational attainment. Therefore, the effect of this variable is expected to have a negative effect on marriage.

Fertility Model

(a) Economic factors

The effects of two variables on fertility will be used in order to test the Chicago Model. The first variable is the women's wage; that is an index of women's opportunity cost. As discussed in the previous section, it is assumed in the Chicago model that a rise in the woman's opportunity cost will drive women to spend more time on the market activities than on the domestic activities. The level of her wage is therefore expected to have a negative effect on fertility from the viewpoint of the New Home Economics theory. However, the effect of the wage is not equal for every woman. If only a few women work outside the home, the effect of their wages on the fertility rate will be relatively small. In contrast, the effect of their wages on the fertility rate will be greater if a large number of women work outside their home; the amount of time they allocate to domestic activities tends to be more sensitive to their opportunity cost. In particular, when many women are self-employed in agriculture and small businesses, their level of wages will not strongly affect fertility. Working and child-rearing are more compatible for these women. Therefore, the structure of occupation also affects the effect of women's wages on fertility. Taking these points into account, we used the average monthly wage of women (excluding bonuses twice a year) deflated by the consumer price index and weighted by the percentage of women from age 20 to 60 working in non-agricultural industries.

The second variable is the men's average monthly wage (excluding bonuses twice a year) deflated by the consumer price index. Since the New Home Economics theory holds that children are consumers' goods (see Chapter 1), a rise in the men's wage will increase the demand for children. This variable can then be expected to be positively connected to fertility.

To examine Easterlin's hypothesis, we will use the relative income that was defined in the marriage model. Since it is assumed in Easterlin's model that fertility as well as marriage are determined by relative income, an improvement in the economic situation of young adults will result in a rise in the demand of children. Thus, this variable is hypothesised to be positively related to fertility.

(b) Quality of children

As discussed in the previous section, strong parental aspirations for giving children a better education are likely to be one of the powerful factors in determining the Japanese fertility trend. More specifically, the post-war fertility decline may be due to the fact that Japanese parents want to have fewer children to enhance the quality of their children. Hence, we use the percentage of men and women going to 2-year colleges and 4-year universities as a proxy variable for the quality of children. This variable is expected to have a reducing effect on fertility.

(c) Induced abortion

Induced abortion is a proximate determinant of fertility (Bongaarts, 1976; 1978). As was discussed in the previous section, induced abortion may play an important role in the fertility decline of the post-war Japan. The reason is firstly that the Eugenic Protection Law⁷ has reduced unwanted births in the late 1950s and the 1960s. Secondly, no drastic change has occurred in post-war Japan with reference to contraceptive methods. It is argued that the reduction of unwanted births contributed to recent fertility declines in industrialised countries. To take an example, Westoff and Ryder (1977) point out that the spread of efficient contraceptive methods, such as the pill, caused the decline in fertility in the U.S. from the baby boom to the

⁷ Since 1948, no major legal change has occurred with regard to the regulation of abortion.

1970s through the reduction of unwanted births in the U.S., especially those in high birth order. However, such a contraceptive revolution has not occurred in Japan.⁸ Condoms and rhythm have remained the dominant contraceptive methods (Coleman, 1983; Matsumoto, Koizumi, & Nohara, 1972). In other words, the supply-side factor of fertility has not changed so greatly in Japan. Since the effectiveness of contraception remains unchanged, it is likely that the level of fertility is affected by the frequency of abortion. Thus, we will employ the abortion ratio⁹ (=abortions per 1,000 live births) in order to test the effect of induced abortion on fertility.

(d) Infant mortality

Mortality may exert an influence on fertility, but to what extent mortality affects fertility is ambiguous. If couples want and plan for their children to survive to adulthood, at least to the age when the parents will probably die, a population with the high probability of newborn children surviving to adulthood will show a lower fertility than that with the high probability of newborn children dying before adulthood. Nevertheless, an opposite relation is also imaginable. For instance, in the face of an infant death, many couples give up future births to avoid experiencing such grief again. This will consequently increase the cost of rearing a child (Schultz, 1974a). In this case, infant mortality may be negatively connected to fertility.

In addition, it is uncertain that these arguments are relevant to contemporary industrialised countries, because the infant mortality rate has already reached a quite low level in these countries. Indeed, Coleman (1992) points out that the probability of children's survival no longer has a

⁸ As of 1995, the low-dose oral contraceptive pill has not yet been licensed by the government in Japan.

⁹ The official statistics on induced abortion are said to suffer from underreporting. However, the degree of underreporting varies from approximately 1.3 times (Honda, 1977) to 3.8 times (Muramatsu, 1974) higher than the official figures. Since the definite degree of underreporting is not decided, we use the original figures of the official statistics in this study.

significant influence on fertility in industrialised countries. For the sake of investigating the effect of mortality, we will use the infant fertility rate as an independent variable. However, the effect of this variable on fertility cannot be determined *a priori*.

(e) Housing cost

Housing cost may exert an influence on fertility pattern as well as marriage pattern. In the analysis of British fertility, Murphy (1987) finds that housing conditions played an important role in family formation. Similarly, Ermish (1988, 1981a) also suggests that a high housing price increases the proportion of women remaining childless and to deter entry into motherhood in Britain.

As shown in the marriage model, the Japanese housing cost is quite expensive. It is therefore likely that Japanese couples give up having additional children because they cannot have enough living space for bringing them up. In fact, Kojima (1993) discovers that the probability of having the third child was greater for couples who own a house than those who rent a house. In order to examine the influence of housing cost on fertility, the same variable as used in the marriage model will be employed in the fertility model.

With regard to the Japanese fertility pattern, we finally have to make a comment about a temporary fertility dip in the Year of the Fire Horse, 1966.¹⁰ The origin of this superstition¹¹ dates back to the Tokugawa period, and this year has been believed to be an unlucky year in which to give birth to a girl. In fact, the TFR of 1966 was smaller by approximately 25% than that of the previous year. This means that this superstition still

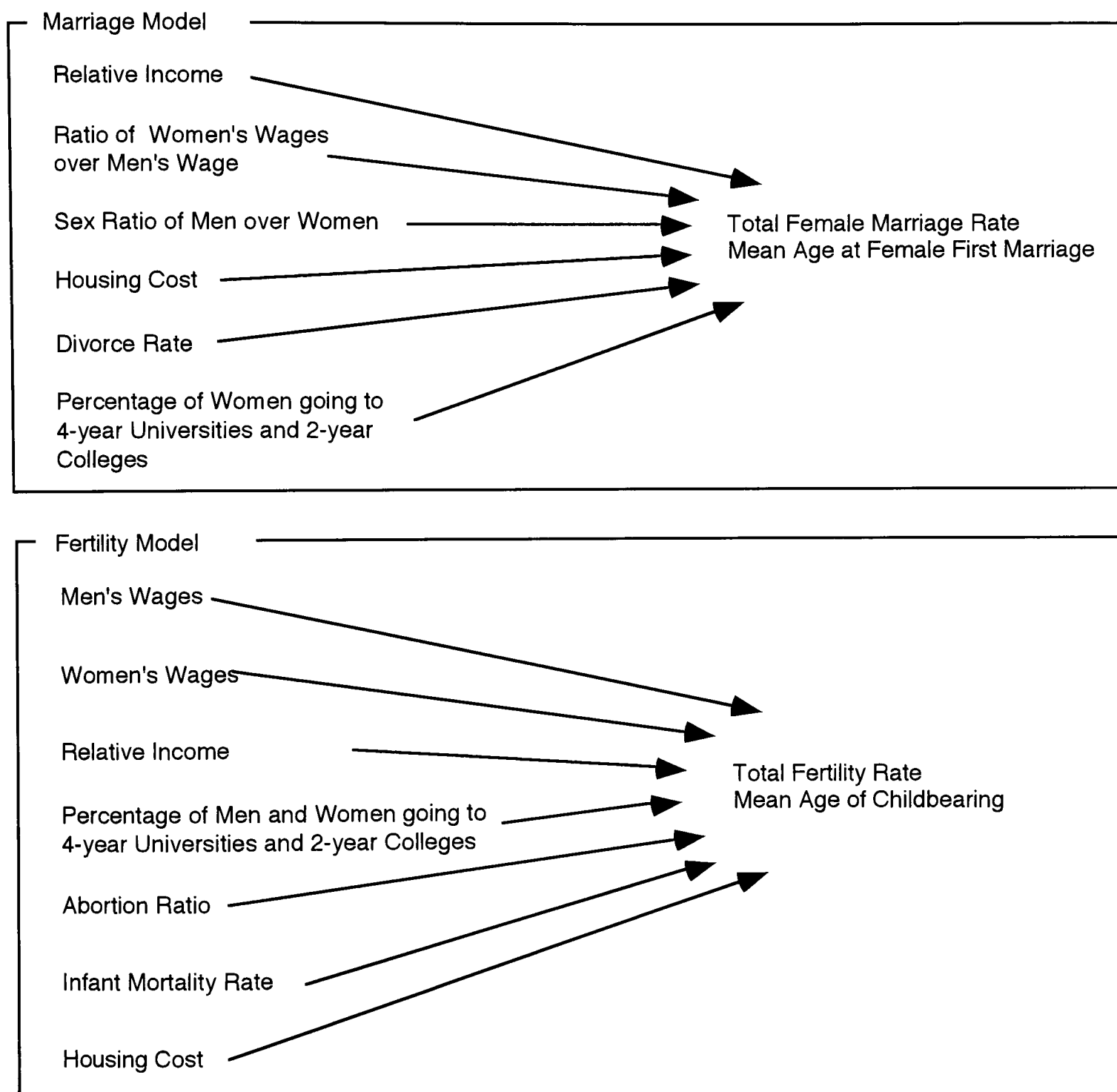
¹⁰ This year appears once every sixty years.

¹¹ For further details of the origin of this superstition, see Kurosu (1992).

lingers on among Japanese people and affects their reproductive behaviour to a considerable degree.

From a technical viewpoint, such an exceptional case will undermine the robustness of statistical analysis. Thus, instead of the actual figure of TFR in 1966, we will use the mean of TFR of the previous and the following year.

Figure 6.1: Analytical Framework of Longitudinal Change in Marriage and Fertility



6.4 Bivariate Analysis of Nuptiality and Fertility

We will, in this section, show the correlation between a dependent and an independent variable used in the marriage and fertility model. In

demographic studies, marriage and fertility pattern are usually analysed from two aspects: a tempo aspect and a quantum aspect. Thus, two quantum variables (the total female marriage rate and the total fertility rate) and two tempo variables (females mean age at first marriage and the mean age of childbearing¹²) were adopted as dependent variables.¹³

Table 6.5 displays the correlation of these variables for the period 1955-1993. To begin with, we can see from the first and the second columns of the table that the ratio of women's wages over men's wages (the index of gains from marriage) had a strong correlation to the marriage pattern. The correlation between the ratio of women's wages over men's wages and the female mean age at first marriage was 0.787, whereas that between the ratio and the total female marriage rate stood at -0.641. It is argued from this evidence that a decline in the gains from marriage raises the female mean age at first marriage, and reduces the total female marriage rate. On the other hand, relative income was positively related to the total female marriage rate and negatively to the mean age at first marriage. The correlation between the relative income and the female mean age at first marriage was -0.831, while that between the relative income and the total female marriage rate reached 0.638. However the relative income was less significantly correlated with the two marriage variables than the ratio of women's wages over men's wages. The significance level of the relative income was 5% for the marriage age and the marriage rate, whereas that of the wage ratio reached 1%. The remaining four variables; that is, the sex ratio, the percentage of women going to universities or colleges and the housing cost, yielded also a significant correlation with the marriage age and the marriage rate.

With regard to the fertility pattern, female wages had a correlation of

¹² This index is also referred to as the mean age of the fertility schedule.

¹³ The proportion of women marrying may be more appropriate as a quantum factor of marriage. However, this figure can be obtained only from the quadrennial population census.

-0.778 with the fertility rate, and a correlation of 0.968 with the age of childbearing. On the other hand, the relative income was, as might be expected, positively correlated to the total fertility rate and negatively correlated to the mean age of childbearing. The correlation between the relative income and the total fertility rate was 0.804, while that between the income and the mean age of childbearing stood at -0.529. This means that an improvement in the economic status of young adults increases the level of fertility and lowers the mean age of childbearing. However, the relation of the relative income with the two fertility variables was weaker than that of the female wages with the variables. The significance of the relative income was 5% for the fertility rate and the age of childbearing, while that of the female wages reached 1%. This evidence suggests that the post-war Japanese fertility rate is not much associated with the economic conditions of young adults.

It is noteworthy that the correlation coefficient of male wages with TFR was negative, and with the mean age of childbearing was positive. These results are opposite to expectations. These unexpected correlations were probably caused by the effect of a time trend. The total fertility rate and the mean age of childbearing have a time trend. Likewise, male wages, in a fixed direction, changed with time throughout the post-war period. Admittedly, the movement of the total fertility rate and the mean age of childbearing may partly be attributable to a change in the male wages. However, other factors with an upward or downward trend have contributed to the change of these variables. For example, technological innovations may generate a time trend into the wage level. Similarly, the fertility rate having a time trend may be caused by the spread of contraception. Since the influence of such unobserved factors is not partialled out with simple correlation, these factors exert an influence on the correlation coefficient between an independent and a dependent variables. As a result, the

unexpected correlations between the male wages, the total fertility rate and the mean age of childbearing were observed in the bivariate analysis of Table 6.5.

The correlation coefficients of the remaining four variables with TFR was opposite to those with the mean age of childbearing. The percentage of men and women going to 4-year universities and 2-year colleges, and the housing cost were negatively associated to the total fertility rate, and positively connected to the mean age of childbearing. In contrast, the infant mortality rate and the abortion ratio had a positive relation to the fertility rate, and a negative relation to the mean age of childbearing.

Table 6.5: Correlation between a Dependent and an Independent Variable for the Period 1955-1993

Independent Variables	Dependent Variable			
	Female Mean Age at First Marriage	Total Female Marriage Rate	Total Fertility Rate	Mean Age of Childbearing
Sex Ratio of Men over Women	-0.930**	0.951**		
Ratio of Women's Wages over Men's Wages	0.787**	-0.641**		
Percentage of Women going to 4-year Universities or 2-year Colleges	0.864**	-0.791**	-0.739**	0.251*
Divorce Rate	0.875**	-0.863**		
Relative Income	-0.831*	0.638*	0.804*	-0.529*
Male Wages			-0.802**	0.970**
Female Wages			-0.778**	0.968**
Infant Mortality Rate			0.686**	-0.924**
Abortion Rate			-0.508**	-0.879**
Housing Cost	0.872**	-0.726**	-0.823**	0.921**

* P<0.05; ** P<0.01

$$\text{Total Femal Marriage Rate} = \frac{\text{The Number of Marriages for Women}}{\text{All Women over Aged 15}} \times 1,000$$

6.5 Multi-variate Analysis of Marriage and Fertility

The final goal of this chapter is to investigate the post-war trend of

marriage and fertility with a multi-variate regression. Before that, we will, in this section, give a statistical explanation of the method used in the regression analysis.

Changes in marriage and fertility pattern over time are sometimes represented as a stochastic process. For instance, assuming that the fertility rate at time t is affected by the fertility rate at time $t-n$, we say that the fertility rate follows a n th-order autoregressive stochastic process. In this process, the value of fertility at time t depends on its value in the previous time period (and a random term). Such a time-series model having lagged independent variables provides the description of the stochastic process generating demographic events. Thus, this model puts more weight on showing how the series of events is generated by a stochastic process than on examining the cause-and-effect relation between variables (Pindyck and Rubinfeld, 1991). Because the primary purpose of this chapter is to examine what factors determine the post-war movement of marriage and fertility, a deterministic model that does not include lagged variables as an independent variable is suitable for the purpose.

In developing the regression model, it is necessary to pay attention to statistical methods, because the structure of time-series data is quite different from that of ordinary cross-sectional data. The first point to be considered is the stationarity. From a theoretical point of view, we define the stationary as a process whose distribution of variables is invariant with respect to displacement in time. In other words, if the series X_t is stationary, then it satisfies the following three assumptions for all t and $t-s$:

1. The mean: $\mu = E(X_t) = E(X_{t-s})$
2. The variance: $\sigma_x^2 = var(X_t) = var(X_{t-s})$
3. The autocovariances: $\gamma_s = cov(X_t, X_{t-s}) = cov(X_{t-j}, X_{t-j-s})$

However, the time-series process of socio-economic and demographic data do not often meet these assumptions. In particular, the mean of the series usually increases or decreases with time, which is called non-stationarity. Since the assumption of the ordinary regression model necessitates that the sequence of dependent and independent variables is stationary, the application of nonstationary data to an ordinary regression will lead to the 'spurious regression' (Granger & Newbold, 1974). A high R^2 and t-statistics reaching the significant level are usually observed in the spurious regression. These statistical values superficially indicate that the regression is fitted well. However, the results of this regression are, in reality, not meaningful, because its least-square estimates are not consistent.

Two methods are proposed to solve this problem. The first method is transforming nonstationary variables to stationary variables by n th differencing, which is recommended by Box, Jenkins, and Reinsel (1994). In fact, Nelson and Plosser (1982) find in the case of American macroeconomic annual data that nonstationary series can be transformed into stationary ones by differencing. Nevertheless, this method has the drawback that information on the long-run relation between the levels of variables is lost (Gottman, 1981; Harvey, Henry, Peters, & Wren-Lewis, 1986). The second method is to include a time-trend (=a deterministic trend) in a regression equation, which is equivalent to removing the trend of nonstationary variables. Although this method does not lose long-run information on the relation between variables, there is a risk of misspecification.

Generally, nonstationary time-series data are classified into two different types: one with a stochastic trend and the other with a deterministic trend. The former type called a difference stationary process (=DSP) can be transformed into a stationary model by differencing; the latter type called a trend stationary process (=TSP) can be transformed

into a stationary model by removing a deterministic trend (Nelson and Plosser, 1982). Incorporating a deterministic trend component into a regression is appropriate if a time-series process belongs to the deterministic process. Hence, modelling the difference stationary process as the deterministic stationary process will cause misspecification errors¹⁴ such as yielding relatively high R^2 . In addition, when including a deterministic trend in a regression equation, we have to determine which type of deterministic trend (such as linear, square or cubic) is appropriate to detrend a time series. Since neither method is entirely flawless, a choice of methods depends on the purpose of the research. In the following analysis, we will adapt the method of incorporating a time-trend component into a regression, while dealing with the marriage and fertility pattern of the whole post-war period. In looking at a relatively short period, however, the method of differencing time-series data will be employed.

The second point to be argued is serial correlation. It is assumed in the classical regression model that the disturbance term u_t relating to any observation is not influenced by the disturbance term u_{t-1} relating to any other observation, namely:

$$E(u_t u_{t-1}) = 0 \quad \text{for all } t$$

However, this assumption is usually violated in term of time-series data. The disturbance term u_t is correlated to u_{t-1} , which is called serial correlation. We often observe that u_t follows the first-order autoregressive process ($u_t = \alpha u_{t-1} + \varepsilon_t$). In this situation, using the ordinary least square (=OLS) ends up with unbiased but inefficient estimation, and invalid inference procedures. Thus, the usual t and F tests of significance cannot be legitimately applied to the result of OLS.

In order to remedy this deficiency, we will, in this analysis, employ the Cochrane-Orcutt iterative procedure. To explain this method, let us

¹⁴ For further details of misspecification, see Nelson and Kang (1981, 1984).

consider the two-variable model:

$$Y_t = \beta_1 + \beta_2 X_t + u_t \quad (1)$$

$$u_t = \rho u_{t-1} + \varepsilon_t \quad (2)$$

where ε_t is a purely random disturbance term with zero mean and constant variance. In this case, if we can obtain ρ properly, β_1 and β_2 can be estimated by applying an OLS regression into the following transformed equation, namely:

$$(Y_t - \rho Y_{t-1}) = \beta_1(1 - \rho) + \beta_2(X_t - \rho X_{t-1}) + \varepsilon_t \quad (3)$$

For the sake of obtaining ρ , we first estimate the above two-variable model by the standard OLS routine, and obtain the residuals, \hat{u}_t . Subsequently, by using the estimated residuals, we run the following regression:

$$\hat{u}_t = \hat{\rho} \hat{u}_{t-1} + v_t \quad (4)$$

By using $\hat{\rho}$ obtained from (4), the following difference equation is carried out:

$$(Y_t - \hat{\rho} Y_{t-1}) = \beta_1(1 - \hat{\rho}) + \beta_2(X_t - \hat{\rho} X_{t-1}) + (u_t - \hat{\rho} u_{t-1})$$

or

$$Y_t^* = \beta_1^* + \beta_2^* X_t^* + e_t^* \quad (5)$$

Since we do not know that the $\hat{\rho}$ obtained from (4) is the best estimator of ρ , we substitute the values of $\hat{\beta}_1^* = \hat{\beta}_1(1 - \hat{\rho})$ and $\hat{\beta}_2^*$ obtained from (5) into the original regression (1) and obtain the new residuals, \hat{u}_t^{**} as:

$$\hat{u}_t^{**} = Y_t - \hat{\beta}_1^* - \hat{\beta}_2^* X_t \quad (6)$$

Finally the following regression is estimated:

$$\hat{u}_t^{**} = \hat{\rho} \hat{u}_{t-1}^{**} + w_t \quad (7)$$

and the second-round estimate of ρ , or $\hat{\hat{\rho}}$, is obtained. However, because it is not known whether this second-round estimate of ρ is the best estimate of ρ , the third-round estimate is carried out. This procedure is iterated until the successive estimates of ρ differ by a very small amount.

The final point we must refer to is co-integration. Although nonstationary time-series are transformed into stationary series by

differencing, the drawback of this method is the loss of long-term information on the relation between variables. The concept of cointegration suggests a solution to this problem. If a series is differenced d times before it becomes stationary, we say that it is integrated of order d , denoted $I(d)$. In addition, if two time-series X_t and Y_t are both $I(1)$ and the residuals obtained from regressing Y_t on X_t are $I(0)$, then the two series are cointegrated of order $CI(1,1)$. In such a case, the ordinary least square theory is true of the nonstationary process. More specifically, the ordinary least square coefficient estimators are consistent concerning a linear combination of levels between Y_t and X_t . Hence, only if two or more nonstationary series are co-integrated, statistical inference can be carried out for the regression coefficients estimated in the levels of variables. In short, the concept of cointegration enables us to examine a long-run relationship between variables over time, even if they are nonstationary.

The studies of co-integration have proliferated in Econometrics since the article of Engle and Granger (1987) was published. In demographic studies, Ermisch (1988) examines the existence of co-integration concerning the time-series analysis of fertility in England and Wales. Although a series of statistical tests was carried out in the article, Ermisch does not discover conclusive evidence supporting the co-integration of demographic and economic variables. Hence, we will not deal with this point in this analysis, although we do not deny that more study on co-integration is necessary in demography.

6.6 Results of the Time-series Analysis of Marriage and Fertility

The first model was carried out to examine the female mean age at first marriage, and its result is displayed in Table 6.6. To begin with, looking at the first regression in Table 6.6, we observe that the ratio of women's wages over men's wages had a positive effect on the female mean age at first

marriage. This positive relation means that a decrease in the wage gap between men and women raises the female marriage age. As was discussed in Section 6.3, this variable is an index of the gains from marriage. Therefore, it follows that women marry later as their gains from marriage decline. This positive coefficient is consistent with the theory of marriage proposed by Becker.

The divorce rate yielded a negative coefficient ($=-0.3370$), which means that a rise in the divorce rate lowers the female marriage age. Since the divorce rate is an index of the permissiveness of divorce, it is argued from this evidence that the female marriage age drops as divorce becomes easier. In particular, since an increase in the number of (male) divorcés enlarges opportunities for the marriages of single women, a high divorce rate probably lowers female age at marriage. The coefficients of the sex ratio of men over women was also negative ($= -0.0235$). This indicates that entry to marriage is delayed as the number of women exceeds that of men. Anzo (1989b) finds that female age at marriage is negatively connected to the sex ratio of men over women in Japan during the period between the early 1960s and the early 1980s. The present result is in agreement with his findings

Housing cost was positively related to female age at marriage. The coefficient of housing cost was 0.0589, which suggests that a rise in the cost of housing causes the delay of marriage. In Section 6.3, we suggested that housing cost might not affect marriage pattern in Japan. However, this argument is not supported by the present findings. Since three-generation households have become less popular in Japan, the high cost of housing probably makes young unmarried couples choose to delay their marriage, rather than to live with their parents after marriage. Similarly, the percentage of women going to universities or colleges yielded a positive coefficient ($=0.0095$). This means that female age at marriage rises as

more women go to 4-year university or 2-year college. In fact, the women's enrolment rate in universities and colleges has been increasing in Japan throughout the post-war period (see Graph 3.4). Therefore, a rise in women's educational level contributes to the change of female marriage age.

The second regression in Table 6.6 included relative income as an independent variable to test Easterlin's hypothesis about marriage behaviour. Relative income had a negative effect on mean age at marriage, which indicates that an improvement in the economic income of young adults encourages women to marry earlier. In the analysis of Japanese marriage pattern using Easterlin's model, Anzo (1989b) discovers that a deterioration in the living standards of young adults lowers the mean marriage age for men and women. The present findings accord with his result.

The interesting point is the difference of the standardised regression coefficient between the wage ratio and relative income. The standardised coefficient of the ratio of women's wages over men's wages was 0.1425, while that of the relative income stood at -0.1200. These two variables affect the post-war movement of female marriage age in the way that Becker's and Easterlin's theories anticipate. However, the wage ratio has a greater explanatory power for female marriage age than relative income. We can conclude that in post-war Japan Becker's model is more relevant for explaining the timing of female marriage than Easterlin's model.

Table 6.6: Results of the Regression of Female Mean Age at First Marriage for the Period 1955-1993

Independent Variables	Female Mean at First Marriage			
	(1)		(2)	
	Regression Coefficient	Standardized Regression Coefficient	Regression Coefficient	Standardized Regression Coefficient
Sex Ratio of Men over Women	-.0235 (.0319)	-.0983	-.0098 (.0299)	-.0402
Ratio of Women's Wages over Men's Wages	.0589 (2.3741)	.1389	.0515 (2.0855)	.1425
Percentage of Women going to Universities or Colleges	.0093 (.0146)	.1428	.0089 (.0125)	.1378
Relative Income			-.8884 (.9316)	-.1200
Divorce Rate	-.3370 (.3196)	-.1477	-.2800 (.2925)	-.1216
Housing Cost	.0095 (.1844)	.0077	.0402 (.1712)	.0032
Trend	.0532* (.0180)	.6713	.0440* (.0168)	.5657
Constant	21.5261** (3.9515)		23.6265** (3.6391)	
Adjusted R-Squared	.4552		.4959	
Durbin-Watson	1.8997		1.8595	
Rho	.9488		.9180	
Number of Cases	39		39	

* P<0.05; ** P<0.01

Parentheses represent the standard error.

The second model was employed to examine the total female marriage rate, and its results are shown in Table 6.7. The overall impression of the result is that the effects of the independent variables on the total female marriage rate were opposite to those on the mean age at marriage. Specifically, the ratio of women's over men's wages, and housing cost were negatively related to the marriage rate. By contrast, the sex ratio, relative income and the divorce rate were positively connected the marriage rate.

Three points have to be made concerning the result of the first regression in Table 6.7. The first point is that the ratio of women's over

men's wages did not have a significant effect on the marriage rate. In the cross-sectional analysis of Japan, Ogura and Dekle (1992) find that an increase in the ratio of women's over men's wages significantly lowers the proportion of women marrying in the 25-29 and the 30-34 age groups. This suggests that Japanese women remain unmarried as their gains from marriage reduce. This difference between the present result and Ogura and Dekle's result is probably due to the fact that the influence of the wage ratio differs across age groups. This analysis uses the total female marriage rate as the prevalence of marriage, while Ogura and Dekle employ the proportion of women marrying in each age group. In fact, Ogura and Dekle discover that the ratio of women's over men's wages has no significant influence on the proportion of women marrying in age groups over 35.

The second point is that, although the sex ratio had no significant effect on the mean age of marriage, this variable was significant at the 5% level in the regressions of Table 6.7. This significance was derived from the dual structure of female marriage behaviour. Anzo (1989b) suggests that a response to demographic changes, in Japan, differs between young single women around the marriageable age and older single women over that age. More specifically, even if a sex ratio changes in a direction unfavourable to women, relatively young women can marry an older or younger man than they wished to marry. However, since it is very difficult for relatively older women to marry an older or younger man, most of them will lose the chance of marriage itself. In this case, since the female mean age at marriage is computed only for women who have married, it will change only slightly. Therefore, when the ratio of women over men rises, this change has a stronger impact on the frequency of marriages than the mean age at marriage. On the other hand, if a sex ratio changes in a direction favourable to women, both younger and older women are able to enter married status more easily. This situation will increase the marriage rate greatly.

However, this change of the sex ratio does not clearly appear in the mean age at marriage. An increase in the number of young women's marriages lowers the mean age at marriage. However, this effect is, to some extent, cancelled out because an increase in the number of older women's marriages raises the mean age at marriage. In short, the effect of a sex ratio is less sensitive to the mean age at marriage than to the marriage rate. Therefore, the sex ratio had a significant effect on the total female marriage rate, rather than on the mean age at marriage.

The third point is that the percentage of women going to universities and colleges had, contrary to our hypothesis, a positive effect on the total female marriage rate. This is probably because a rise in the female enrolment rate in colleges and universities increased the supply of partners suitable to men with a high educational qualification. In Japan, a husband and wife tend to have the same level of education. This tendency may be regarded as a kind of homogamy. In fact, the percentage of couples having the same educational qualification reached more than 40% (Kôsei Shô Jinkô Mondai Kenkyûjo, 1988). As was shown in Graph 3.4, a gap between the men's and the women's enrolment rate in higher education has become narrow during the post-war period. This change will allow women to enjoy a better chance of finding their suitable partner. Therefore, this variable showed a positive impact on the total female marriage rate.

Let us examine Easterlin's model in the second regression of Table 6.7. As might be expected, the relative income had a positive effect on the total female marriage rate, which means that, as the economic situation of young adults is improved, they were more willing to get married. However, the effect of this variable is slightly smaller than that of the ratio of women's over men's wages. The standardised coefficient of the relative income stood 0.1023, whereas that of the wage ratio was -0.1203. The post-war movement of the marriage rate, like the female age at marriage, is

better explained by Becker's theory than Easterlin's theory.

Table 6.7: Result of the Regression of the Total Female Marriage Rate for the Period 1955-1993

Independent Variables	Total Female Marriage Rate			
	(1)		(2)	
	Regression Coefficient	Standardized Regression Coefficient	Regression Coefficient	Standardized Regression Coefficient
Sex Ratio of Men over Women	.8835* (.3974)	.3960	.9154* (.4012)	.3926
Ratio of Women's Wages over Men's Wages	-14.7466 (28.0487)	-.1339	-14.1370 (28.4888)	-.1203
Percentage of Women going to Universities or Colleges	.1697 (.1633)	.3474	.17051 (.1663)	.2702
Relative Income			1.9743 (4.6139)	.1023
Divorce Rate	5.1547 (3.9467)	.2792	5.1394 (3.995)	.2461
Housing Cost	-.6747 (2.3467)	-.0478	-.4338 (2.4090)	-.0422
Trend	-.5501* (.2211)	-.7757	-.5638* (.2287)	-.6784
Constant	134.7428** (48.6653)		136.5903** (50.1190)	
Adjusted R-Squared	.3757		.3302	
Durbin-Watson	1.9936		1.8290	
Rho	.7453		.8540	
Number of Cases	39		39	

* P<0.05; ** P<0.01

Parentheses represent the standard error.

The third analysis was carried out to explore the trend of the total fertility rate, whose result is presented in Table 6.8. Children are not instantaneously produced in response to changes in socio-economic circumstances, since at least nine months lapse from the time a couple decide to have an additional child to the actual birth itself (McDonald, 1983). Therefore, current reproductive behaviour should be related to the past socio-economic environment. With this point in mind, we will, in the following analysis, employ a year lag in terms of all independent variables

except for the abortion ratio and the trend.

To begin with, the first regression of Table 6.8 shows that the male wages and the female wages are connected to the fertility rate in a way that the New Home Economics theory predicts. More specifically, the coefficient of the male wages was 0.2046, while that of female wages was -0.0547. This means that the men's wages raise and the women's wages lower the level of fertility. Preceding studies using the Butz-Ward model have already found that male wages have a positive and female wages have a negative impact on the Japanese TFR (Ogawa & Mason, 1986; Osawa, 1988). The present result is in agreement with these findings. Moreover, the standardised regression coefficient (=beta coefficient) of the male wages and of the female wages stood at 0.2098 and -0.2260 respectively. These two variables are almost equal in the influence on the total fertility rate.

The percentage of men and women going to colleges and universities was negatively connected to the fertility rate. It follows from this result that, the higher the quality of children, the lower the level of fertility. Nevertheless, the influence of this variable on the TFR is not so strong. Its beta coefficient stood at only -0.0405. Yamamura and Hanley (1975) claim that the post-war Japanese fertility decline was caused by the strong motivation of parents to give their children a better education. However, as far as the present result shows, the educational level reduces the TFR only slightly.

Interestingly, the abortion ratio had a negative and significant effect on the fertility rate. Furthermore, its beta coefficient was considerably great (= -0.909). We suggested in Section 6.2 that induced abortions contributed to the fertility decline before the 1960s rather than after the 1960s. However, according to the present result, abortions have exerted a strong influence on the TFR throughout the post-war period. This evidence suggests that, since more effective contraceptive methods have not been

yet prevailed in Japan, induced abortion is still an important measure to avoid unwanted births.

As might be expected, housing cost was negatively and the infant mortality rate was positively connected to the total fertility rate. However, the influences of these variables on the fertility rate were relatively small. The standardised coefficient of the housing cost was -0.1243, whereas that of the infant mortality rate was 0.1424. Although Kono (1986) points out that extremely costly housing causes the low fertility rate in Japan, the present findings show that this factor has a relatively weak influence on the Japanese fertility pattern. On the other hand, the small beta coefficient of the infant mortality rate implies that the probability of children's survival plays a minor role in determining the number of children a couple has. This supports the argument of Coleman (1992).

Let us turn to the second regression in Table 6.8 in order to examine Easterlin's model. The coefficient of the relative income was 0.1539, which means that an improvement in young adults' income relative to their parents' income leads to a greater demand for children. Nevertheless, compared with the female wages and the male wages, this variable affects the TFR more slightly. The standardised coefficient of the female and male wages was -0.344 and 0.288 respectively, while the relative income yielded a standardised coefficient of 0.085. Hence, the two economic factors proposed by the New Home Economics theory play a more influential role in the fertility trend of post-war Japan than Easterlin's notion of relative economic status.

Table 6.8: Result of the Regression of the Total Fertility Rate for the Period 1955-1993

Independent Variables	Total Fertility Rate			
	(1)		(2)	
	Regression Coefficient	Standardized Regression Coefficient	Regression Coefficient	Standardized Regression Coefficient
Logarithm of Male Wages t-1	.2046 (.2692)	.2098	.2809 (.2969)	.2884
Logarithm of Female Wages t-1	-.0547 (.0820)	-.2260	-.0929 (.1020)	-.3443
Percentage of Men and Women going to Universities and Colleges t-1	-.0013 (.0047)	-.0405	-.0009 (.0048)	-.0295
Relative Income t-1			.1539 (.2394)	.0851
Abortion Ratio	-.0025** (.0004)	-.9090	-.0025** (.0004)	-.9059
Housing Cost t-1	-.1529 (.0937)	-.1243	-.1545 (.0947)	-.1268
Infant Mortality Rate t-1	.0047 (.0069)	.1424	.0034 (.0072)	.1049
Trend	-.0340* (.0117)	-.8805	-.0312* (.0122)	-.8061
Constant	3.0165* (1.0404)		2.2734* (1.0156)	
Adjusted R-Squared	.6641		.6576	
Durbin-Watson	1.8574		1.8271	
Rho	.9027		.9026	
Number of Cases	39		39	

* P<0.05; ** P<0.01

Parentheses represent the standard error.

Finally, we will analyse the mean age of childbearing in Table 6.9. As in the case of total fertility rate, we used a year lag with regard to the socio-economic variables in this analysis.¹⁵ Firstly, male wages yielded a negative coefficient (= -0.0677) in the first regression of Table 6.9, which means that a rise in men's wages lowers the mean childbearing age. This effect is due to the fact that a higher husband's income increases demand for children. More specifically, as was shown in the analysis of the total

¹⁵ Since the longitudinal change of the mean age of childbearing showed a U-shaped curve, we added a squared trend-term into the regressions of this analysis.

fertility rate, a rise in the male wages increased the fertility rate. The increasing effect that the male wages have on the level of fertility naturally leads to the earlier timing of fertility. In contrast, the female wages were positively related to childbearing age. Hence, a rise in women's wages raises the mean age of childbearing. The influence of female wages is opposite to that of male wages with regard to the timing of fertility. In the previous analysis, we found that a greater women's wage reduced the fertility rate. The reducing effect that the female wages have on the level of fertility delays the age at which a woman bears a child. It is worth noting that the coefficient of the female wages was significant at the 5% level. It is argued that, in industrialised countries where the fertility rate reaches a low level, economic factors affect the tempo of fertility more strongly than the quantum of fertility (Ward & Buts, 1980). Since the Japanese TFR has remained at around two since the early 1950s, Japan is one of these countries. The significant effect of female wages on the mean age of childbearing is in agreement with this argument.

The percentage of men and women going to universities and colleges was negatively connected to the mean age of childbearing. It follows from this evidence that a rise in the quality of children raises the age at which a woman bears a child. The enrolment rate in universities and colleges exerted a negative influence on the mean age of childbearing, probably because parents needed a good deal of time to establish an economic basis for covering the expenditure for their children's higher education. In fact, according to the survey carried out by the Mainichi Newspaper Company, more than 50% of the respondents felt that the burden of bringing up children was the high cost of their education (Mainichi Shimbunsha Jinkômondai Chôsakai, 1994).

Housing cost had a negative impact on the mean age of childbearing. This indicates that women delay having children as housing cost increases.

Kojima (1993) finds in the cross-sectional analysis that the probability of having the third child was greater for couples who owned a house than those who rented one. The present result of the time-series analysis is consistent with his findings. The negative relation between the two variables is attributable to economic reasons. As discussed before, a certain amount of money is needed for parents to achieve sufficient housing conditions for their children. Hence, as the housing cost rises, they will need more time to establish an economic basis for such conditions. Consequently, housing cost will exert a negative influence on the timing of fertility.

The abortion ratio was negatively related to the mean age of childbearing. This is due to the fact that relatively older women mainly have abortions in order to avert unwanted high-order births. A high abortion ratio for older women results in a low birth rate for them. Consequently, the mean age of childbearing will have a negative relation to the abortion ratio. In fact, as far as the Eugenic Protection Statistics Report of 1995¹⁶ shows, the age-specific abortion ratio is the highest in the 30-34 age group (=18.6) and the second highest in the 25-29 age (=18.1) (Kôseishô Daijinkanbô Tôkei Jôhû Bu, 1995).

Subsequently, we will examine Easterlin's theory in the second regression of Table 6.9. The relative income showed a negative coefficient (= -0.5934). This indicates that, when the economic situation of young adults is better than that of their parents, the mean age of childbearing becomes low. Although the present result is consistent with Easterlin's argument, the extent to which this variable affects the mean age of childbearing is not great. In the second regression of Table 6.9, the standardised regression coefficient of the relative income stood at -0.1750, while that of the male wages and the female wages reached -0.1920 and

¹⁶ In this report, the age-specific abortion rate is calculated as follows:
Age-specific Abortion Rate = Abortions at *t* five-year age group / Women at the same age group.

0.435 each. Thus, we can conclude that the New Home Economics theory is more appropriate for explaining the timing of fertility in post-war Japan than Easterlin's theory.

Table 6.9: Result of the Regression of the Mean Age of Childbearing for the Period 1955-1993

Independent Variables	Mean Age of Childbearing			
	(1)		(2)	
	Regression Coefficient	Standardized Regression Coefficient	Regression Coefficient	Standardized Regression Coefficient
Logarithm of Male Wages t-1	-.0677 (.5737)	-.1717	-.0955 (.6036)	-.1920
Logarithm of Female Wages t-1	.3512* (.1665)	.4993	.2555* (.1072)	.4356
Percentage of Men and Women going to Universities and Colleges t-1	-.0170 (.0185)	-.3163	-.0212 (.0207)	-.3252
Relative Income t-1			-.5934 (.3711)	-.1750
Abortion Ratio	-.0004 (.0006)	-.1085	-.0002 (.0004)	-.1059
Housing Cost t-1	.0534 (.1847)	.1243	.0627 (.1856)	.1118
Infant Mortality Rate t-1	.0037 (.0139)	.0426	.0005 (.0166)	.0485
Trend	-.2126* (.0602)	-.9149	-.1506* (.0718)	-.7467
Trend ²	.0046** (.0008)	.5870	.0038** (.0009)	.3217
Constant	28.0119** (5.0355)		27.3589** (5.2668)	
Adjusted R-Squared	.6424		.6742	
Durbin-Watson	1.8549		1.8330	
Rho	.8149		.8014	
Number of Cases	39		39	

* P<0.05; ** P<0.01

Parentheses represent the standard error.

6.7 Stability of the Effects of Socio-Economic Factors

By dealing with the whole post-war period, we investigated the long-term relationship between the demographic factors and the socio-economic factors in the previous section. Indeed, the analyses of the section revealed

the factors affecting the marriage and fertility pattern of Japan during the past several decades. However, owing to their treatment of the whole post-war period as a single unit, the previous analyses cannot shed light upon whether or not the influence of these factors has changed over time. What is particularly important here is whether or not the influence of economic factors has remained constant over time. Studies based on Becker's and Easterlin's theory treat the demographic changes from the baby boom to the recent below-replacement level as a single phase. They have not explored explicitly whether or not the influence of economic factors has changed with time. As is shown in the study of Butz and Ward (1979), the fertility decline from the baby boom to the baby bust is understood as a continuous process caused by the rise of women's wages.

As mentioned earlier, there is no guarantee that the post-war demographic change in industrialised countries can be regarded as a continuous process. In particular, the Japanese fertility rate began to decline in the early 1970s after the stable period of the 1960s. Thus, it is likely that the influence of socio-economic factors on marriage and fertility pattern is not constant throughout the post-war period. We will, in the next section, divide the whole post-war period into two parts, and attempt to examine whether the influence of socio-economic factors on demographic patterns differs between the two periods. We thought that the year 1973, when the total fertility rate resumed a decline, was the starting point of a new phase, and divided the whole period into a pre-1973 and a post-1973 period. In addition, we did not use a deterministic trend variable because the length of each period was relatively short. Therefore, by taking the first order difference of each variable, we constructed stationary time-series and carried out a regression analysis. Because of dividing the whole period to two, the number of cases for each period becomes quite small in the following regression. Thus, including many independent variables in the

regression reduces the degree of freedom. In the next section, we will limit ourselves to examining the effects of the key socio-economic variables in Becker's model and Easterlin's model.

6.8 Results of the Analysis of Marriage and Fertility for Two Periods

The first analysis was carried out to investigate the influence of socio-economic factors on the marriage pattern. Its result is displayed in Table 6.10. To begin with, the ratio of women's over men's wages revealed a stronger positive effect on the female mean age at marriage in the post-1973 period than the pre-1973 period. In concrete terms, the coefficient of the variable was 2.6022 in the regression of the pre-1973 period, whereas the figure reached 7.6461 in that of the post-1973 period. Moreover, the variable was significant at the 5% level in the latter regression. Hence, the gains from marriage play a more important role in determining the timing of female marriage in the post-1973 than in the pre-1973 period. Likewise, the effect of the relative income also became larger in the regression of the second period than in that of the first period. The coefficient of this variable was -0.3537 in the first regression, whereas it stood at -0.9149 in the second regression. The latter coefficient is about twice as great as the former. Nevertheless, relative income was not statistically significant in the first regression. This suggests that a rise in the female age at marriage after 1973 was caused by a change in the gains from marriage, rather than relative economic status.

Let us turn to the third and fourth regression of Table 6.10 in order to examine the total female marriage rate. These two regressions include the sex ratio of men over women, since this variable revealed a significance effect in the regressions of Table 6.7. The marked difference between the two regressions is that the influence of the two economic variables; that is., the ratio of women's over men's wages and the relative income, was smaller

in the post-1973 period than in the pre-1973 period. The coefficient of the wage ratio fell from -48.4340 in the pre-1973 period to -15.3155 in the post-1973. Similarly, the coefficient of the relative income reduced from 8.6353 to 5.2344 . Furthermore, the R^2 of the second regression was smaller by 0.08 than that of the first regression. It follows from these findings that the decision on whether to marry was more affected by the economic factors in the pre-1973 period than in the post-1973 period.

Table 6.10: Results of the Regression Analysis of Female Mean Age at First Marriage and the Female Total Marriage Rate for the Period 1955-1973 and 1974-1993

Independent Variables	Δ Female Mean Age at Marriage		Δ Female Total Marriage Rate	
	Regression Coefficient		Regression Coefficient	
	1955-1973	1974-1993	1955-1973	1974-1993
Δ Sex Ratio of Men over Women			-.3667* (.1353)	-.2550* (.1167)
Δ Ratio of Women's Wages over Men's Wages	2.6002 (2.4405)	7.6461* (2.8964)	-48.4340 (25.3899)	-15.3155 (33.2792)
Δ Relative Income	-.3537 (.3199)	-.9149 (.6923)	8.6353 (7.5977)	5.2344 (4.1825)
Constant	.0464 (.0411)	.0669 (.0201)	.4508 (.3513)	.4215 (.5210)
Adjusted R-Squared	.2767	.3075	.3246	.2609
Durbin-Watson	1.7337	2.2012	1.7236	1.7786
Number of Cases	19	19	19	19

* $P < 0.05$; ** $P < 0.01$

Parentheses represent the standard error.

Δ signifies the first order difference.

Next, we will examine the total fertility rate and the mean age of childbearing in Table 6.11. The first two regressions include the abortion ratio as an independent variable, because this variable was significant in the regressions of Table 6.8. To begin with, male and female wages had a more powerful effect on the total fertility rate in the post-1973 period than in the pre-1973. In particular, the coefficient of female wages was -0.0123 in the first regression, while it reached -0.0612 in the second regression. This evidence indicates that the Japanese fertility rate has become

sensitive to the level of men's and women's wages after 1974. In contrast, the coefficient of the relative income fell from 0.4298 in the pre-1973 period to 0.1943 in the post-1973 period. This means that the level of fertility is less affected by the economic situation of young adults in the post-1973 period. Therefore, decline in Japanese fertility after the early 1970s is due to a change in men's and women's wages, rather than in the relative economic status. It is worth noting that the value of R^2 was smaller in the second regression ($=0.3065$) than in the first regression ($=0.5984$). Indeed, the absolute value for male wages and female wages rose in the second regression. This reduction of R^2 means that the movement of the total fertility rate is less explained by these economic factors after 1974. In other words, this evidence implies that other factors that are not included in these models become more influential to the fertility rate of the post-1973 period.

The same is true of the mean age of childbearing. While the influence of relative income is weaker in the post-1973 period than in the pre-1973 period, the coefficients of male wages and female wages are greater in the latter period than in the former period. Nevertheless, the level of significance for the male wages was lower in the former than in the latter. More specifically, the male wages were significant at the 1% level in the third regression, but became insignificant in the fourth regression. Likewise, although the level of significance for the female wages reached the 1% level in the pre-1973 period, it was at the 5% level in the post-1973 period. Furthermore, the value of R^2 fell from 0.5634 in the third regression to 0.4146 in the fourth regression. These economic variables play a less important role in determining the mean age of childbearing after 1974.

Table 6.11: Results of the Regression Analysis of the Total Fertility Rate and the Mean Age of Childbearing for the Period 1955-1973 and 1974-1993

Independent Variables	Δ Total Fertility Rate		Δ Mean Age of Childbearing	
	Regression Coefficient		Regression Coefficient	
	1955-1973	1974-1993	1955-1973	1974-1993
Δ Logarithm of Male Wages t-1	.1112 (.3903)	.1490 (.3455)	-.5761** (.1376)	-.8868* (.4991)
Δ Logarithm of Female Wages t-1	-.0123 (.0820)	-.0612 (.2409)	.4399** (.1382)	.9427 (.5600)
Δ Relative Income t-1	.4298 (.2512)	.1943 (.2703)	-.2194 (.1773)	-.1234 (.4800)
Δ Abortion Ratio	-.0023* (.0005)	-.0026* (.0005)		
Constant	-.0432 (.0432)	-.0269 (.0451)	.0092 (.1994)	.2194* (.0725)
Adjusted R-Squared	.5984	.3065	.5634	.4146
Durbin-Watson	1.9475	1.9794	1.8182	1.8455
Number of Cases	19	19	19	19

* P<0.05; ** P<0.01

Parentheses represent the standard error.

Δ signifies the first order difference.

6.9 Influence of Attitudes on Demographic Pattern

In the previous section, we divided the whole post-war period into two periods and carried out multiple regressions, and examined whether the socio-economic factors proposed in Becker's and Easterlin's model have an equivalent effect on marriage and fertility pattern between the two periods. The results of the analyses revealed that these factors differently affected marriage and fertility patterns between the two periods. In particular, the fertility pattern of the post-1973 period was less accounted for by either Becker's model or the Easterlin's model. Hence, factors other than the economic factors may also have contributed to the Japanese fertility decline after the 1970s.

The influence of attitudinal factors on marriage and fertility pattern is important in considering the recent demographic change in Japan. As discussed in Chapter 1, it is argued that the recent demographic changes in

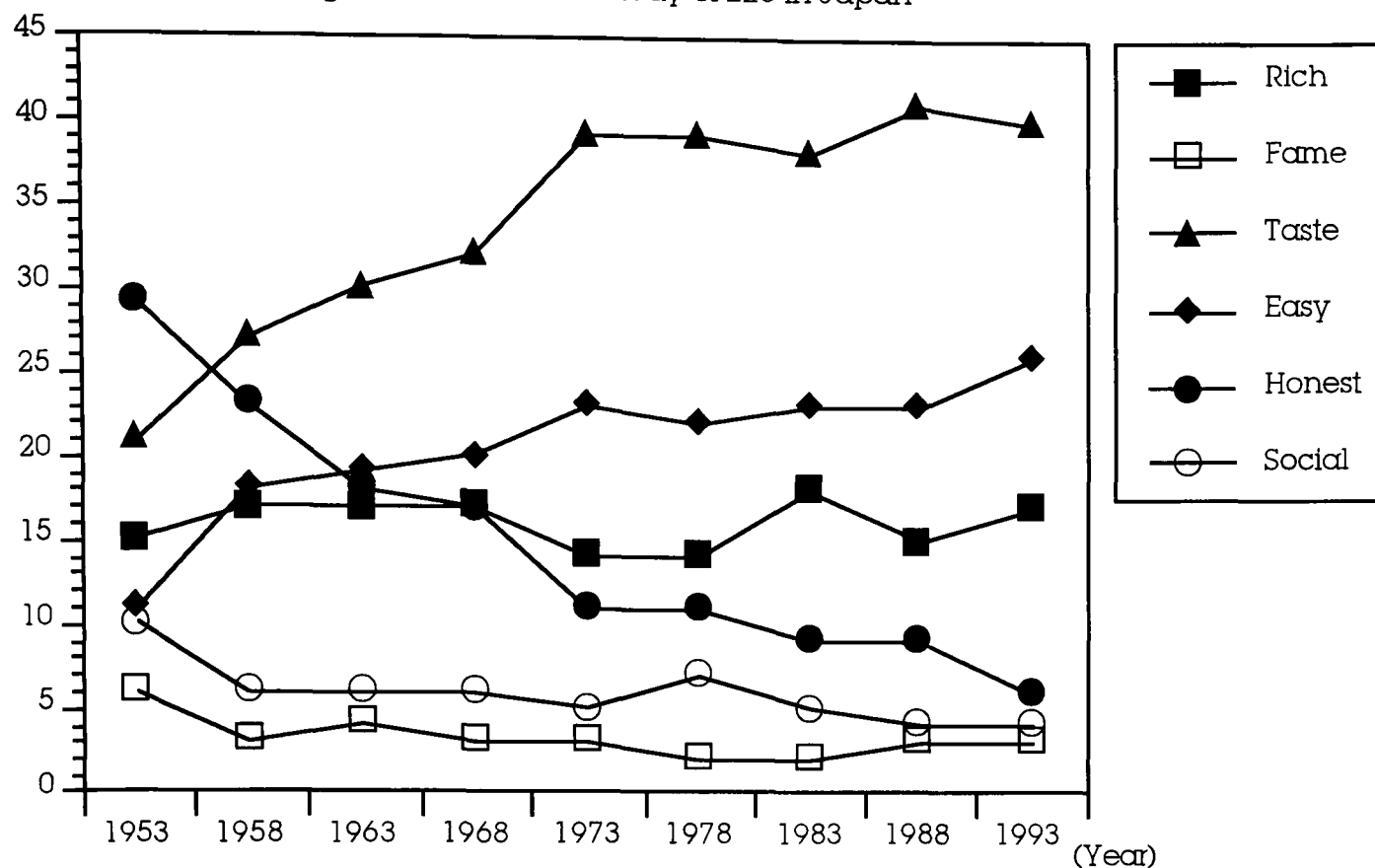
Western industrialised countries are caused by attitudinal factors. Owing to economic development and material security in industrialised countries, traditional social norms and values have weakened, and great importance has been put on attaining one's own goals (Ariès, 1980; Lesthaeghe, 1983, 1991, 1995; Lesthaeghe & Meekers, 1986; Lesthaeghe & Surkyn, 1988). If these ideational changes resulting from economic development have any relation to the recent demographic situation in Western countries, it is likely that recent changes in marriage and fertility pattern in Japan are also affected by attitudinal factors. In fact, the cross-sectional analyses of the previous chapters shows that attitudinal factors have an influence on marriage and fertility behaviour. In what follows, we will examine the effect of attitudes on the trend of marriage and fertility.

6.10 Attitudinal Changes in Japan

As discussed in the previous section, it is likely that attitudinal factors affect marriage and fertility pattern in Japan. In this section, we will look at the change of attitudes in the post-war Japan. Graph 6.3 presents changes in attitudes towards a way of life. The most distinctive feature is that the proportion of people in the 'Taste' group rose drastically during the past forty years. The percentage of this group stood at 21% in 1953, but reached as many as 40% in the latest survey of 1993. Likewise, the percentage of the 'Easy' group rose from 11% to 26% during the same period. These two kind of lifestyle indicate an attitude that places great importance on individuality. Hence, a steep rise in the percentage of these groups means that more Japanese people want to live an individualistic way of life. In contrast, conformity to social norms and morals becomes weaker and weaker. A fall in the percentage of the 'Honest' group is a good example. The percentage of this group fell from 29% in 1953 to 6% in 1993. The evidence clearly shows that individualistic attitudes have been

spreading in Japan.

(%) Graph 6.3: Changes in Attitudes to a Way of Life in Japan



Question: What is nearest to your way of life?

Answer:

Rich: To work hard and become rich.

Fame: To study hard and become famous.

Taste: To live a life suiting my taste, without thinking of money and fame.

Easy: To live a easy-going life without worrying.

Honest: To live honestly and scrupulously, maintaining moral integrity.

Social: To devote myself to society without considering self-interest.

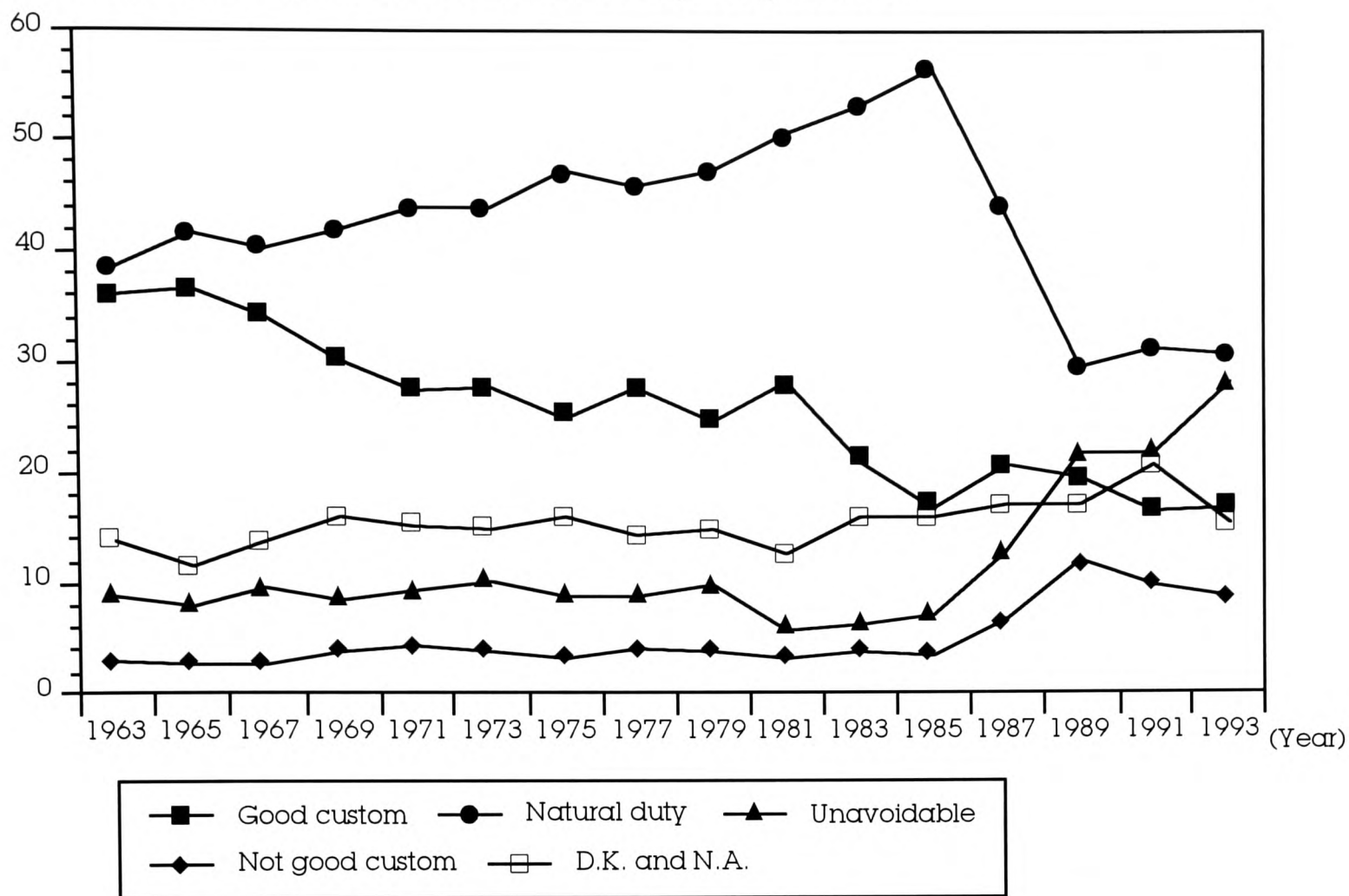
Source: Institute of Statistical Mathematics. (1994). A Study of the Japanese National Character: the Ninth Nationwide Survey.

A reduction in the influence of traditional social norms and values is seen in the attitudes to the family relationship. This tendency is demonstrated by the trend of attitudes towards caring for aged parents (see Graph 6.4). The proportion of women showing negative attitudes to the care of aged parents increased after the late half of the 1980s. The percentage of women in the 'Unavoidable' category jumped from 5.7% in 1981 to 28.2% in 1993. Similarly, the percentage of the 'Not good custom' category rose from 3.1% to 8.7% during the same period. In contrast, the proportion of women having positive attitudes to the care of aged parents declined during the period 1963-93. The percentage of women who thought

of the care of aged parents as a good custom reached as much as 38.6% in 1963, while the figure fell to 30.7% in 1993. In particular, the percentage of the 'Natural duty' category fell steeply from 56.5% in 1985 to 29.6% in 1989. Although we lack definite information on the causes of this drastic fall, the social climate may have encouraged women to lead a more independent life since the mid-1980s. For instance, they may have come to prefer an independent lifestyle as a result of the Equal Employment Law in 1986, which theoretically paved the way for improving the socio-economic position of women.

In Japan, influenced as it is by Confucian values, great importance has been traditionally attached to the care of aged parents as a filial duty. Thus, an increase in the number of women having negative attitudes toward this obligation indicates that the influence of traditional social values is weakening. Since the percentage of women showing negative attitudes has decreased since the latter half of the 1980s, it is likely that the Japanese TFR decline after the mid-1970s is related to the ideational change of Japanese people.

(%) Graph 6.4: Changes in Attitudes towards Caring for Aged Parents



Question: What do you think of children taking care of their aged parents?

Answer:

- Good custom: It's a good custom.
- Natural duty: It's children's natural duty.
- Unavoidable: It's unavoidable, because of a lack of nursing homes or pensions for the aged.
- Not good custom: It's not a good custom.
- D.K. and N.A.: Don't know / No answer.

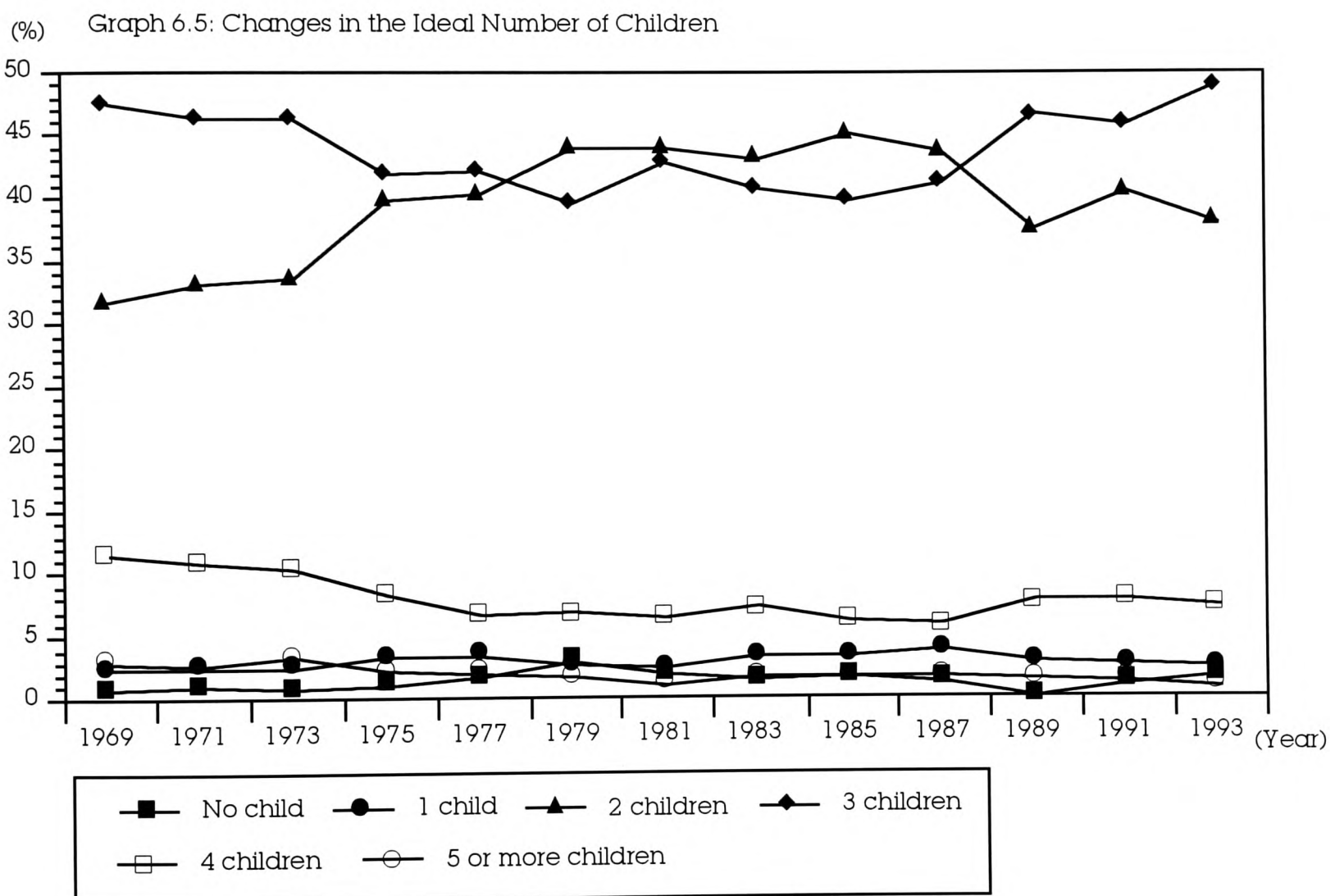
Note: Respondents are women aged from 20 to 50.

Source: The Mainich Newspaper Company. (1994). In Search of the New Family Model: Summary of Twenty-second National Survey on Family Planning.

Ariès (1980) argues that recent low fertility in Western countries has its root in a fall in children's position in the value pyramid of adults. This phenomenon is called the end of the 'child-king' era. However, Japanese society has not yet reach this stage, and children still command an important position in the family. As far as the trend of the ideal number of children in Graph 6.5 shows, a clear shift in the ideal number of children did not occur over the past twenty-five years. The percentage of married women wanting to have four children or five children fell slightly from 1969 to 1993, but that of women wanting to have no children or one child remained almost unchanged during the same period. The percentage of the

'two children' category rose slightly until 1985, and thereafter showed a downward trend. The percentage of the 'three children' category revealed an upward trend after 1979.

If the argument of Ariès (1980) holds true for the Japanese demographic situation, a rise in the percentage of women remaining childless or wanting to have one child should be observed after the mid-1970s. However, the figures in Graph 6.5 do not display such a decline in the ideal number of children. This calls the validity of Ariès's argument on Japanese fertility decline into question.

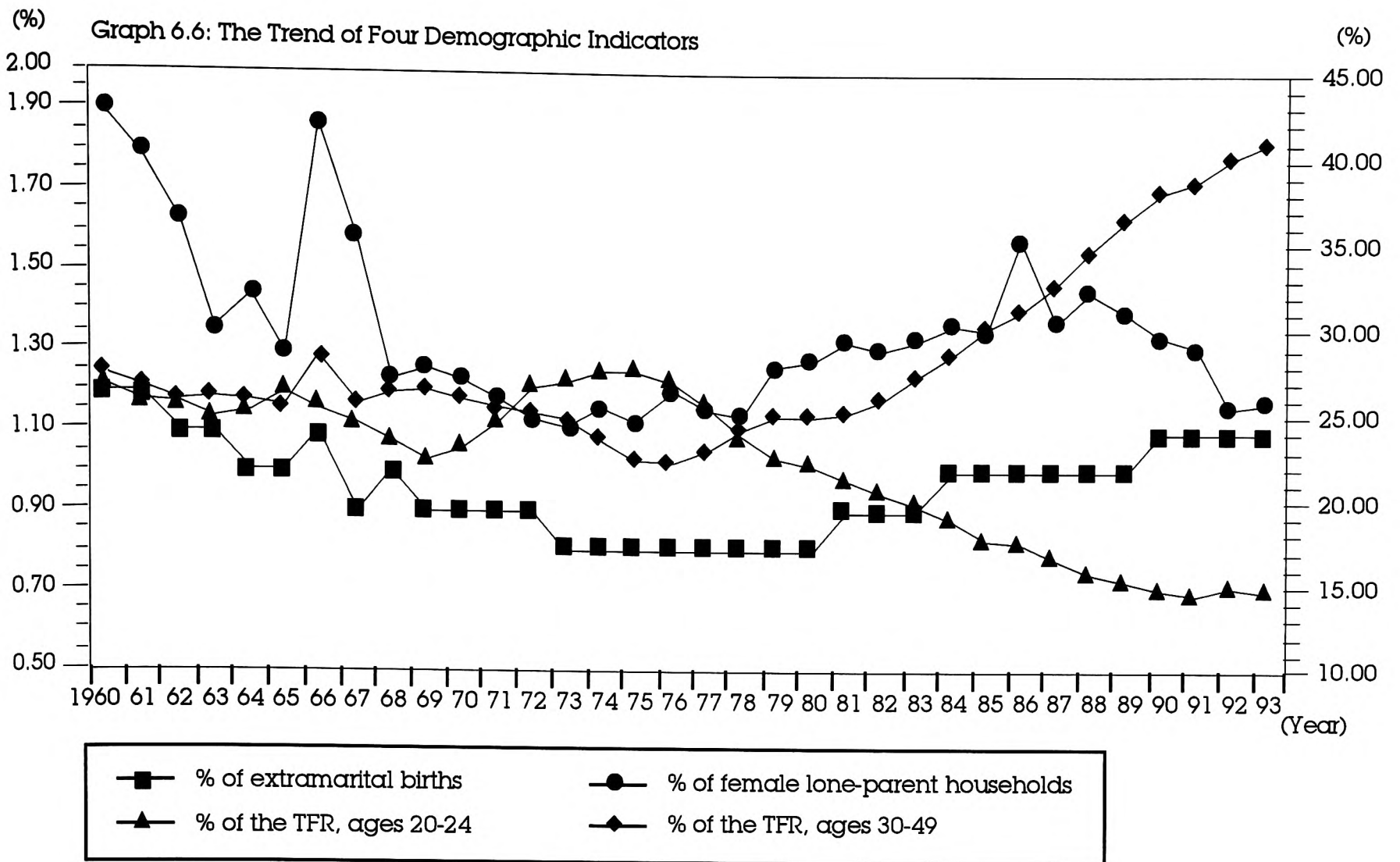


Note: Respondents are women aged from 20 to 50.
 Source: The Mainich Newspaper Company. (1994). In Search of the New Family Model: Summary of Twenty-second National Survey on Family Planning.

A change of attitude may affect the actual reproductive behaviour. In the cross-sectional study of European countries, Lesthaeghe (1995) points out five demographic features caused by ideational changes. The first feature is that the percentage of the fertility rate under age 25 reduces.

Secondly, by its recuperation effect, the percentage of the fertility rate after age 30 rises. Thirdly, the proportion of lone-parent households expands. Fourthly, births out of wedlock increase in number. Fifthly, a growing number of couples lives in consensual unions (=cohabitation).

Unfortunately time-series data concerning cohabitation are not available in Japan. As far as the remaining four features are concerned, the Japanese demographic situation is equivocal (see Graph 6.6). The percentage of the fertility rate from age 20 to 24 fell from 26.98% in 1976 to 14.53% in 1993, whereas that from age 30 to 49 rose from 22.18% to 41.12% during the same period. This change occurred nearly in tandem with the fertility decline after the 1970s. Hence, Lesthaeghe's argument is partly true of the Japanese reproductive pattern. However, the remaining two indicators did not reveal a clear upward trend. The percentage of female lone-parent households and of extramarital births remained quite low and constant. In particular, the low percentage of extramarital births is a marked feature of Japan. To put it another way, Malinowski's 'Principle of Legitimacy' (Malinowski 1930) is considerably maintained in Japan. If this low percentage is related to social disadvantages which children born out of wedlock are confronted with in Japanese society, we can argue that parents are still preoccupied with children's well-being.



Note: The left vertical axis is for the percentage of extramarital births and of female lone-parent households. The right vertical axis is for the two percentages of the TFR
 Source: Ministry of Health and Welfare. (various years). Report of Basic Survey on the Life of the People. Ministry of Health and Welfare. (various years). Vital Statistics.

The complicated picture of attitudinal change in Japan may be due to the fact that the influence of family-related values diminishes at a different pace. Since the Confucian values embodied in the Meiji civil code were regarded as a source of militarism in pre-war Japan, they were discouraged by democratic reforms after the Second World War. Due to this institutional change, the care of aged parents may have become unpopular rapidly. On the other hand, such an external impact was not made on child-related values. Therefore, children may hold an important position in the value pyramid of adults.

6.11 Constructing a Series of Attitudinal Variables

In the previous section, we looked at the trend of attitudes by using the survey results and the official statistics. Our final goal is to examine the

effects of attitudinal variables on a change in marriage and fertility pattern with multi-variate analysis. Before that, we will, in this section, show the procedure of constructing time-series attitudinal data used in the analysis.

In examining the time-series relation between attitudes and demographic behaviour, it is necessary to use a series of survey data with identical questions concerning attitudes related to the family. In particular, since Japanese demographic behaviour began to change in the early 1970s, we have to employ survey data covering the period before and after this change occurred. Furthermore, in order to secure an enough sample size for multi-variate analysis, it is desirable that a survey is fairly regularly conducted at short intervals.

However, replicated surveys satisfying these conditions are rare. Most replicated surveys began to be conducted in the 1970s.¹⁷ Probably the replicated survey which covers the longest period is the National Opinion Survey on Family Planning conducted by the Mainichi Newspaper Company. Although this survey has been carried out since 1950 at intervals of every other year, its questioning items vary from round to round. Among questions including a series of the surveys, we chose the two questions used in the previous section (attitudes towards the care of aged parents and the ideal number of children¹⁸), because the survey has included these questions for the longest period.

Although the two indices of attitudes cover the longest period, it is impossible to obtain annual figures of them; they are the results of biennial surveys. Therefore, we firstly estimated their figures in each intermediate year when the survey was not carried out, by taking the arithmetic mean of the figures of the preceding and the following year. In addition, since

¹⁷ The reason that replicated surveys including attitudinal questions have proliferated since the 1970s is probably that the drastic fertility decline after 1973 has raised much interest in Japanese demographic behaviour.

¹⁸ The former question has been included since 1963, whereas the latter has been asked since 1969.

respondents of the survey are sampled from the national population, figures resulted from the survey are likely to suffer temporary fluctuations. In order to adjust for these fluctuations, we smoothed the time-series data obtained, by taking a three-year centred moving average of the annual figures¹⁹ (=the arithmetic mean of values of year $t-1$, t and $t+1$).

After generating the annual percentages of all answering categories in the two questions under the above procedure, we used two variables as an index of attitudinal change. The first variable is the percentage of respondents who thought of the care of aged parents as a good custom or a natural duty. We regarded this as an index of the attitude toward traditional values. The second variable is the percentages of respondents who wished to have no children or one child, indicating an attitude toward having children.

In addition to these survey data, we used a surrogate variable for attitudinal changes. As has been already mentioned, Lesthaeghe (1995) points out that the reinforcement of individualistic attitudes causing the recent demographic change in European countries manifest themselves in five demographic aspects: cohabitation, extramarital births, lone-parent households, and the fertility rate under age 25 and over age 30. Although time-series data concerning cohabitation are not available, we can obtain data on the remaining four indicators. Therefore, we generated a composite variable²⁰ by using factor analysis and used it as a proxy variable for attitudinal change (we term this composite variable as the 'latent attitudinal variable'). Firstly, common factors latent in the four indicators were extracted with factor analysis. Secondly, the factor score coefficient of each indicator was computed in terms of the first factor. Finally, by multiplying the standardised values of the four indicators (=a mean of 0 and

¹⁹ We used the original figure at the startpoint and the endpoint of the series.

²⁰ For further details of this method, see Krzanowski (1990).

a standard deviation of 1) by the corresponding factor score coefficients, we obtained a value of the latent attitudinal variable in each year. The mathematical expression of this procedure is as follows:

$$F_t = \sum_{i=1}^n W_i X_{it}$$

where F_t is an estimated value of the latent attitudinal variable in year t , X_{it} is the standardised value of the i th variable for year t , and W_i is the factor score coefficient for the i th variable.²¹ This variable will become greater as individualistic attitudes are reinforced.

6.12 Influence of Attitudinal Factors on Marriage and Fertility Pattern

We will, in this section, investigate the influence of the attitudinal variables generated in the previous section on marriage and fertility pattern. We took the first-order difference of variables in the multiple regressions of this section.

The first analysis was carried out to examine the influence of the attitudinal variables on the mean age at first marriage. The result is displayed in Table 6.12. To begin with, the coefficient of the attitude toward traditional values stood at -0.0137, which means that age at marriage rises as more women become less affirmative to the care of aged parents. In contrast, the remaining two attitudinal variables yielded a positive coefficient. The coefficient of the attitude toward children was 0.0452. It follows from this evidence that a diminution in the importance of having children delay the timing of entry to married status. On the other hand, the

²¹ The factor loading and the factor score coefficients of the four indicators are as follows:

Indicator	Factor loading	Factor score coefficient
% of extramarital birth	0.9684	0.4600
% of female lone-parent households	0.9760	0.4861
% of the fertile rate from age 20 to 24	0.1731	-0.1716
% of the fertility rate from age 30 to 49	0.4094	0.1216

coefficient of the latent attitudinal variable was 0.0256. This suggests that the reinforcement of individualistic attitudes raises the mean age at marriage rises.

However, compared with the regressions without these attitudinal variables, the regressions having the variables do not greatly improve their value of adjusted R². When the first regression included the attitudinal variable, its R² rose by about 9%. Similarly, including the attitudinal variable increased R² by about 5% in the second regression, and by about 6% in the third regression. These results indicate that the attitudinal variables have a small impact on the mean age at marriage. Hence, the trend of the mean age at marriage is not sufficiently explained by a shift in attitudes.

Table 6.12: Result of the Regression Analysis of Female Mean Age at First Marriage for the Period 1963-1993 and 1969-1993

Independent Variables	Δ Female Mean Age at Marriage		
	Regression Coefficient		
	(1) 1963-1993	(2) 1969-1993	(3) 1963-1993
Δ Ratio of Women's Wages over Men's Wages	6.0077* (2.4321)	6.6926* (2.9660)	5.4175* (2.4097)
Δ Relative Income	-.2818 (.2911)	-.4362 (.4077)	-.1814 (.3206)
Δ Attitudetoward Traditional Values	-.0137 (.1124)		
Δ Attitude toward Children		.0452 (.0593)	
Δ Latent Attitudinal Variable			.0256 (.0551)
Constant	.0132 (.0345)	.0598 (.0241)	.0294 (.0321)
Adjusted R-Squared	.4437	.3198	.4191
Durbin-Watson	2.1590	1.9221	2.2421
Number of Cases	30	24	30

Adjusted R-Squared (Without Attitudinal Variable)	.3554	.2669	.3554

* P<0.05; ** P<0.01

Note:

Parentheses represent the standard error.

Δ signifies the first order difference.

Attitude toward Traditional Value: the percentage of respondents thinking of the care of aged parents as a good custom or a natural duty.

Attitude toward Children: the percentage of respondents wanting to have no children or a child.

The second analysis was prepared to test the effects of the attitudinal variables on the total female marriage rate, and its result is presented in Table 6.13. The overall impression is that the influence of the three attitudinal variables on the total female marriage rate was the opposite of the mean age at marriage. More specifically, the attitude toward traditional value was positively connected to the marriage rate. This means that the reinforcement of the negative attitude to caring for aged parents decreases the frequency of marriages. In contrast, the attitude toward children and the latent attitudinal variable were negatively related to the marriage rate. Therefore, a low willingness to have children results in a fall in the popularity of marriage. Likewise, marriages are less likely to occur as people become more individualistic.

Nevertheless, as in the case of the mean marriage age, these attitudinal variables have a weak explanatory power over the marriage rate. In the first regression, the value of R^2 was about 6% larger in the model having the attitudinal variable than that not having the variable. Similarly, including the attitudinal variable increased R^2 by approximately 3% in the second regression, and by about 5% in the third regression. Thus, the trend of the total female marriage rate is hardly affected by the attitudinal factors.

Table 6.13: Result of the Regression Analysis of the Total Female Marriage Rate for the Period 1963-1993 and 1969-1993

Independent Variables	Δ Total Female Marriage Rate		
	Regression Coefficient		
	(1) 1963-1993	(2) 1969-1993	(3) 1963-1993
Δ Sex Ratio of Men over Women	-.3188* (.1463)	-.2947* (.1372)	-.3425* (.1563)
Δ Ratio of Women's Wages over Men's Wages	-11.4388 (23.9009)	-13.8273 (37.5970)	-10.0697 (23.3374)
Δ Relative Income	7.9736 (6.1510)	3.4386 (3.5049)	8.0207 (7.1189)
Δ AttitudetowardTraditional Values	.0394 (.1121)		
Δ Attitude toward Children		-.0510 (.7886)	
Δ Latent Attitudinal Variable			-.3943 (.5179)
Constant	-.0596 (.3683)	-.2412 (.2766)	-.1534 (.3323)
Adjusted R-Squared	.4305	.3286	.4191
Durbin-Watson	1.9076	1.9033	2.0421
Number of Cases	30	24	30

Adjusted R-Squared (Without Attitudinal Variable)	.3670	.2841	.3670

* P<0.05; ** P<0.01

Note:

Parentheses represent the standard error.

Δ signifies the first order difference.

Attitude toward Traditional Value: the percentage of respondents thinking of the care of aged parents as a good custom or a natural duty.

Attitude toward Children: the percentage of respondents wanting to have no children or a child.

Subsequently, we will look at the influence of the attitudinal variables on the total fertility rate in Table 6.14. The attitude toward traditional values was positively connected to the total fertility rate, its coefficient being 0.0029. The result indicates that the weakening of Confucian filial values reduces the fertility rate. On the other hand, the attitude toward children and the latent attitudinal variable had a negative effect on the

fertility rate. The coefficient of the former variable stood at -0.0007, whereas that of the latter was -0.0043. Hence, the fertility rate falls as more people want to remain childless or have one child. Likewise, the reinforcement of individualistic attitudes lowers the fertility rate.

However, a change in the total fertility rate over time is not sufficiently accounted for by these attitudinal variables. An improvement in the explanatory power of the regressions brought by these attitudinal variables was quite small. In particular, the figure of R^2 increased by only 2% in the second regression, and by only 1% in the third regression, when they included the attitudinal variables. Ariès (1980) claims that a fertility decline in Western countries over the past decades is attributable to a diminution in the importance of having children (the end of the 'child-king' era). However, the present results suggest that the ideational change does not exert an influence on the Japanese fertility decline. The same is said of the latent attitudinal variable. Lesthaeghe (1991, 1995) argues that the ideational change indicated by extramarital births, lone-parent households, and the fertility rate above age 30 and below age 25, plays an important role in recent demographic changes in Western countries. However, our findings do not support his argument. A definite influence of the latent variable on the trend of the Japanese total fertility rate was not identified.

Retherford, Ogawa and Sakamoto (1996) argue that, since Japanese society still remains at an early stage of an ideational change in attitudes toward children, its demographic pattern after the 1970s can only slightly be explained by attitudinal factors. In fact, as seen in Graph 6.5 and 6.6, indicators of child-related values such as voluntary childless couples and extramarital births have not revealed an upward trend in the past thirty years. This indicates that children still hold an important position in a marital unit. We discover, in the present analysis, the weak influence of the attitudinal factors relative to children on the fertility rate, which supports

their argument.

Table 6.14: Result of the Regression Analysis of the Total Fertility Rate for the Period 1963-1993 and 1969-1993

Independent Variables	Δ Total Fertility Rate		
	Regression Coefficient		
	(1) 1963-1993	(2) 1969-1993	(3) 1963-1993
Δ Logarithm of Male Wages t-1	.1500 (.3089)	.1812 (.2648)	.2472 (.2533)
Δ Logarithm of Female Wages t-1	-.0210 (.0928)	-.0775 (.0684)	-.0911 (.0876)
Δ Relative Income t-1	.1596 (.1563)	.1001 (.1663)	.0810 (.1388)
Δ Abortion Ratio	-.0027* (.0005)	-.0026* (.0006)	-.0023* (.0004)
Δ Attitudetoward Traditional Values t-1	.0029 (.0051)		
Δ Attitude toward Children t-1		-.0007 (.0334)	
Δ Latent Attitudinal Variable t-1			-.0043 (.0289)
Constant	-.0357 (.0201)	-.0748 (.2158)	-.0277 (.1577)
Adjusted R-Squared	.53381	.4656	.4936
Durbin-Watson	1.9779	1.9270	1.9033
Number of Cases	29	23	29

Adjusted R-Squared (Without Attitudinal Variable)	.4818	.4481	.4818

* P<0.05; ** P<0.01

Note:

Parentheses represent the standard error.

Δ signifies the first order difference.

Attitude toward Traditional Value: the percentage of respondents thinking of the care of aged parents as a good custom or a natural duty.

Attitude toward Children: the percentage of respondents wanting to have no children or a child.

Finally, let us examine the mean age of childbearing in Table 6.15. The overall impression of the result is that the influence of the three attitudinal variables on the mean age of childbearing was opposite to that of the total fertility rate. In concrete terms, the coefficient of the attitude

toward traditional values was negative ($=-0.0162$), which means that the mean age of childbearing rises as caring for aged parents becomes less popular. In contrast, the coefficient of the attitude toward children and the latent variable was 0.0091 and 0.1300 each. Thus, an increase in the number of women wanting to have no children or one child results in a rise in the mean age of childbearing. Similarly, the reinforcement of individualistic attitudes raised the age at which women have children.

As in the case of the total fertility rate, these variables had a weak explanatory power to explain a change in the timing of fertility. The figure of R^2 rose from 0.427 in the first regression without the attitudinal variable to 0.485 in the regression having the variable. Likewise, including the attitudinal variable increased R^2 from 0.377 to 0.392 in the second regression, from 0.4274 to 0.4491 in the third regression. These findings suggest that the ideational factors negligibly affect the timing of fertility in Japan. Admittedly, filial duty as indicated by the care of aged parents became unpopular in Japan after the early 1980s (see Graph 6.4), which implies that people tend to be less committed to traditional values and to seek greater individual autonomy. However, this ideational shift has not yet gone as far as the pursuit of one's own goals in exchange for giving up having a child or delaying age at childbearing. This tendency is understood from the very low percentage of women wanting to remain childless in Graph 6.5. To put it another way, children still hold an important position in the Japanese family, and having a child affords satisfaction to parents in Japan.

Table 6.15: Result of the Regression Analysis of the Mean Age of Childbearing for the Period 1963-1993 and 1969-1993

Independent Variables	Δ Mean Age of Childbearing		
	Regression Coefficient		
	(1) 1963-1993	(2) 1969-1993	(3) 1963-1993
Δ Logarithm of Male Wages t-1	-.8970* (.4054)	-.6945* (.3181)	-.7968* (.3891)
Δ Logarithm of Female Wages t-1	.1597 (.1952)	.2633 (.3284)	.2330 (.1581)
Δ Relative Income t-1	-.5725 (.5405)	-.9304 (.5084)	-.7290 (.6794)
Δ Attitude toward Traditional Values t-1	-.0162 (.0090)		
Δ Attitude toward Children t-1		.0091 (.0456)	
Δ Latent Attitudinal Variable t-1			.1300 (.1551)
Constant	.7094* (.2754)	1.1129* (.3294)	.8798* (.3205)
Adjusted R-Squared	.4854	.3927	.4491
Durbin-Watson	1.830	1.8724	1.8796
Number of Cases	29	23	29

Adjusted R-Squared (Without Attitudinal Variable)	.4274	.3772	.4274

* P<0.05; ** P<0.01

Note:

Parentheses represent the standard error.

Δ signifies the first order difference.

Attitude toward Traditional Value: the percentage of respondents thinking of the care of aged parents as a good custom or a natural duty.

Attitude toward Children: the percentage of respondents wanting to have no children or a child.

Conclusion

This chapter examined the determinants of marriage and fertility in post-war Japan. More specifically, the first purpose of this chapter was to discern whether the post-war swings of marriage and fertility can be explained by the New Home Economics theory or by Easterlin's theory. The second purpose was to examine whether attitudinal factors affect a

change in the marriage and fertility pattern of Japan.

The findings presented in this chapter, firstly, suggest that socio-economic factors affect Japanese demographic patterns in the whole post-war period in the way that these theories anticipate. In concrete terms, a reduction in the gains from marriage raised the mean age at marriage, and lowered the total female marriage rate. Men's wages were positively and women's wages were negatively related to the fertility rate. On the other hand, an improvement in the relative economic status of young adults lowered marriage age, and increased the frequency of marriages. In addition, this improvement raised the fertility rate, and lowered the mean age of childbearing.

As a whole, however, the coefficients of socio-economic factors are not significant to Japanese demographic patterns, and this evidence is in marked contrast with the results of the previous chapters. It may be argued that the national-level aggregate data employed in this chapter are not suitable indices for a social change over time. For example, in the analysis of fertility, we used the percentage of men and women going to universities and colleges as an index for the quality of children. However, this index is inappropriate, if the actual enrolment rate in tertiary education does not accurately measure the level of parental aspiration for children's education. Furthermore, national-level aggregate data show only a general trend in socio-economic and demographic patterns. Hence, if a different demographic pattern is observed between the majority and the minority of Japanese people, the behaviour of the latter will hardly appear in figures of aggregated data. In short, aggregate data tend to conceal the heterogeneity of responses to socio-economic changes among the Japanese population.

Secondly, the results of this chapter indicate that the socio-economic factors proposed by the New Home Economics theory are greater than those proposed by Easterlin's theory with regard to their explanatory power

over the post-war movement of marriage and fertility pattern. Therefore, a change in marriage and fertility behaviour in post-war Japan is more greatly explained by the New Home Economics theory than by Easterlin's theory.

The present study, thirdly, suggests that the influence of socio-economic factors on marriage and fertility behaviour differs in the period before and after 1973. In particular, fertility pattern was sufficiently accounted for neither by the New Home Economics model nor Easterlin's model in the post-1973 period. This indicates that the fertility decline after the early 1970s is partly attributable to the influence of other factors.

Fourthly, the findings of this chapter indicates that attitudinal factors play a minor role in the recent demographic changes in Japan. In particular, the two variables indicating the attitudes to children and individuality had a negligible impact on a change in the fertility rate and the mean age of childbearing. This evidence calls the validity of the ideational (=attitudinal) theory to the Japanese demographic situation into question. However, it should be borne in mind that these attitudinal factors affect the Japanese marriage and fertility pattern in the way the ideational theory assumes. More specifically, the weakening of traditional values and the reinforcement of individualistic attitudes tended to raise age at marriage, and lower the fertility rate. Therefore, even though the influence of these attitudinal factors on demographic behaviour is weak, Japanese demographic behaviour is not entirely governed by socio-economic factors.

Chapter 7

Conclusions:

What Determines Demographic Behaviour in Japan?

Introduction

The purpose of this study was to investigate determinants of recent demographic changes in Japan. More specifically, the primary interest of this study is to examine whether Japanese marriage and fertility behaviour have been determined by socio-economic factors or attitudinal factors or both. Following this research interest, the analyses were carried out in the previous chapters, by using micro- and macro- data.

In this final chapter, we will first summarise main arguments and empirical findings presented in the previous chapters. Subsequently, we will conclude this thesis by considering Japanese marriage and fertility behaviour further.

7.1 Theoretical Considerations (Chapter 1)

As a starting point of this thesis, we considered three main theories about the recent fertility decline in industrialised countries: the New Home Economic theory, Easterlin's theory and the ideational (=attitudinal) theory.

In the New Home Economics theory, it is assumed that, under a fixed preference, human fertility behaviour is decided by rational cost-benefit calculation. Fertility behaviour is, in this theory, understood within the same conceptual framework as consumer behaviour. As such, there is no fundamental difference between having children and consuming material goods. Hence, based on the New Home Economic theory, fertility decline in industrialised countries is attributable to economic changes, such as those in wages and prices.

Easterlin's theory deals with a preference for having children in a

slightly flexible way. This theory holds that the motivation behind fertility behaviour is not fixed but changeable. According to Easterlin's theory, one's preference for having children is shaped by economic conditions in one's childhood and adulthood. Therefore, the relative economic status between the two periods of time, dynamically determines human demographic behaviour. It is assumed in the theory that an improvement in relative economic status results in higher fertility and an earlier marriage. Although Easterlin's theory is not constructed on the simple assumption that an individual preference for having children is fixed, it posits that human motivation for having children is still under the influence of economic factors. There is, in this sense, no distinct difference between the New Home Economic theory and Easterlin's theory.

In contrast, a more independent and important role is assigned to human values and attitudes in the ideational theory. According to this theory, the decision-making process in fertility behaviour is affected by social norms and values, so that individual attitudes to having children, more independently of economic factors, have an influence on reproductive patterns. In the ideational theory, a particularly strong emphasis is put on the spread of progressive and individualistic attitudes. The theory holds that this attitudinal change has played a key role in the recent fertility decline in industrialised countries.

From a theoretical viewpoint, it was impossible to decide whether the recent fertility decline in industrialised countries has been caused by socio-economic or attitudinal factors. On the one hand, since children in industrialised countries are no longer economic contributors to the family, they may be viewed as consumer goods bringing non-material satisfaction. This special characteristic of children provides theoretical grounds for applying the frameworks of economic theories (namely, the Becker and Easterlin theory) to demographic analyses in industrialised countries. On

the other hand, the power of community control over individuals tends to weaken and to expand the freedom of individual choice in demographic behaviour. As a result, the reinforcement of progressive attitudes, and the diversification of behavioural patterns are seen in industrialised countries. In addition, the unprecedented prosperity of the post-war period in these countries has changed the priority of human needs. This change can, in Maslow's sense, be regarded as a shift from material needs to personal self-fulfilment needs. Owing to this attitudinal shift, attaining individual goals in the social sphere has become more accentuated. Therefore, it is theoretically reasonable to think that an attitudinal change is related to the fertility change in industrialised countries.

Since the arguments of these three theories are, on the theoretical side, seen as an appropriate explanation of demographic behaviour in industrialised countries, it is, without an empirical analysis, impossible to decide what factor governs marriage and fertility behaviour in Japan. The best way to investigate the determinants of demographic behaviour in Japan is to carry out an empirical analysis taking socio-economic and attitudinal factors into consideration. This was the aim of this study.

7.2 Japanese Demographic Behaviour From a Comparative View (Chapter 2)

The comparative analysis between Japan and other industrialised countries revealed some major differences in terms of Japanese reproductive patterns, although Japan shared a low fertility rate in common with most industrialised countries. First, Japan had a more compressed pattern than Western countries with regard to the timing of fertility. In particular, the majority of Japanese women gave birth to children intensively in their late twenties. Secondly, the distribution of birth orders was quite homogeneous in Japan. The percentage of fourth and higher order births was extremely small, while the cumulative percentage up to the second birth was

considerably great. This homogeneous distribution of birth orders suggests that Japan has the stronger 'two-child' norm than other countries. Thirdly, a change in female age at marriage had a greater impact on the total fertility rate in Japan than in Western countries. This means that one year increase in female age at marriage leads to a greater decline in the fertility rate in Japan. Therefore, marriage pattern is an important proximate determinant of fertility in Japan.

In addition to the characteristics of the Japanese demographic pattern, the analysis of Chapter 2 also revealed similarities and differences between Japan and other industrialised countries in terms of the relation between fertility and its underlying determinants. First, although the association between female wages and the fertility rate did not vary much among the countries, the effect of male wages on the fertility rate differed in Japan and other countries. In concrete terms, Japanese male wages were highest among all countries, but the Japanese total fertility rate was lower than the average of the fertility rates in Western countries. This evidence poses a question as to the relation between income and fertility assumed by the New Home Economics theory. Secondly, Japan was more similar to Western countries than the other Asian industrialised countries with reference to the relation between the fertility rate and the female labour participation rate. The percentage of the female labour participation rate in the 20-29 age group was positively related to the total fertility rates of Japan and the Western countries, but such a positive relation could not be clearly discovered in the other Asian countries. Thirdly, a variation in the extent of religious secularisation did not definitely account for an inter-country variation in the fertility rate. More specifically, as far as the 'World Values Survey' shows, the influence of religion was weakest in Japan, which was the most secularised of all the countries. However, the level of Japanese fertility was almost equal to the average of the fertility rates in

all countries. Similarly, although the percentage of people showing individualistic attitudes differed considerably, the level of fertility was not greatly different between Japan and Western countries.

7.3 Determinants of Marriage Behaviour (Chapter 3)

Marriage pattern is one of the important determinants of fertility. In particular, since most births in Japan have occurred within wedlock, changes in marriage patterns have a significant impact on fertility pattern. Hence, the analysis of marriage behaviour is essential for a full understanding of recent low fertility in Japan.

By using the survey data, we investigated marriage behaviour from two aspects: a tempo and a quantum aspect. Female age at marriage was employed as an index of the tempo aspect; the determinants of marriage probability as an index of the quantum aspect.

The results obtained from the analysis of female age at marriage firstly revealed that socio-economic factors such as educational attainment and occupation had a significant effect on the age at which Japanese women married. More specifically, the higher the level of a woman's education, the later she married. Similarly, women who were engaged in a professional or managerial job married at a later stage than those who were engaged in a clerical or a manual job. Nevertheless, female age at marriage was not entirely determined by socio-economic factors. In the analysis of female age at marriage, attitudinal factors had a significant effect on determining female age at marriage. In particular, women having more progressive attitudes tended to delay their marriage.

The results obtained from the analysis of marriage probability were similar to those from the analysis of female age at marriage. As in the case of female age at marriage, educational attainment and occupation had a significant effect on the probability of female marriage. The higher the

educational attainment, the more women remained unmarried. Likewise, the proportion of women marrying was smaller in the category of a professional or managerial job than in that of a clerical or manual job. On the other hand, attitudinal factors also affected the probability of marriage. More progressive and more individualistic attitudes resulted in a reduction in the proportion of married women.

These findings, in part, support the marriage theory proposed by Becker. The level of income increases in tandem with the level of educational qualifications. Likewise, women who are engaged in a professional job earn more money than those engaged in a clerical job. Therefore, the relations observed in the analyses suggest that the marriage behaviour of Japanese women is affected by the comparative advantage assumed by Becker.

However, it is not appropriate to think that the marriage behaviour of Japanese women is governed exclusively by socio-economic factors. Admittedly, compared with the estimated parameters of socio-economic variables, those of attitudinal variables are smaller. This implies that socio-economic factors have a greater impact on marriage pattern than attitudinal factors. Nevertheless, the effect of attitudinal variables was statistically significant, which indicates that attitudinal factors had an influence on the female marriage pattern in Japan. Therefore, we can conclude that not only socio-economic but also attitudinal factors are important determinants of marriage behaviour in Japan.

7.4 Determinants of the Number of Children (Chapter 4)

Although a marriage pattern is a proximate determinant of fertility, the analysis of marriage behaviour does not go beyond an indirect investigation of fertility pattern. Thus, we, in a more direct way, examined Japanese fertility behaviour. In the analysis of Chapter 4, two kinds of dependent

variable were used: the realised number and the intended number of children.

The findings of this analysis firstly revealed that the level of income had a significant effect on both the realised and the intended number of children. In concrete terms, the higher the husband's income, the more children a couple had (and wanted to have). In contrast, an increase in the wife's income led to a decrease in both the realised and the intended number of children. This is in agreement with the argument of the New Home Economics theory. Secondly, a preference for the quality of children affected the decision regarding the number of children a couple had (and wanted to have). Parents who wanted to give their sons and daughters a better education tended to have fewer children than those for whom it was not a priority. Thirdly, progressive and individualistic attitudes also played a significant role in the realised and intended number of children a couple had. As women showed a stronger progressive and individualistic attitude, the probability of having three or more children was enhanced. In contrast, the reinforcement of progressive and individualistic attitudes increased the probability of having no children or one child.

These findings indicate that both socio-economic and attitudinal factors exert an influence on the quantum aspect of fertility. Admittedly, the influence of socio-economic variables, such as the husband's income, the wife's income and the quality of children, on reproductive behaviour is greater than the influence of attitudinal factors. However, the effect that ideational variables had on the number of children was statistically significant. In this sense, low fertility in contemporary Japan cannot be explained entirely from the viewpoint of economic rationality assumed by the New Home Economics theory. In other words, Japanese married couples are not purely materialistic, and their reproductive behaviour is influenced by values and attitudes.

7.5 Determinants of the Timing of Births (Chapter 5)

The timing of fertility is another important aspect of fertility behaviour. In Chapter 5, we investigated the determinants of the timing of first and second births.

The results obtained from this analysis showed first of all that socio-economic factors influenced the timing of a first birth significantly. Specifically, the higher the wife's educational level, the shorter the interval from her marriage to first birth. In contrast, the length of time from marriage to first birth decreased as the husband's income increased. However, the effects of these socio-economic factors differed on the interval between first to second births. As in the case of the first birth interval, a rise in the level of wife's education resulted in the lengthening of the interval from a first to a second birth. However, the husband's income did not have a statistically significant effect on the second birth interval. These findings imply that, in Japan, the influence of socio-economic factors on the timing of fertility varies among birth orders. The second birth interval is less affected by socio-economic factors than the first birth interval.

Secondly, the analysis revealed that attitudinal factors also significantly affected the timing of first and second births. The reinforcement of individualistic attitudes lengthened first and second birth intervals. On the other hand, as wives expressed more negative attitudes to Japanese traditional values, their first and second births occurred at longer intervals. This evidence shows that the timing of fertility, like the level of fertility, is not entirely determined by socio-economic factors in Japan. Attitudinal factors have a weak but significant influence on the age at which Japanese wives give birth to children.

Thirdly, the wife's age at first birth was a crucial determinant of her second birth interval. In concrete terms, as the wife's age at her first birth

increased, the interval from the first to second birth became shorter. In contrast, the influence of socio-economic and attitudinal variables was weaker on the second birth interval than the first birth interval. This relation implies that socio-economic and attitudinal factors exert a direct influence on the timing of a first birth, which in turn affects the timing of a second birth.

7.6 Post-war Change in Marriage and Fertility Pattern (Chapter 6)

In the analyses of the previous chapters, the time-series change of demographic pattern was little considered. Acknowledging the importance of this aspect, we therefore carried out the time-series analysis of Japanese marriage and fertility behaviour by using macro-data. The first point to be examined in this analysis was whether the post-war swings of nuptiality and fertility pattern were explained by the New Home Economics theory or by Easterlin's theory. The second point was whether attitudinal factors had an influence on the swings of marriage and fertility patterns.

Several findings were obtained from the Chapter 6 analysis. First, economic factors affected the post-war Japanese demographic pattern in the way assumed by the two theories. As argued by the New Home Economics theory, the decline of gains from marriage raised female marriage age, and decreased the frequency of marriages. Moreover, a rise in male income increased the fertility rate, and lowered the mean age of childbearing. In contrast, a rise in women's wages decreased the fertility rate and raised the mean age of childbearing. On the other hand, with regard to Easterlin's theory, an improvement in relative economic status lowered female age at marriage, and increased the general marriage rate. In addition, this improvement also increased the level of fertility, and accelerated the tempo of childbearing.

Secondly, when comparing the two theories, we found that the

variables proposed by the New Home Economics theory had a stronger explanatory power over the post-war changes in marriage and fertility patterns than those proposed by Easterlin's theory. Therefore, the Japanese demographic pattern in the whole post-war period is better explained by the New Home Economics theory than by Easterlin's theory.

However, the analysis, thirdly, showed that, when the whole post-war period was divided into two, these socio-economic factors affected marriage and fertility patterns to a different degree. In particular, the New Home Economics and the Easterlin model has a greater explanatory power over the fertility movement in the period before 1973 than after 1973. Hence, it follows that the two periods have a different relation between demographic behaviour and socio-economic factors.

Fourthly, the results from the analysis did not provide sufficient evidence to prove that attitudinal factors play a significant role in the recent demographic changes. Although the attitude toward Japanese traditional values affected, to some extent, a change in marriage and fertility patterns, the remaining two attitudinal variables had very little effect on these two patterns. This evidence suggests that, from a macro-perspective, a shift in attitude has almost no bearing on the longitudinal swings of Japanese marriage and fertility behaviour. Nevertheless, it should be borne in mind that the estimated coefficients of these attitudinal factors showed the direction that the ideational (=attitudinal) theory predicted. The weakening of Japanese traditional values, a diminution in the importance of having children, and the reinforcement of individualism tended to discourage people from marrying and having children. Therefore, even though the influence of these attitudinal factors is very weak, it would be rash to conclude that recent Japanese demographic changes have resulted entirely from socio-economic factors.

7.8 The Determinants of Demographic Behaviour in Japan

As summarised above, we investigated the determinants of Japanese marriage and fertility behaviour in this study. We will conclude this thesis by considering Japanese demographic behaviour further.

The purpose of this study was to examine the determinants of marriage and fertility behaviour in Japan. As discussed in Chapter 1, the central problem of this study was whether Japanese marriage and fertility behaviour was determined by socio-economic or ideational (attitudinal) factors.

The results derived from the micro-analyses using the survey data indeed showed that attitudinal factors had a significant influence on marriage and reproductive behaviour. This means that not only socio-economic but also attitudinal factors are the determinants of Japanese marriage and reproductive pattern. Hence, when we look at Japanese demographic behaviour on an individual level, we may say that marriage and fertility patterns are not entirely governed by socio-economic factors. Nevertheless, as far as the results from the macro-analyses in Chapter 6 show, the longitudinal swings of marriage and fertility patterns were not definitely linked to a shift in attitude. In particular, the two attitudinal variables hardly had an effect on the swings of marriage and fertility. Thus, if we look at the Japanese demographic phenomena on the national level, we may think that the trend of marriage and fertility in Japan are, as a whole, determined by socio-economic factors. It is, from a macroscopic view, not entirely inappropriate to think that the key determinants of Japanese marriage and reproductive behaviour are socio-economic factors.

These findings suggest that individualistic and progressive attitudes have not been reinforced as greatly as to influence the overall demographic trend of Japan, although they may influence other demographic changes (e.g., household composition and a preference for arranged marriage). Since

the aggregated data used in the macro-analysis of this study show summarised figures for individual observations, only information on an overall trend in people's attitudes is obtained from these figures. Thus, unless the majority of observations show a shift in attitude, the aggregated figures will remain almost unchanged. This is the case with our macro-analysis. As seen in Graph 6.5, the aggregated figures of the ideal number of children did not show a clear change over the past thirty years. Likewise, the percentage of extramarital births and lone-parent households in Graph 6.6 remained almost unchanged. Indeed, we found in the multi-variate analyses using these figures that attitudinal variables bore little relation to the change of marriage and fertility patterns. This clearly indicates that a shift in attitude is not as strong as to affect the overall movement of marriage and fertility pattern.

On the other hand, an analysis using macro-data investigates an association between properties of individual observations. Thus, the analysis reveals whether or not a variable is related to another variable at an individual behavioural level. As shown in the micro-analyses of this study, attitudinal variables had a significant effect on marriage and fertility behaviour. This implies that the attitudinal factors play a crucial role in determining marriage and fertility at an individual behavioural level. In short, although both marriage and fertility behaviour in Japan are affected by socio-economic and ideational factors, the influence of the latter factors is not strong enough change the national demographic trend.

This evidence challenges the cross-cultural validity of the ideational theory. As we discussed in Chapter 1, individualism and secularisation are central concepts in the ideational theory. For instance, Lesthaeghe (1991, 1995) shows that secular individualism is articulated to the leads and lags of the post-war demographic changes in European countries. However, the results of our macro-analyses show that the national demographic trend in

Japan is not sufficiently explained by the ideational theory. In particular, this suggests that secularisation is a culturally specific concept with little contribution to a cross-cultural understanding of changes in marriage and fertility patterns. On one hand, Japan is a secular society, in which only a few people believe in God (see Chapter 2). On the other hand, as is apparent in the prevalence of two-child families, Japanese people show the high degree of conformity to Confucian-informed group-norms. Although this latter characteristics is regarded as a hallmark of a pre-secularised society (Simons, 1986a), the evidence in Chapter 6 indicates that the relation between economic development and attitudinal changes differ among industrialised countries. In Chapter 1, we argued that socio-economic is inextricably linked to attitudinal changes in affluent society. In theory, economic growth produces great prosperity in industrialised countries, so that the latter brings about a shift in attitudes. However, the results of our macro-analyses do not always support this argument. Affluence has caused different changes in attitudes between Japan and other Western industrialised countries.

Moreover, we have to be reminded of the controversy surrounding the fertility trend and its evaluation in industrialised countries, for their low fertility rates are largely induced by a change in the timing of fertility. For instance, although the French total fertility rate was around 1.8 in the 1980s, the cohort rate of women born in the 1950s arrived at the replacement level of fertility (Council of Europe, 1990, 1995). Thus, there has been a flaming controversy about the recent fertility trend and its evaluation in industrialised countries (Le Bras, 1991, 1997; Teitelbaum & Winter, 1985, forthcoming). The Japanese TFR has also been affected by a change in the tempo of fertility. The complete fertility of the 1950s birth cohort in Japan (they reached the midpoint of their reproductive period in the 1980s) satisfied the replacement level of 2.1 children per women (Kôsei

Shô Jinkô Mondai Kenkyû Jo, 1995). In addition, Japan has not displayed a drastic fall in the fertility rate calculated from period parity progression ratios since 1975 (see Graph 4.2). From this evidence, we can see the overwhelming preponderance of two-child families in Japan. In fact, a large proportion of Japanese women have been wanting to have at least two children over the past 20 years, despite expensive housing costs (see Graphs 6.2 & 6.5). The norm regarding family size has persisted in Japan regardless of socio-economic change. As has been argued, we cannot ignore that culture plays a powerful role in governing demographic patterns.

About two hundred years ago, Thomas Robert Malthus advocated moral restraint in 'An Essay on the Principle of Population' (especially in its second edition, 1803). He thought that a decrease in the birth rate brought about by a attitudinal change would improve human well-being. Today, industrialised countries suffer from a low birth rate caused by a change in attitude. If Malthus were to look at our demographic situation, what would he say about it?

Appendix A1: Total Fertility Rates in Industrialised Countries, 1945-1994

The following data are used in Chapters 2 and 6.

Year	Australia	Austria	Belgium	Canada	Denmark	Finland	France	Greece
1945	2.74			3.02				
1946	2.98		2.52	3.37				
1947	3.06		2.46	3.60				
1948	2.98		2.44	3.44				
1949	3.07		2.39	3.46				
1950	3.06		2.35	3.46	2.58	3.16	2.93	
1951	3.06	2.03	2.29	3.50	2.50	3.01	2.79	
1952	3.18	2.06	2.34	3.64	2.54	3.06	2.77	
1953	3.19	2.07	2.33	3.72	2.60	2.96	2.69	2.46
1954	3.19	2.11	2.37	3.83	2.54	2.93	2.70	
1955	3.27	2.23	2.38	3.83	2.58	2.93	2.68	
1956	3.33	2.41	2.42	3.86	2.59	2.91	2.66	2.33
1957	3.42	2.49	2.47	3.93	2.56	2.86	2.68	2.33
1958	3.42	2.52	2.50	3.88	2.54	2.68	2.67	2.27
1959	3.44	2.61	2.56	3.94	2.49	2.75	2.74	2.23
1960	3.45	2.65	2.58	3.90	2.54	2.71	2.73	2.27
1961	3.54	2.80	2.64	3.84	2.55	2.70	2.81	2.19
1962	3.42	2.80	2.59	3.76	2.54	2.66	2.78	2.23
1963	3.33	2.81	2.68	3.67	2.64	2.67	2.88	2.22
1964	3.15	2.77	2.71	3.50	2.60	2.58	2.90	2.31
1965	2.98	2.68	2.61	3.15	2.61	2.47	2.83	2.30
1966	2.88	2.66	2.53	2.81	2.62	2.40	2.78	2.38
1967	2.85	2.63	2.42	2.60	2.35	2.32	2.64	2.55
1968	2.89	2.59	2.31	2.45	2.12	2.14	2.57	2.56
1969	2.89	2.50	2.25	2.41	2.00	1.93	2.53	2.48
1970	2.86	2.31	2.20	2.33	1.95	1.83	2.48	2.34
1971	2.95	2.24	2.21	2.19	2.04	1.68	2.51	2.30
1972	2.74	2.11	2.09	2.02	2.03	1.58	2.43	2.32
1973	2.49	1.95	1.95	1.93	1.92	1.49	2.32	2.28
1974	2.40	1.92	1.83	1.88	1.90	1.61	2.13	2.39
1975	2.22	1.84	1.74	1.85	1.92	1.68	1.93	2.37
1976	2.14	1.70	1.73	1.83	1.75	1.72	1.83	2.39
1977	2.04	1.63	1.71	1.81	1.66	1.69	1.86	2.27
1978	1.93	1.60	1.69	1.78	1.67	1.65	1.82	2.27
1979	1.92	1.60	1.69	1.76	1.60	1.64	1.86	2.26
1980	1.99	1.65	1.69	1.75	1.55	1.63	1.95	2.23
1981	1.94	1.67	1.67	1.70	1.44	1.65	1.95	2.09
1982	1.94	1.66	1.61	1.69	1.43	1.72	1.91	2.02
1983	1.93	1.56	1.56	1.68	1.38	1.74	1.79	1.94
1984	1.88	1.52	1.57	1.69	1.40	1.70	1.81	1.82
1985	1.89	1.47	1.50	1.67	1.45	1.64	1.82	1.68
1986	1.87	1.45	1.54	1.67	1.48	1.60	1.84	1.62
1987	1.85	1.43	1.55	1.66	1.50	1.59	1.82	1.52
1988	1.84	1.44	1.56	1.69	1.56	1.70	1.82	1.52
1989	1.85	1.45	1.58	1.76	1.62	1.71	1.81	1.43
1990	1.91	1.46	1.62	1.83	1.67	1.79	1.78	1.42
1991	1.86	1.50	1.57	1.86	1.67	1.80	1.77	1.40
1992	1.89	1.49	1.56	1.85	1.76	1.85	1.73	1.39
1993	1.87	1.48	1.62	1.82	1.75	1.81	1.65	1.34
1994	1.85	1.45	1.62	1.81	1.81	1.85	1.65	1.34

Year Hong Kong Iceland Ireland Italy Japan Luxembourg Netherlands

1945		3.55				3.97	
1946		3.47		3.01	2.77	3.70	
1947		3.67		2.89	4.63	3.41	
1948		3.72		2.83	4.38	1.99	3.22
1949		3.73		2.54	4.29		3.10
1950		3.86		2.47	3.65		3.06
1951		3.72	3.28	2.37	3.25		3.05
1952		3.79		2.29	2.97	2.07	3.05
1953		3.94	3.58	2.25	2.68		3.04
1954		3.91		2.32	2.47		3.05
1955		4.07	3.26	2.31	2.37	2.13	3.05
1956	4.57	4.14	3.40	2.30	2.22	2.08	3.08
1957		4.20	3.50	2.28	2.04	2.13	3.10
1958		4.09	3.49	2.24	2.11	2.13	3.16
1959		4.24	3.62	2.29	2.04	2.16	3.11
1960	5.17	4.17	3.76	2.41	2.01	2.28	3.12
1961		3.88	3.79	2.41	1.95	2.35	3.22
1962		3.98	3.92	2.46	1.96	2.29	3.18
1963		3.98	4.01	2.55	1.98	2.32	3.19
1964		3.86	4.07	2.70	2.03	2.34	3.17
1965	4.93	3.71	4.03	2.67	2.14	2.38	3.04
1966	4.46	3.58	3.95	2.63	1.60	2.34	2.90
1967	4.23	3.28	3.84	2.54	2.22	2.24	2.81
1968	3.98	3.06	3.78	2.49	2.10	2.12	2.72
1969	3.73	2.98	3.84	2.51	2.06	2.02	2.75
1970	3.49	2.81	3.87	2.43	2.13	1.97	2.57
1971	3.42	2.92	3.98	2.41	2.15	1.92	2.36
1972	3.39	3.09	3.87	2.36	2.18	1.72	2.15
1973	3.28	2.95	3.74	2.34	2.09	1.52	1.90
1974	3.20	2.66	3.62	2.33	1.93	1.55	1.77
1975	2.51	2.65	3.40	2.21	1.91	1.63	1.66
1976	2.58	2.52	3.31	2.11	1.85	1.48	1.63
1977	2.42	2.29	3.27	1.98	1.80	1.45	1.58
1978	2.30	2.35	3.24	1.87	1.79	1.49	1.58
1979	2.13	2.49	3.23	1.76	1.77	1.48	1.56
1980	2.06	2.48	3.23	1.69	1.75	1.50	1.60
1981	1.96	2.32	3.07	1.62	1.74	1.55	1.56
1982	1.86	2.26	2.96	1.59	1.77	1.49	1.47
1983	1.71	2.24	2.76	1.52	1.80	1.44	1.47
1984	1.54	2.08	2.59	1.46	1.81	1.43	1.49
1985	1.47	1.93	2.50	1.41	1.76	1.38	1.51
1986	1.35	1.85	2.44	1.32	1.72	1.44	1.55
1987	1.28	2.05	2.34	1.31	1.69	1.41	1.56
1988	1.36	2.27	2.17	1.34	1.61	1.51	1.54
1989	1.24	2.21	2.11	1.33	1.57	1.52	1.55
1990	1.19	2.31	2.19	1.29	1.54	1.62	1.62
1991	1.28	2.19	2.18	1.26	1.53	1.60	1.61
1992	1.31	2.21	2.11	1.25	1.50	1.67	1.59
1993	1.30	2.22	1.93	1.33	1.44	1.70	1.57
1994	1.33	2.14	1.86	1.26	1.45	1.72	1.58

Year New Zealand Norway Portugal Singapore Spain South Korea Sweden

1945	2.91						
1946	3.25	2.77			3.02		2.57
1947	3.45	2.66			2.90		2.50
1948	3.38	2.57			2.88		2.48
1949	3.33	2.52			2.58		2.39
1950	3.38	2.53			2.46		2.32
1951	3.36	2.47			2.50		2.21
1952	3.52	2.58			2.54		2.23
1953	3.48	2.64			2.60		2.25
1954	3.60	2.67			2.54		2.17
1955	3.72	2.76	3.04		2.58	5.46	2.25
1956	3.77	2.83			2.59	5.33	2.28
1957	3.88	2.83		6.56	2.56	5.40	2.28
1958	3.96	2.86		6.39	2.54	5.94	2.24
1959	4.00	2.88		6.14	2.49	5.98	2.23
1960	4.03	2.83	3.01	5.80	2.86	5.98	2.17
1961	4.16	2.91	3.18	5.46	2.76	6.02	2.21
1962	4.11	2.89	3.21	5.26	2.80	5.85	2.25
1963	3.99	2.91	3.08	5.17	2.88	5.89	2.33
1964	3.73	2.96	3.15	4.95	3.01	5.23	2.47
1965	3.33	2.93	3.08	4.62	2.94	4.95	2.41
1966	3.44	2.89	3.05	4.42	2.91	4.48	2.37
1967	3.35	2.80	3.00	3.95	2.94	4.50	2.28
1968	3.33	2.75	2.90	3.50	2.87	4.66	2.07
1969	3.27	2.70	2.85	3.15	2.86	4.54	1.94
1970	3.16	2.51	2.76	3.10	2.84	4.47	1.94
1971	3.19	2.50	2.80	3.06	2.86	4.54	1.98
1972	3.01	2.39	2.70	3.07	2.82	4.41	1.93
1973	2.70	2.24	2.66	2.81	2.82	4.01	1.88
1974	2.57	2.14	2.60	2.37	2.87	3.75	1.89
1975	2.33	1.99	2.52	2.08	2.79	3.33	1.78
1976	2.27	1.87	2.57	2.11	2.79	3.00	1.69
1977	2.23	1.75	2.45	1.82	2.65	2.94	1.65
1978	2.09	1.77	2.23	1.80	2.53	2.74	1.60
1979	2.13	1.75	2.11	1.79	2.34	2.83	1.66
1980	2.04	1.72	2.19	1.74	2.22	2.71	1.68
1981	2.00	1.70	2.14	1.72	2.03	2.64	1.63
1982	1.95	1.71	2.07	1.71	1.94	2.37	1.62
1983	1.92	1.66	1.95	1.59	1.79	2.09	1.61
1984	1.93	1.66	1.89	1.61	1.72	1.80	1.65
1985	1.93	1.68	1.70	1.62	1.61	1.70	1.73
1986	1.96	1.71	1.63	1.42	1.52	1.62	1.79
1987	2.03	1.75	1.57	1.64	1.46	1.55	1.84
1988	2.10	1.84	1.53	1.98	1.43	1.66	1.96
1989	2.12	1.88	1.48	1.79	1.38	1.54	2.02
1990	2.18	1.93	1.51	1.83	1.30	1.70	2.14
1991	2.16	1.92	1.57	1.82	1.28	1.63	2.11
1992	2.24	1.88	1.54	1.83	1.23	1.69	2.09
1993	2.20	1.86	1.52	1.54	1.26	1.75	2.00
1994	2.12	1.87	1.44	1.58	1.22	1.76	1.88

Year Switzerland Taiwan United Kingdom United States West Germany

1945			2.04	2.48	
1946	2.62		2.46	2.86	
1947	2.56		2.69	3.18	
1948	2.53		2.38	3.03	
1949	2.48		2.26	3.04	
1950	2.40		2.18	3.03	2.09
1951	2.34		2.14	3.20	2.06
1952	2.35		2.16	3.29	2.08
1953	2.30		2.21	3.35	2.08
1954	2.29		2.20	3.46	2.12
1955	2.33	6.53	2.22	3.50	2.13
1956	2.38	6.51	2.35	3.61	2.23
1957	2.44	6.00	2.45	3.68	2.33
1958	2.34	6.06	2.51	3.63	2.32
1959	2.37	5.99	2.53	3.64	2.39
1960	2.44	5.57	2.66	3.61	2.37
1961	2.48	5.61	2.77	3.56	2.46
1962	2.46	5.47	2.84	3.42	2.44
1963	2.68	5.35	2.88	3.30	2.52
1964	2.85	5.10	2.94	3.17	2.54
1965	2.61	4.83	2.86	2.88	2.51
1966	2.47	4.82	2.76	2.67	2.53
1967	2.37	4.22	2.66	2.53	2.49
1968	2.29	4.33	2.58	2.43	2.38
1969	2.12	4.12	2.48	2.42	2.21
1970	2.09	4.00	2.41	2.48	2.02
1971	2.02	3.71	2.38	2.27	1.92
1972	1.90	3.37	2.19	2.01	1.71
1973	1.80	3.21	2.02	1.88	1.54
1974	1.72	3.05	1.90	1.84	1.51
1975	1.60	2.83	1.79	1.77	1.45
1976	1.54	3.08	1.72	1.74	1.45
1977	1.53	2.70	1.69	1.79	1.40
1978	1.51	2.71	1.76	1.76	1.38
1979	1.52	2.66	1.86	1.81	1.38
1980	1.55	2.52	1.89	1.84	1.44
1981	1.54	2.46	1.81	1.81	1.44
1982	1.56	2.32	1.78	1.83	1.41
1983	1.52	2.16	1.77	1.80	1.33
1984	1.53	2.05	1.77	1.81	1.29
1985	1.51	1.89	1.80	1.84	1.28
1986	1.53	1.68	1.78	1.84	1.35
1987	1.51	1.70	1.82	1.87	1.38
1988	1.57	1.85	1.84	1.93	1.40
1989	1.57	1.68	1.81	2.01	1.39
1990	1.59	1.81	1.84	2.08	1.45
1991	1.58	1.72	1.82	2.07	1.42
1992	1.58	1.73	1.79	2.07	1.40
1993	1.51	1.76	1.76	2.05	1.39
1994	1.49	1.76	1.74	2.04	1.34

Source: see Chapters 2 and 6

Appendix A2: Demographic and Socio-economic Developments in Japan, 1950-1993

The following data are used in Chapter 6.

Table A2.1: Population of Japan, by 5 Years of Age

Male					
Year	Age group 0-4	5-9	10-14	15-19	20-24
1950	5,718,000	4,825,000	4,400,000	4,318,000	3,836,000
1951	5,970,000	4,612,000	4,481,000	4,382,000	3,913,000
1952	5,748,000	4,776,000	4,570,000	4,426,000	4,027,000
1953	5,410,000	5,040,000	4,680,000	4,417,000	4,123,000
1954	5,017,000	5,297,000	4,895,000	4,363,000	4,198,000
1955	4,726,000	5,636,000	4,816,000	4,341,000	4,196,000
1956	4,489,000	5,909,000	4,592,000	4,435,000	4,263,000
1957	4,278,000	5,695,000	4,769,000	4,552,000	4,306,000
1958	4,151,000	5,354,000	5,044,000	4,672,000	4,307,000
1959	4,101,000	4,952,000	5,298,000	4,874,000	4,262,000
1960	4,013,000	4,702,000	5,620,000	4,678,000	4,125,000
1961	3,974,000	4,467,000	5,896,000	4,486,000	4,213,000
1962	4,004,000	4,253,000	5,678,000	4,698,000	4,340,000
1963	4,041,000	4,115,000	5,344,000	4,997,000	4,476,000
1964	4,078,000	4,055,000	4,952,000	5,272,000	4,703,000
1965	4,150,000	3,995,000	4,670,000	5,478,000	4,496,000
1966	4,085,000	3,965,000	4,442,000	5,787,000	4,286,000
1967	4,226,000	3,991,000	4,231,000	5,606,000	4,496,000
1968	4,346,000	4,017,000	4,103,000	5,303,000	4,801,000
1969	4,472,000	4,044,000	4,053,000	4,929,000	5,101,000
1970	4,565,000	4,226,000	4,067,000	4,623,000	5,345,000
1971	4,847,000	4,156,000	4,038,000	4,436,000	5,615,000
1972	4,949,000	4,284,000	4,061,000	4,259,000	5,424,000
1973	5,072,000	4,386,000	4,087,000	4,149,000	5,136,000
1974	5,158,000	4,487,000	4,116,000	4,108,000	4,803,000
1975	5,130,000	4,586,000	4,239,000	4,043,000	4,566,000
1976	5,064,000	4,858,000	4,171,000	4,030,000	4,353,000
1977	4,929,000	4,943,000	4,305,000	4,063,000	4,171,000
1978	4,750,000	5,050,000	4,410,000	4,096,000	4,070,000
1979	4,555,000	5,120,000	4,517,000	4,124,000	4,052,000
1980	4,370,000	5,147,000	4,599,000	4,227,000	3,964,000
1981	4,211,000	5,073,000	4,874,000	4,168,000	3,953,000
1982	4,090,000	4,928,000	4,962,000	4,306,000	3,997,000
1983	3,990,000	4,741,000	5,071,000	4,416,000	4,044,000
1984	3,917,000	4,534,000	5,144,000	4,525,000	4,088,000
1985	3,819,000	4,373,000	5,147,000	4,600,000	4,166,000
1986	3,747,000	4,212,000	5,076,000	4,877,000	4,118,000
1987	3,671,000	4,083,000	4,931,000	4,964,000	4,268,000
1988	3,574,000	3,977,000	4,745,000	5,072,000	4,389,000
1989	3,457,000	3,897,000	4,539,000	5,142,000	4,507,000
1990	3,326,000	3,822,000	4,370,000	5,122,000	4,468,000
1991	3,251,000	3,755,000	4,224,000	5,077,000	4,783,000
1992	3,185,000	3,670,000	4,099,000	4,938,000	4,896,000
1993	3,127,000	3,566,000	3,995,000	4,754,000	5,025,000

Male

Year	Age group 25-29	30-34	35-39	40-44	45-49
1950	2,822,000	2,360,000	2,376,000	2,199,000	2,019,000
1951	3,041,000	2,343,000	2,386,000	2,260,000	2,002,000
1952	3,285,000	2,384,000	2,363,000	2,275,000	2,013,000
1953	3,497,000	2,465,000	2,338,000	2,294,000	2,034,000
1954	3,663,000	2,632,000	2,284,000	2,319,000	2,090,000
1955	3,775,000	2,797,000	2,319,000	2,325,000	2,136,000
1956	3,861,000	3,032,000	2,318,000	2,333,000	2,196,000
1957	3,946,000	3,258,000	2,356,000	2,315,000	2,215,000
1958	4,020,000	3,468,000	2,437,000	2,291,000	2,234,000
1959	4,072,000	3,623,000	2,602,000	2,236,000	2,255,000
1960	4,095,000	3,747,000	2,763,000	2,274,000	2,257,000
1961	4,130,000	3,830,000	2,998,000	2,275,000	2,266,000
1962	4,141,000	3,910,000	3,223,000	2,314,000	2,251,000
1963	4,117,000	3,973,000	3,437,000	2,396,000	2,228,000
1964	4,061,000	4,004,000	3,595,000	2,560,000	2,177,000
1965	4,157,000	4,147,000	3,748,000	2,730,000	2,225,000
1966	4,210,000	4,194,000	3,844,000	2,968,000	2,223,000
1967	4,290,000	4,209,000	3,937,000	3,196,000	2,266,000
1968	4,376,000	4,183,000	4,010,000	3,414,000	2,350,000
1969	4,550,000	4,113,000	4,050,000	3,582,000	2,517,000
1970	4,546,000	4,216,000	4,155,000	3,691,000	2,697,000
1971	4,308,000	4,272,000	4,204,000	3,785,000	2,928,000
1972	4,475,000	4,355,000	4,226,000	3,883,000	3,143,000
1973	4,737,000	4,440,000	4,210,000	3,972,000	3,346,000
1974	4,982,000	4,609,000	4,150,000	4,030,000	3,502,000
1975	5,429,000	4,627,000	4,215,000	4,127,000	3,659,000
1976	5,705,000	4,395,000	4,290,000	4,187,000	3,758,000
1977	5,482,000	4,578,000	4,396,000	4,218,000	3,858,000
1978	5,157,000	4,842,000	4,501,000	4,207,000	3,941,000
1979	4,779,000	5,084,000	4,688,000	4,152,000	3,992,000
1980	4,550,000	5,426,000	4,599,000	4,163,000	4,037,000
1981	4,326,000	5,712,000	4,372,000	4,241,000	4,101,000
1982	4,132,000	5,498,000	4,563,000	4,352,000	4,136,000
1983	4,019,000	5,177,000	4,836,000	4,461,000	4,129,000
1984	3,987,000	4,795,000	5,085,000	4,651,000	4,079,000
1985	3,948,000	4,558,000	5,398,000	4,552,000	4,092,000
1986	3,923,000	4,345,000	5,690,000	4,332,000	4,174,000
1987	3,949,000	4,154,000	5,478,000	4,524,000	4,285,000
1988	3,986,000	4,040,000	5,165,000	4,801,000	4,395,000
1989	4,032,000	3,997,000	4,796,000	5,053,000	4,585,000
1990	4,078,000	3,925,000	4,525,000	5,350,000	4,482,000
1991	4,040,000	3,914,000	4,334,000	5,656,000	4,284,000
1992	4,180,000	3,942,000	4,147,000	5,451,000	4,475,000
1993	4,289,000	3,971,000	4,030,000	5,138,000	4,749,000

Male

Year	Age group 50-54	55-59	60-64	65-69	70-74
1950	1,719,000	1,379,000	1,110,000	796,000	540,000
1951	1,775,000	1,429,000	1,136,000	792,000	544,000
1952	1,836,000	1,461,000	1,169,000	813,000	562,000
1953	1,876,000	1,518,000	1,180,000	846,000	567,000
1954	1,909,000	1,556,000	1,198,000	890,000	578,000
1955	1,929,000	1,608,000	1,227,000	919,000	594,000
1956	1,908,000	1,664,000	1,279,000	943,000	593,000
1957	1,930,000	1,714,000	1,315,000	964,000	608,000
1958	1,950,000	1,754,000	1,366,000	980,000	634,000
1959	1,999,000	1,784,000	1,398,000	997,000	667,000
1960	2,041,000	1,802,000	1,438,000	1,027,000	694,000
1961	2,100,000	1,781,000	1,493,000	1,072,000	711,000
1962	2,123,000	1,801,000	1,548,000	1,104,000	730,000
1963	2,145,000	1,822,000	1,588,000	1,151,000	745,000
1964	2,164,000	1,871,000	1,615,000	1,182,000	762,000
1965	2,173,000	1,930,000	1,625,000	1,219,000	789,000
1966	2,187,000	1,987,000	1,615,000	1,270,000	826,000
1967	2,177,000	2,003,000	1,649,000	1,319,000	857,000
1968	2,159,000	2,024,000	1,675,000	1,357,000	896,000
1969	2,114,000	2,050,000	1,723,000	1,386,000	923,000
1970	2,172,000	2,055,000	1,766,000	1,408,000	968,000
1971	2,177,000	2,068,000	1,825,000	1,402,000	1,013,000
1972	2,220,000	2,060,000	1,855,000	1,431,000	1,057,000
1973	2,306,000	2,051,000	1,879,000	1,460,000	1,093,000
1974	2,467,000	2,022,000	1,900,000	1,508,000	1,119,000
1975	2,618,000	2,074,000	1,937,000	1,572,000	1,149,000
1976	2,849,000	2,082,000	1,956,000	1,632,000	1,151,000
1977	3,073,000	2,126,000	1,954,000	1,665,000	1,186,000
1978	3,288,000	2,209,000	1,944,000	1,698,000	1,219,000
1979	9,455,000	2,368,000	1,908,000	1,731,000	1,268,000
1980	3,550,000	2,513,000	1,947,000	1,745,000	1,319,000
1981	3,648,000	2,734,000	1,958,000	1,767,000	1,374,000
1982	3,740,000	2,950,000	2,002,000	1,769,000	1,410,000
1983	3,819,000	3,154,000	2,082,000	1,764,000	1,444,000
1984	3,868,000	3,311,000	2,234,000	1,736,000	1,479,000
1985	3,926,000	3,409,000	2,380,000	1,781,000	1,504,000
1986	3,993,000	3,505,000	2,590,000	1,798,000	1,529,000
1987	4,029,000	3,594,000	2,792,000	1,842,000	1,538,000
1988	4,029,000	3,670,000	2,984,000	1,918,000	1,537,000
1989	3,985,000	3,719,000	3,135,000	2,062,000	1,515,000
1990	3,997,000	3,783,000	3,237,000	2,195,000	1,560,000
1991	4,091,000	3,863,000	3,336,000	2,397,000	1,581,000
1992	4,202,000	3,898,000	3,419,000	2,586,000	1,624,000
1993	4,307,000	3,897,000	3,488,000	2,763,000	1,691,000

Male			
Year	Age group 75-79	80-84	85+
1950	268,000	96,000	29,000
1951	292,000	134,000	134,000
1952	443,000	443,000	443,000
1953	314,000	150,000	150,000
1954	332,000	159,000	159,000
1955	342,000	133,000	40,000
1956	352,000	145,000	42,000
1957	354,000	149,000	45,000
1958	361,000	158,000	49,000
1959	368,000	166,000	53,000
1960	377,000	169,000	56,000
1961	377,000	174,000	61,000
1962	389,000	175,000	63,000
1963	408,000	182,000	66,000
1964	435,000	186,000	71,000
1965	452,000	187,000	74,000
1966	466,000	190,000	79,000
1967	484,000	200,000	82,000
1968	495,000	212,000	84,000
1969	510,000	228,000	87,000
1970	536,000	244,000	90,000
1971	565,000	253,000	93,000
1972	591,000	266,000	100,000
1973	624,000	276,000	107,000
1974	647,000	286,000	115,000
1975	689,000	308,000	123,000
1976	727,000	328,000	128,000
1977	764,000	349,000	138,000
1978	798,000	375,000	148,000
1979	827,000	396,000	162,000
1980	849,000	418,000	172,000
1981	857,000	446,000	185,000
1982	891,000	474,000	201,000
1983	923,000	501,000	219,000
1984	967,000	521,000	234,000
1985	1,017,000	542,000	256,000
1986	1,067,000	551,000	277,000
1987	1,104,000	583,000	301,000
1988	1,138,000	609,000	323,000
1989	1,174,000	645,000	341,000
1990	1,197,000	678,000	357,000
1991	1,228,000	718,000	373,000
1992	1,236,000	749,000	399,000
1993	1,238,000	778,000	423,000

Female

Year	Age group 0-4	5-9	10-14	15-19	20-24
1950	5,487,000	4,697,000	4,300,000	4,250,000	3,890,000
1951	5,734,000	4,480,000	4,384,000	4,299,000	3,961,000
1952	5,519,000	4,626,000	4,462,000	4,338,000	4,027,000
1953	5,188,000	4,867,000	4,567,000	4,329,000	4,102,000
1954	4,802,000	5,102,000	4,775,000	4,274,000	4,158,000
1955	4,521,000	5,406,000	4,692,000	4,284,000	4,207,000
1956	4,291,000	5,667,000	4,466,000	4,357,000	4,268,000
1957	4,083,000	5,465,000	4,620,000	4,459,000	4,303,000
1958	3,957,000	5,139,000	4,868,000	4,567,000	4,291,000
1959	3,907,000	4,750,000	5,100,000	4,760,000	4,235,000
1960	3,832,000	4,502,000	5,397,000	4,631,000	4,193,000
1961	3,792,000	4,277,000	5,661,000	4,412,000	4,272,000
1962	3,815,000	4,071,000	5,453,000	4,585,000	4,381,000
1963	3,845,000	3,936,000	5,135,000	4,847,000	4,491,000
1964	3,875,000	3,880,000	4,751,000	5,088,000	4,694,000
1965	3,984,000	3,854,000	4,513,000	5,374,000	4,572,000
1966	3,915,000	3,824,000	4,291,000	5,657,000	4,346,000
1967	4,037,000	3,845,000	4,086,000	5,467,000	4,520,000
1968	4,132,000	3,866,000	3,959,000	5,162,000	4,788,000
1969	4,230,000	3,890,000	3,912,000	4,779,000	5,047,000
1970	4,343,000	4,041,000	3,911,000	4,544,000	5,383,000
1971	4,597,000	3,975,000	3,882,000	4,334,000	5,670,000
1972	4,682,000	4,095,000	3,899,000	4,140,000	5,477,000
1973	4,793,000	4,187,000	3,921,000	4,017,000	5,160,000
1974	4,865,000	4,281,000	3,944,000	3,966,000	4,793,000
1975	4,875,000	4,356,000	4,046,000	3,909,000	4,509,000
1976	4,806,000	4,612,000	3,981,000	3,879,000	4,290,000
1977	4,675,000	4,691,000	4,106,000	3,898,000	4,098,000
1978	4,499,000	4,797,000	4,202,000	3,922,000	3,983,000
1979	4,309,000	4,864,000	4,298,000	3,943,000	3,948,000
1980	4,151,000	4,891,000	4,367,000	4,050,000	3,883,000
1981	3,998,000	4,821,000	4,626,000	3,984,000	3,857,000
1982	3,881,000	4,686,000	4,708,000	4,107,000	3,885,000
1983	3,783,000	4,506,000	4,817,000	4,206,000	3,914,000
1984	3,714,000	4,310,000	4,886,000	4,305,000	3,943,000
1985	3,640,000	4,159,000	4,895,000	4,380,000	4,035,000
1986	3,567,000	4,006,000	4,826,000	4,634,000	3,979,000
1987	3,491,000	3,885,000	4,691,000	4,712,000	4,110,000
1988	3,392,000	3,786,000	4,512,000	4,818,000	4,209,000
1989	3,278,000	3,712,000	4,317,000	4,884,000	4,306,000
1990	3,167,000	3,645,000	4,157,000	4,885,000	4,332,000
1991	3,089,000	3,574,000	4,012,000	4,821,000	4,609,000
1992	3,022,000	3,492,000	3,896,000	4,687,000	4,698,000
1993	2,966,000	3,390,000	3,797,000	4,511,000	4,811,000

Female

Year	Age group 25-29	30-34	35-39	40-44	45-49
1950	3,363,000	2,842,000	2,672,000	2,284,000	1,986,000
1951	3,480,000	2,888,000	2,711,000	2,404,000	1,966,000
1952	3,587,000	2,986,000	2,713,000	2,471,000	2,010,000
1953	3,681,000	3,105,000	2,721,000	2,527,000	2,059,000
1954	3,782,000	3,256,000	2,699,000	2,585,000	2,160,000
1955	3,829,000	3,320,000	2,796,000	2,621,000	2,232,000
1956	3,896,000	3,442,000	2,856,000	2,656,000	2,348,000
1957	3,974,000	3,540,000	2,949,000	2,663,000	2,418,000
1958	4,051,000	3,633,000	3,066,000	2,672,000	2,477,000
1959	4,099,000	3,727,000	3,211,000	2,648,000	2,530,000
1960	4,115,000	3,771,000	3,275,000	2,745,000	2,560,000
1961	4,169,000	3,835,000	3,396,000	2,807,000	2,598,000
1962	4,203,000	3,909,000	3,494,000	2,902,000	2,607,000
1963	4,194,000	3,981,000	3,588,000	3,021,000	2,614,000
1964	4,143,000	4,023,000	3,680,000	3,166,000	2,594,000
1965	4,207,000	4,110,000	3,751,000	3,232,000	2,697,000
1966	4,278,000	4,170,000	3,821,000	3,360,000	2,753,000
1967	4,371,000	4,210,000	3,899,000	3,460,000	2,850,000
1968	4,462,000	4,206,000	3,976,000	3,555,000	2,970,000
1969	4,642,000	4,153,000	4,021,000	3,652,000	3,117,000
1970	4,602,000	4,226,000	4,118,000	3,703,000	3,223,000
1971	4,378,000	4,303,000	4,182,000	3,774,000	3,349,000
1972	4,559,000	4,402,000	4,226,000	3,865,000	3,441,000
1973	4,824,000	4,500,000	4,224,000	3,959,000	3,518,000
1974	5,065,000	4,685,000	4,172,000	4,020,000	3,602,000
1975	5,370,000	4,622,000	4,211,000	4,100,000	3,706,000
1976	5,652,000	4,386,000	4,293,000	4,163,000	3,777,000
1977	5,445,000	4,557,000	4,399,000	4,206,000	3,858,000
1978	5,130,000	4,811,000	4,504,000	4,206,000	3,940,000
1979	4,751,000	5,044,000	4,696,000	4,158,000	3,991,000
1980	4,498,000	5,352,000	4,609,000	4,180,000	4,059,000
1981	4,278,000	5,637,000	4,375,000	4,263,000	4,124,000
1982	4,082,000	5,436,000	4,547,000	4,372,000	4,167,000
1983	3,962,000	5,125,000	4,801,000	4,482,000	4,167,000
1984	3,921,000	4,750,000	5,034,000	4,677,000	4,119,000
1985	3,875,000	4,496,000	5,340,000	4,583,000	4,144,000
1986	3,844,000	4,280,000	5,625,000	4,352,000	4,227,000
1987	3,864,000	4,085,000	5,423,000	4,525,000	4,335,000
1988	3,883,000	3,965,000	5,113,000	4,782,000	4,443,000
1989	3,910,000	3,923,000	4,742,000	5,017,000	4,636,000
1990	3,992,000	3,862,000	4,479,000	5,308,000	4,536,000
1991	3,944,000	3,836,000	4,275,000	5,601,000	4,318,000
1992	4,075,000	3,858,000	4,084,000	5,404,000	4,491,000
1993	4,177,000	3,881,000	3,965,000	5,100,000	4,748,000

Female

Year	Age group 50-54	55-59	60-64	65-69	70-74
1950	1,669,000	1,370,000	1,194,000	975,000	741,000
1951	1,730,000	1,416,000	1,211,000	962,000	743,000
1952	1,796,000	1,445,000	1,234,000	976,000	765,000
1953	1,844,000	1,504,000	1,239,000	992,000	773,000
1954	1,889,000	1,542,000	1,249,000	1,028,000	783,000
1955	1,920,000	1,598,000	1,270,000	1,048,000	799,000
1956	1,909,000	1,655,000	1,324,000	1,065,000	792,000
1957	1,951,000	1,715,000	1,359,000	1,082,000	801,000
1958	1,998,000	1,764,000	1,414,000	1,097,000	814,000
1959	2,088,000	1,805,000	1,446,000	1,110,000	843,000
1960	2,161,000	1,839,000	1,494,000	1,133,000	870,000
1961	2,274,000	1,827,000	1,554,000	1,184,000	886,000
1962	2,346,000	1,866,000	1,620,000	1,219,000	904,000
1963	2,407,000	1,913,000	1,669,000	1,272,000	920,000
1964	2,458,000	2,004,000	1,708,000	1,308,000	933,000
1965	2,485,000	2,072,000	1,719,000	1,343,000	956,000
1966	2,531,000	2,179,000	1,716,000	1,400,000	1,002,000
1967	2,546,000	2,243,000	1,766,000	1,462,000	1,036,000
1968	2,557,000	2,306,000	1,811,000	1,512,000	1,083,000
1969	2,538,000	2,365,000	1,896,000	1,551,000	1,115,000
1970	2,669,000	2,400,000	1,986,000	1,598,000	1,182,000
1971	2,735,000	2,446,000	2,096,000	1,597,000	1,240,000
1972	2,837,000	2,463,000	2,174,000	1,643,000	1,300,000
1973	2,959,000	2,485,000	2,231,000	1,690,000	1,348,000
1974	3,104,000	2,485,000	2,278,000	1,777,000	1,384,000
1975	3,166,000	2,602,000	2,349,000	1,878,000	1,428,000
1976	3,288,000	2,668,000	2,392,000	1,984,000	1,435,000
1977	3,389,000	2,766,000	2,409,000	2,056,000	1,485,000
1978	3,486,000	2,884,000	2,425,000	2,124,000	1,534,000
1979	3,588,000	3,027,000	2,412,000	2,185,000	1,618,000
1980	3,654,000	3,103,000	2,520,000	2,222,000	1,706,000
1981	3,732,000	3,218,000	2,588,000	2,266,000	1,807,000
1982	3,805,000	3,325,000	2,687,000	2,289,000	1,878,000
1983	3,885,000	3,422,000	2,804,000	2,306,000	1,946,000
1984	3,936,000	3,521,000	2,946,000	2,297,000	2,006,000
1985	4,007,000	3,590,000	3,026,000	2,412,000	2,060,000
1986	4,073,000	3,666,000	3,141,000	2,484,000	2,106,000
1987	4,115,000	3,740,000	3,245,000	2,583,000	2,131,000
1988	4,115,000	3,817,000	3,339,000	2,698,000	2,153,000
1989	4,070,000	3,866,000	3,439,000	2,837,000	2,149,000
1990	4,091,000	3,942,000	3,508,000	2,909,000	2,258,000
1991	4,176,000	4,014,000	3,586,000	3,032,000	2,329,000
1992	4,283,000	4,055,000	3,663,000	3,135,000	2,429,000
1993	4,388,000	4,055,000	3,740,000	3,229,000	2,539,000

Female

Year	Age group 75-79	80-84	85+
1950	418,000	180,000	67,000
1951	454,000	256,000	256,000
1952	748,000	748,000	748,000
1953	492,000	295,000	295,000
1954	516,000	314,000	314,000
1955	534,000	245,000	94,000
1956	546,000	266,000	100,000
1957	552,000	277,000	106,000
1958	563,000	293,000	116,000
1959	571,000	308,000	126,000
1960	578,000	314,000	132,000
1961	574,000	321,000	142,000
1962	585,000	325,000	149,000
1963	599,000	333,000	161,000
1964	628,000	341,000	170,000
1965	644,000	341,000	176,000
1966	660,000	342,000	185,000
1967	680,000	354,000	193,000
1968	695,000	366,000	199,000
1969	712,000	390,000	207,000
1970	744,000	413,000	210,000
1971	784,000	426,000	216,000
1972	819,000	445,000	228,000
1973	264,000	459,000	239,000
1974	895,000	472,000	253,000
1975	953,000	501,000	268,000
1976	1,005,000	533,000	278,000
1977	1,058,000	565,000	294,000
1978	1,107,000	604,000	313,000
1979	1,148,000	636,000	337,000
1980	1,188,000	676,000	357,000
1981	1,200,000	721,000	384,000
1982	1,252,000	769,000	416,000
1983	1,304,000	814,000	451,000
1984	1,384,000	849,000	484,000
1985	1,476,000	891,000	529,000
1986	1,572,000	908,000	578,000
1987	1,645,000	962,000	632,000
1988	1,713,000	1,012,000	682,000
1989	1,775,000	1,085,000	727,000
1990	1,821,000	1,154,000	765,000
1991	1,875,000	1,240,000	808,000
1992	1,900,000	1,309,000	875,000
1993	1,923,000	1,374,000	942,000

Source: Sômuchô Tôkei kyoku. (various years). Kokusei Chôsa Hôkoku.
Sômuchô Tôkei kyoku. (various years). Jinkô Suikei Shiryô.

Table A2.2: Mean Age at First Marriage

Year	Men	Women
1950	25.9	23.0
1951	25.9	23.1
1952	26.1	23.3
1953	26.2	23.4
1954	26.4	23.6
1955	26.6	23.8
1956	26.8	23.9
1957	26.9	24.0
1958	27.0	24.2
1959	27.1	24.3
1960	27.2	24.4
1961	27.3	24.5
1962	27.3	24.5
1963	27.3	24.5
1964	27.3	24.4
1965	27.2	24.5
1966	27.3	24.5
1967	27.2	24.5
1968	27.2	24.4
1969	27.1	24.3
1970	26.9	24.2
1971	26.8	24.2
1972	26.7	24.2
1973	26.7	24.3
1974	26.8	24.5
1975	27.0	24.7
1976	27.2	24.9
1977	27.4	25.0
1978	27.6	25.1
1979	27.7	25.2
1980	27.8	25.2
1981	27.9	25.3
1982	28.0	25.3
1983	28.0	25.4
1984	28.1	25.4
1985	28.2	25.5
1986	28.3	25.6
1987	28.4	25.7
1988	28.4	25.8
1989	28.5	25.8
1990	28.4	25.9
1991	28.4	25.9
1992	28.4	26.0
1993	28.4	26.1

Source: Kōseishō Daijinkambō Tōkei Jōhō Bu. (various years). Jinkō Dōtai Tōkei.

Table A2.3: The Numbers of Marriages and Divorces

Year	The total number of marriages	Male first marriages	Female first marriages	Divorces
1950				83,689
1951				82,331
1952				79,021
1953				75,255
1954				76,759
1955	714,861	626,394	656,591	75,267
1956	715,934	631,134	659,673	72,040
1957	773,362	687,680	717,305	71,651
1958	826,902	741,221	771,529	74,004
1959	847,135	763,252	793,413	72,455
1960	866,115	782,021	812,597	69,410
1961	890,158	808,483	838,354	69,323
1962	928,341	843,934	874,667	71,394
1963	937,516	855,688	884,756	69,996
1964	963,130	880,175	909,165	72,306
1965	954,852	872,649	900,304	77,195
1966	940,120	860,197	886,108	79,432
1967	953,096	871,919	897,156	83,478
1968	956,312	876,803	900,586	87,327
1969	984,142	902,251	925,538	91,280
1970	1,029,405	943,783	967,716	95,937
1971	1,091,229	1,003,381	1,026,772	103,595
1972	1,099,984	1,011,042	1,032,967	108,382
1973	1,071,923	983,035	1,002,656	111,877
1974	1,000,455	911,808	929,824	113,622
1975	941,628	855,825	871,445	119,135
1976	871,543	787,521	801,264	124,512
1977	821,029	738,321	750,756	129,485
1978	793,257	710,875	722,577	132,146
1979	788,505	704,321	715,551	135,250
1980	774,702	690,885	701,415	141,689
1981	776,531	691,448	702,259	154,221
1982	781,252	693,990	704,840	163,980
1983	762,552	675,514	686,477	179,150
1984	739,991	652,618	663,021	178,746
1985	735,850	646,241	656,609	166,640
1986	710,962	620,754	630,353	166,054
1987	696,173	605,675	615,148	158,227
1988	707,716	613,919	623,743	153,600
1989	708,316	611,963	623,485	157,811
1990	722,138	625,453	637,472	157,608
1991	742,264	645,790	657,715	168,969
1992	754,441	667,540	669,760	179,191
1993	792,658	692,214	704,929	188,297

Source: Kōseishō Daijinkanbō Tōkei Jōhō Bu. (various years). Jinkō Dōtai Tōkei.

Table A2.4: Age-Specific Fertility Rates

Year	Age group						
	15-19	20-24	25-29	30-34	35-39	40-44	45-49
1950	0.01	0.16	0.24	0.18	0.10	0.04	0.00
1951	0.01	0.14	0.22	0.16	0.09	0.03	0.00
1952	0.01	0.13	0.21	0.15	0.08	0.02	0.00
1953	0.01	0.12	0.19	0.13	0.07	0.02	0.00
1954	0.01	0.11	0.18	0.12	0.06	0.02	0.00
1955	0.01	0.11	0.18	0.11	0.05	0.01	0.00
1956	0.01	0.11	0.18	0.10	0.04	0.01	0.00
1957	0.00	0.10	0.17	0.09	0.04	0.01	0.00
1958	0.00	0.11	0.18	0.09	0.03	0.01	0.00
1959	0.00	0.11	0.18	0.08	0.03	0.01	0.00
1960	0.00	0.11	0.18	0.08	0.02	0.01	0.00
1961	0.00	0.10	0.18	0.08	0.02	0.00	0.00
1962	0.00	0.10	0.19	0.08	0.02	0.00	0.00
1963	0.00	0.10	0.19	0.08	0.02	0.00	0.00
1964	0.00	0.10	0.20	0.08	0.02	0.00	0.00
1965	0.00	0.11	0.20	0.09	0.02	0.00	0.00
1966	0.00	0.09	0.15	0.06	0.02	0.00	0.00
1967	0.00	0.11	0.22	0.09	0.02	0.00	0.00
1968	0.00	0.10	0.21	0.09	0.02	0.00	0.00
1969	0.00	0.09	0.21	0.09	0.02	0.00	0.00
1970	0.00	0.10	0.21	0.09	0.02	0.00	0.00
1971	0.00	0.11	0.21	0.09	0.02	0.00	0.00
1972	0.00	0.12	0.21	0.09	0.02	0.00	0.00
1973	0.00	0.12	0.21	0.09	0.02	0.00	0.00
1974	0.00	0.12	0.20	0.08	0.02	0.00	0.00
1975	0.00	0.11	0.19	0.07	0.01	0.00	0.00
1976	0.00	0.10	0.18	0.07	0.01	0.00	0.00
1977	0.00	0.09	0.18	0.07	0.01	0.00	0.00
1978	0.00	0.09	0.18	0.07	0.01	0.00	0.00
1979	0.00	0.08	0.18	0.07	0.01	0.00	0.00
1980	0.00	0.08	0.18	0.07	0.01	0.00	0.00
1981	0.00	0.07	0.18	0.07	0.01	0.00	0.00
1982	0.00	0.07	0.18	0.07	0.01	0.00	0.00
1983	0.00	0.07	0.19	0.08	0.02	0.00	0.00
1984	0.00	0.07	0.18	0.08	0.02	0.00	0.00
1985	0.00	0.06	0.18	0.09	0.02	0.00	0.00
1986	0.00	0.06	0.17	0.09	0.02	0.00	0.00
1987	0.00	0.06	0.17	0.09	0.02	0.00	0.00
1988	0.00	0.05	0.16	0.09	0.02	0.00	0.00
1989	0.00	0.05	0.15	0.09	0.02	0.00	0.00
1990	0.00	0.04	0.14	0.09	0.02	0.00	0.00
1991	0.00	0.04	0.14	0.09	0.02	0.00	0.00
1992	0.00	0.04	0.13	0.09	0.02	0.00	0.00
1993	0.00	0.04	0.13	0.09	0.02	0.00	0.00

Source: Kōseishō Daijinkanbō Tōkei Jōhō Bu. (various years). Jinkō Dōtai Tōkei.

Table A2.5: Infant Mortality, Abortion and Childbearing Age

Year	Infant mortality rate (per 1,000 live births)	Abortion ratio (per 1,000 live births)	Mean age of childbearing
1950	60.1		
1951	57.5		
1952	49.4		
1953	48.9		
1954	44.6		
1955	39.8	50.2	28.9
1956	40.6	48.7	28.6
1957	40.0	46.2	28.4
1958	34.5	45.6	28.2
1959	33.7	43.6	28.1
1960	30.7	42.0	27.9
1961	28.6	40.6	27.8
1962	26.4	37.8	27.7
1963	23.2	35.7	27.7
1964	20.4	32.1	27.7
1965	18.5	30.2	27.7
1966	19.3	28.5	27.7
1967	14.9	26.0	27.8
1968	15.3	26.0	27.8
1969	14.2	25.3	27.8
1970	13.1	24.8	27.8
1971	12.4	24.9	27.7
1972	11.7	24.5	27.7
1973	11.3	23.2	27.6
1974	10.8	22.4	27.5
1975	10.0	22.1	27.5
1976	9.3	21.8	27.5
1977	8.9	21.1	27.6
1978	8.4	20.3	27.6
1979	7.9	20.1	27.7
1980	7.5	19.5	27.8
1981	7.1	19.5	27.8
1982	6.6	19.3	27.9
1983	6.2	18.5	28.0
1984	6.0	18.5	28.2
1985	5.5	17.8	28.3
1986	5.2	17.1	28.4
1987	5.0	16.0	28.6
1988	4.8	15.6	28.7
1989	4.6	14.9	28.8
1990	4.6	14.5	29.0
1991	4.4	13.9	29.0
1992	4.5	13.2	29.1
1993	4.3	12.4	29.2

Source: Kôseishô Daijinkanbô Tôkei Jôhô Bu. (various years). Jinkô Dôtai Tôkei
Kôseishô Daijinkanbô Tôkei Jôhô Bu. (various years). Yûsei Hogo Tôkei Hôkoku.

Table A2.6: Mean Mother's Age at Birth

Year	First birth	Second birth	Third birth	Fourth birth
1950				
1951				
1952				
1953				
1954				
1955	25.1	27.6	29.9	32.0
1956	25.2	27.6	30.0	32.1
1957	25.4	27.7	30.0	32.1
1958	25.4	27.8	30.1	32.2
1959	25.5	27.9	30.1	32.3
1960	25.6	28.0	30.1	32.2
1961	25.7	28.1	30.1	32.2
1962	25.8	28.2	30.2	32.2
1963	25.9	28.3	30.2	32.3
1964	25.9	28.4	30.3	32.3
1965	25.9	28.5	30.4	32.3
1966	25.9	28.5	30.6	32.5
1967	25.9	28.5	30.6	32.4
1968	25.9	28.6	30.7	32.5
1969	25.9	28.5	30.7	32.5
1970	25.8	28.5	30.8	32.6
1971	25.8	28.4	30.7	32.5
1972	25.7	28.4	30.7	32.5
1973	25.6	28.3	30.6	32.5
1974	25.6	28.2	30.6	32.5
1975	25.7	28.2	30.5	32.5
1976	25.7	28.1	30.4	32.3
1977	25.9	28.2	30.4	32.3
1978	26.0	28.3	30.4	32.4
1979	26.0	28.4	30.4	32.3
1980	26.1	28.4	30.5	32.3
1981	26.2	28.5	30.6	32.4
1982	26.3	28.6	30.7	32.5
1983	26.3	28.7	30.9	32.6
1984	26.4	28.8	31.0	32.7
1985	26.5	28.8	31.0	32.8
1986	26.7	28.9	31.1	33.0
1987	26.8	29.1	31.3	33.0
1988	26.9	29.2	31.4	33.2
1989	27.1	29.3	31.5	33.3
1990	27.2	29.5	31.6	33.5
1991	27.2	29.6	31.8	33.6
1992	27.4	29.7	31.9	33.7
1993	27.5	29.8	32.0	33.8

Source: Kōseishō Daijinkanbō Tōkei Jōhō Bu. (various years). Jinkō Dōtai Tōkei

Table A2.7: Unemployment Rate and the Percentage of Persons Engaged in Primary Industry

Year	Male unemployment rate (%)	Female unemployment rate (%)	The percentage of men engaged in primary industry (Ages 20-64)	The percentage of women engaged in primary industry (Ages 20-64)
1950	1.28	1.05	43.0	64.0
1951	1.08	0.97	38.9	61.9
1952	1.36	1.13	36.5	55.3
1953	1.11	1.23	36.5	55.0
1954	1.40	1.45	35.3	50.7
1955	1.61	1.60	35.0	48.9
1956	1.40	1.50	33.1	47.9
1957	1.05	1.35	31.1	46.9
1958	1.28	1.29	29.4	45.8
1959	1.25	1.40	28.2	44.8
1960	0.89	1.15	26.8	43.8
1961	0.78	1.03	24.8	42.8
1962	0.69	1.13	22.5	40.7
1963	0.72	1.18	20.9	38.3
1964	0.64	1.06	19.6	36.1
1965	0.62	1.21	18.6	34.8
1966	0.71	1.28	16.4	33.0
1967	1.26	1.33	15.5	31.2
1968	1.18	1.15	14.5	25.6
1969	1.20	1.15	14.0	25.0
1970	1.18	0.99	13.0	23.5
1971	1.29	1.15	11.7	21.5
1972	1.47	1.26	10.7	20.0
1973	1.32	1.17	9.7	18.1
1974	1.43	1.25	9.3	16.4
1975	2.01	1.76	5.6	15.8
1976	2.20	1.69	8.9	15.5
1977	2.16	1.88	8.7	14.5
1978	2.38	2.02	8.7	13.7
1979	2.15	1.99	8.2	13.3
1980	2.08	1.97	7.7	12.5
1981	2.31	2.17	7.4	11.4
1982	2.39	2.27	7.2	10.5
1983	2.69	2.58	6.9	10.0
1984	2.66	2.77	6.7	9.1
1985	2.58	2.70	6.7	8.7
1986	2.73	2.84	6.4	8.3
1987	2.87	2.80	6.3	7.9
1988	2.46	2.63	6.1	7.4
1989	2.20	2.29	5.8	7.0
1990	2.06	2.16	5.5	6.4
1991	1.97	2.26	5.3	6.0
1992	2.10	2.20	5.1	5.3
1993	2.41	2.69	4.8	4.9

Source: Sômuchô Tôkei kyoku. Rôdôryoku Chôsa Nenpô

Sômuchô Tôkei kyoku. (various years). Shûgyô Kôzôu Kihon Chôsa.

Table A2.8: Monthly Wages and Housing Cost

Year	Men's monthly wage (yen)	Women's monthly wage (yen)	Housing cost (yen)
1950	12,613	6,044	
1951	14,051	6,496	
1952	16,782	7,533	
1953	19,559	8,617	1,165
1954	20,098	9,143	1,224
1955	21,349	9,479	1,331
1956	23,527	10,112	1,625
1957	25,272	10,597	1,819
1958	25,051	10,616	2,239
1959	26,811	11,427	2,600
1960	22,000	9,900	2,790
1961	23,900	11,000	3,399
1962	27,200	13,100	3,951
1963	29,700	14,600	3,827
1964	32,100	16,000	4,178
1965	35,500	18,200	4,435
1966	38,900	19,900	4,823
1967	42,800	21,700	5,318
1968	51,200	25,800	6,451
1969	58,000	29,200	7,551
1970	68,400	35,200	8,418
1971	77,000	40,600	9,482
1972	88,300	46,900	10,240
1973	107,500	58,900	11,731
1974	133,400	75,200	10,712
1975	148,200	83,600	11,809
1976	166,100	93,500	12,966
1977	182,800	102,800	14,274
1978	194,900	109,700	14,892
1979	207,000	116,000	15,973
1980	221,000	124,000	16,846
1981	235,000	132,000	17,768
1982	246,000	138,000	18,231
1983	254,000	143,000	19,054
1984	265,000	148,000	20,060
1985	274,000	154,000	20,191
1986	281,000	160,000	21,068
1987	287,000	165,000	22,829
1988	297,000	170,000	23,599
1989	311,000	177,000	23,809
1990	327,000	187,000	23,741
1991	341,000	196,000	26,774
1992	345,200	201,750	29,311
1993	349,400	207,500	18,725

Source: Rôdôshô. (various years). Chingin Kôzô Kihon Tôkei Chôsa.

Table A2.8: The Percentage of Men and Women Going to Universities and Colleges

Year	Men and Women	Men	Women
1950			
1951			
1952			
1953			
1954	10.1	15.3	4.6
1955	10.1	15.0	5.0
1956	9.8	14.7	4.9
1957	11.2	16.8	5.4
1958	10.7	16.0	5.2
1959	10.1	15.0	5.1
1960	10.3	14.9	5.5
1961	11.8	16.9	6.5
1962	12.8	18.1	7.4
1963	15.4	21.7	9.0
1964	19.9	27.9	11.6
1965	17.0	22.4	11.3
1966	16.1	20.2	11.8
1967	17.9	22.2	13.4
1968	19.2	23.8	14.4
1969	21.4	26.6	16.1
1970	23.6	29.2	17.7
1971	26.8	32.5	20.8
1972	29.8	35.7	23.7
1973	32.2	37.5	26.6
1974	34.7	39.9	29.3
1975	37.8	43.0	32.4
1976	38.6	43.3	33.6
1977	37.7	41.9	33.3
1978	38.4	43.1	33.5
1979	37.4	41.5	33.1
1980	37.4	41.3	33.3
1981	36.9	40.5	33.0
1982	36.3	39.8	32.7
1983	35.1	37.9	32.2
1984	35.6	38.3	32.8
1985	37.6	40.6	34.5
1986	34.7	35.9	33.5
1987	36.1	37.1	35.1
1988	36.7	37.2	36.2
1989	36.3	35.8	36.8
1990	36.3	35.2	37.4
1991	37.7	36.3	39.2
1992	38.9	37.0	40.8
1993	40.9	38.5	43.4

Source: Monbushô. (various years). Gakkô Kihonchôsa Hôkokusho.

Appendix A3: List of Official Sources

Japan

Kokudo Chô [The National Land Agency]. (various years). *Chika Kôji [The Assessed Value of Land]*.

Kôseishô Daijinkanbô Tôkei Jôhû Bu [Statistics and Information Department, Ministry of Health and Welfare]. (various years). *Yûsei Hogo Tôkei Hôkoku [Eugenics Protection Statistics Report]*.

Kôseishô Daijinkanbô Tôkei Jôhû Bu [Statistics and Information Department, Ministry of Health and Welfare]. (various years). *Jinkô Dôtai Tôkei [Vital Statistics]*.

Kôseishô Daijinkanbô Tôkei Jôhû Bu [Statistics and Information Department, Ministry of Health and Welfare]. (various years). *Kokumin Seikatu Kiso Chôsa Hôkoku [Report of Basic Survey on the Life of the People]*.

Monbushô [Ministry of Education]. (various years). *Gakkô Kihonchôsa Hôkokusho [Report on the Basic Survey of Schools]*.

Rôdôshô [Ministry of Labour]. (various years). *Chingin Kôzô Kihon Tôkei Chôsa [Basic Survey on Wage Structure]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Jinkô Suikei Shiryô [Population Estimates Series]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Kakei Chôsa [Survey on Household Expenditure]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Kokusei Chôsa Hôkoku [Population Census]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various issues). 'Rôdôryoku Chôsa Hôkoku [Monthly Report on the Labour Force Survey]

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Rôdôryoku Chôsa Nenpô [Annual Report on Labour Force Survey]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Shôhi Shaya Bukka Shisû Nenpô [Annual Report on Consumer's Price Index]*.

Sômuchô Tôkei Kyoku [Statistics Bureau, Management and Coordination Agency]. (various years). *Shûgyô Kôzô Kihon Chôsa [Employment Status Survey]*.

Other Countries

Australian Bureau of Statistics. (1996). *Australian Demographic Statistics*.

Bank of Korea. (1995). *Principal Economic Indicators*.

Census and Statistics Department of Hong Kong. (various years). *Hong Kong Annual Digest of Statistics*.

Census and Statistics Department, Hong Kong. (various issues). *Hong Kong Monthly Digest of Statistics*.

Census and Statistics Department, Hong Kong. (various years). *Hong Kong Social and Economic Trends*.

Census Office of the Executive Yuan, Republic of China. (1992). *An Extract Report on the 1990 Census of Population and Housing, Taiwan-Fukien Area*

Commissioner for Labour. (1983). *Hong Kong Annual Departmental Report*.

Council for Economic Planning and Development, Taiwan. (1996). *Industry of Free China*.

Council of Europe. (1990). *Cohort Fertility in Member States of the Council of Europe*.

Council of Europe. (1993). *Recent Demographic Development in Europe and North America, 1992*.

Council of Europe. (1995). *Recent Demographic Development in Europe, 1995*.

Directorate-General of Budget, Accounting and Statistics Executive Yuan. (various years). *Statistical Yearbook of the Republic of China*.

Directorate-General of Budget, Accounting and Statistics Executive Yuan. (various years). *Social Indicators in Taiwan Area of the Republic of China*.

Directorate-General of Budget, Accounting and Statistics Executive Yuan. (various years). *Yearbook of Earnings and Productivity Statistics Taiwan Area, Republic of China*.

Economic and Social Commission for Asia and the Pacific, the United Nations. (various year). *Statistical Yearbook for Asia and the Pacific*.

Eurostat. (1996). *Demographic Statistics 1996*.

International Labour Office. (various years). *Yearbook of Labour Statistics*.

International Monetary Fund. (various years). *International Financial Statistics*.

Ministry of Education, Singapore. (1993). *Education Statistics Digest 1994*.

Ministry of Trade and Industry, Singapore. (various issues). *Economic Survey of Singapore*.

National Bureau of Statistics, Republic of Korea. (1992). *1990 Population and Housing Census Report*.

National Bureau of Statistics, Republic of Korea. (1994). *Korea Statistical Yearbook*.

National Statistics Office, Republic of Korea. (various years). *Annual Report on the Vital Statistics*.

New Zealand Census and Statistics Department. (1996). *Vital statistics*.

Organisation for Economic Co-operation and Development. (various years). *National Accounts*.

Registrar-General of Births and Deaths, Republic of Singapore. (1988). *Report on Registration of Births and Deaths*.

Statistical Office of the United Nations. (various issues). *Monthly Bulletin of Statistics*.

Superintendent of Census, Department of Statistics, Singapore. (1992). *Singapore Census of Population 1990*.

The Ministry of Interior, Republic of China. (1995). *Taiwan-Fukien Demographic Fact Book, Republic of China.*

UNESCO. (various years). *Statistical Yearbook.*

United Nations, Department of International Economic and Social Affairs. (1989). *Levels and Trends of Contraceptive Use As Assessed in 1989.*

United Nations. (1988). *World Population Trends and Politics: 1987 Monitoring Report.*

United Nations. (1994). *The Sex and Age Distribution of the World Populations: the 1994 Revision.*

United Nations. (various issues). *Monthly Bulletin of Statistics.*

United Nations. (various years). *Demographic Yearbook.*

Appendix A4: Response Bias in the Survey

As was mentioned in Chapter 1, this survey was conducted from June 1 to July 15 in 1995. Since the population of this survey consisted of married and unmarried women between the ages of 20 and 49 from the entire country, it is important whether the obtained data reproduced the distribution of its population in terms of basic properties. If a collected sample has a bias concerning certain properties, it does not represent its population accurately. In such a case, any discussion derived from the analysis of collected data would be less convincing with regard to the characteristics of its population. In order to check the bias of respondents, we will examine the response rates of regional units, age distribution, level of education, and type of occupation in the obtained data.

Table A4.1 shows response rates in the sampling regions. No clear discrepancies could, as a whole, be found in the response rate of each region. All figures ranged from 34% to 37%. Admittedly, there is a tendency for the response rate to be slightly smaller in big cities than in other regions. For example, the total response rate of the big cities stood at 32.6%, while that of the towns and villages was 37.6%. However, the variation in the response rate was quite small. Therefore, we may say that no significant response bias could be discerned in the data concerning regions and areas.

Table A4.1: Response Rates by Regional Unit

(%)

Area	Region					
	Hokkaiô	Tôhokû	Kantô	Hokuriku	Tôzan	Tôkai
Big cities	32.2	32.3	33.0	-	33.3	-
Medium cities	36.5	36.4	35.7	36.4	36.0	36.3
Small cities	38.3	38.2	36.2	37.4	34.9	38.5
Towns and villages	37.2	37.6	37.2	38.9	36.6	37.7
Total	35.5	36.8	35.0	37.5	37.4	35.5

Area	Region					Total
	Kinki	Chûgoku	Shikoku	Kitakyûshû	Minamikyûshû	
Big cities	31.9	32.6	-	31.7	-	32.6
Medium cities	34.9	34.2	35.3	35.5	36.9	35.7
Small cities	34.6	37.4	36.9	36.1	38.1	36.5
Towns and villages	37.9	38.1	38.7	37.5	37.7	37.6
Total	34.5	35.5	36.9	35.1	37.5	35.5

Note:

Big cities are Tokyo (23 special wards), Sapporo, Sendai, Chiba, Kawasaki, Yokohama, Nagoya, Kyoto, Osaka, Kobe, Hiroshima, Kita-Kyushu and Fukuoka.
 Medium cities denote those with a population of 100,000 or more, but excluded the above 12 cities.
 Small cities are those with a population of less than 100,000.

In Table A4.2, we will compare the age distributions of this survey data with those of the 1990 Japanese national census. There are no remarkable discrepancies to be not found between the two. This survey undersamples unmarried women in the 20-24 and 25-29 age groups by 2.1%. Likewise, the percentage of married women aged from 40 to 44 is smaller by 2.8% in this survey than in the national census. However, the remaining age groups reveal no great percentage difference between the sample and the national census. Hence, we may say that the age distributions of this survey are almost identical to those of the national

population.

Table A4.2: The Age Distributions of Women Aged 20-49 (%)

Age	Unmarried			Married		
	This survey	National Census	Difference	This survey	National Census	Difference
20-24	12.5	14.6	-2.1	2.1	2.3	-0.2
25-29	4.3	6.4	-2.1	9.7	9.1	0.6
30-34	3.3	2.1	1.2	12.2	12.7	-0.5
35-39	2.9	1.3	1.6	17.3	15.5	1.8
40-44	2.2	1.2	1.0	15.6	18.4	-2.8
45-49	1.9	0.8	1.1	16.0	15.6	-0.4
Total	27.1	26.5		72.9	73.5	

Source: Sômuchô Tôkei Kyoku. 1990 Population Census of Japan.

Let us turn to the educational levels of respondents. Table A4.3 displays the distributions of education levels in this survey and the 1990 national census. Compared to the national census, this survey undersamples the junior high school group by 4.3%. However, the difference between this survey and the census does not exceed 2.1% with regards to the remaining educational categories. These discrepancies are not particularly crucial. Therefore, the distribution of educational levels in this survey is, overall, identical to that of the national census.

Table A4.3: The Percentages of Educational Levels Women Aged 20-49 (%)

Education	This survey	National Census	Difference
Junior high school	11.1	15.4	-4.3
Senior high school	57.5	55.4	2.1
Junior college	21.8	20.8	1.0
University	9.6	8.4	1.2
total	100.0	100.0	

Note:

Junior high school: Junior high school

Senior high school: Senior high school

Junior College: 2-year junior college, technical college, and vocational school after senior high school graduation

University: University or higher

Source: Sômuchô Tôkei Kyoku. 1990 Population Census of Japan.

Finally, we will look at the distributions of main occupational groups. Table A4.4 displays the percentages of main occupational groups both in this survey and the national census. When compared with the national census, this survey over-represents the clerical category by 4.3%. On the other hand, this survey under-represents the housework category by 2.3%, and the manual category by 2.0%. However, this survey and the national census do not differ in terms of the percentages of the remaining occupational groups. Thus, the overall distribution of occupational groups in this survey are representative of the country as a whole.

Table A4.4: The percentages of occupations for Women Aged 20-49 (%)

Occupation	This survey	National Census	Difference
Agriculture	1.9	2.2	-0.3
Small business	9.5	8.5	1.0
Professional	9.6	10.4	-1.0
Clerical	37.0	32.4	4.3
Manual	10.1	12.1	-2.0
Housework	32.1	34.4	-2.3
Total	100.0	100.0	

Note:

Agriculture: Agriculture, forestry, or fisheries

Small business: Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries

Professional: Professional or managerial work

Clerical: Clerical, sales, service work

Manual: Factory work and other manual work (craftsperson, driver, construction worker, etc.)

Source: Sômuchô Tôkei Kyoku. 1990 Population Census of Japan.

As far as the four properties (response rates of regional units, age distribution, education, and occupation) reveal, a critical response bias could not be found in the results of this survey. Hence, we can say that the data collected in this survey sufficiently satisfy the representiveness of its population.

Appendix A5: Questionnaire Form Translated from Japanese

In Chapters 3, 4 and 5, we based our discussion upon the results of the survey which contains the following questions.

[Question 1 to 12 are to be answered by all respondents]

Question 1: Please fill in the year and month of your birth, and circle your marital status. If you are married, please fill in your husband's details as well.

	The date of birth	Marital status
You	Year _____ Month ____	1. Unmarried (Single or divorced) 2. First marriage 3. Remarriage after divorce (whether first or subsequent) 4. Remarriage after a spouse's death (whether first or subsequent)
Your husband	Year _____ Month ____	1. First marriage 2. Remarriage after divorce (whether first or subsequent) 3. Remarriage after a spouse's death (whether first or subsequent)

Question 2: At what level did complete your education? (if you are a student, at what level are you currently attending an educational establishment?) If you are married, please circle your husband's corresponding details.

A. Your education

1. Junior high school
2. High school
3. Vocational school after high school graduation
4. 2-year junior college
5. Technical college
6. University or higher
7. Other

B. Your husband's education

1. Junior high school
2. High school
3. Vocational school after high school graduation
4. 2-year junior college
5. Technical college
6. University or higher
7. Other

Question 3: What is your main occupation? If you are married, please fill in your husband's corresponding details.

A. Your occupation

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction worker, etc.)
6. Housework
7. Student
8. Not working

9. Other ()

(Only those who chose 1, 2, 3, 4 or 5)

B. Type of working status

1. Full-time 2. Part-time 3. Day labourer, temporary 4. Other ()

C. Your husband's work

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction worker, etc.)
6. Student
7. Not working
8. Other ()

(Only those who chose 1, 2, 3, 4, or 5)

D. Type of working status

1. Full-time 2. Part-time 3. Day labourer, temporary 4. Other ()

(Only those who chose 1, 2, 3, 4, or 5 in Question 3)

Question 4: How many hours do you work on average per week, including overtime and holiday work? If you are married, please circle your husband's corresponding details.

A. Your working hours

1. Less than 20 hours
2. 20 or more hours, less than 25 hours
3. 25 or more hours, less than 30 hours
4. 30 or more hours, less than 35 hours
5. 35 or more hours, less than 40 hours
6. 40 or more hours, less than 45 hours
7. 45 or more hours, less than 50 hours
8. 50 or more hours, less than 55 hours
9. 55 or more hours, less than 60 hours
10. 60 or more hours

B. Your husband's working hours

1. Less than 20 hours
2. 20 or more hours, less than 25 hours
3. 25 or more hours, less than 30 hours
4. 30 or more hours, less than 35 hours
5. 35 or more hours, less than 40 hours
6. 40 or more hours, less than 45 hours
7. 45 or more hours, less than 50 hours
8. 50 or more hours, less than 55 hours
9. 55 or more hours, less than 60 hours
10. 60 or more hours

(Only those who chose 1, 2, 3, 4, or 5 in Question 3)

Question 5: How much was your total annual income before taxes in the last year? If you are married, please circle your husband's corresponding details.

A. Your annual income

1. Less than 1 million yen
2. 1 million yen to less than 2 million yen
3. 2 million yen to less than 3 million yen
4. 3 million yen to less than 4 million yen
5. 4 million yen to less than 5 million yen
6. 5 million yen to less than 6 million yen

7. 6 million yen to less than 8 million yen
8. 8 million yen to less than 10 million yen
9. 10 or more million yen
10. Don't know

B. Your husband's annual income

1. Less than 1 million yen
2. 1 million yen to less than 2 million yen
3. 2 million yen to less than 3 million yen
4. 3 million yen to less than 4 million yen
5. 4 million yen to less than 5 million yen
6. 5 million yen to less than 6 million yen
7. 6 million yen to less than 8 million yen
8. 8 million yen to less than 10 million yen
9. 10 or more million yen
10. Don't know

Question 6: What is your father's present occupation? (if your father is retired or decreased, please circle his main occupation before his retirement or death.) If you are married, please circle corresponding details for your husband.

A. Your father

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction worker, etc.)
6. Not working
7. Other ()

B. Your husband's father

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction worker, etc.)
6. Not working
7. Other ()

Question 7: When you finished primary school, what type of area did you live in? If you are married, please circle your husband's corresponding details.

You	Your husband
1. Urban	1. Urban
2. Rural	2. Rural
3. Foreign country	3. Foreign country

Question 8: What type of area do you live in now?

- A. The name of prefecture _____
- B. Administrative unit
- | | | | |
|---------|---------|---------|------------|
| 1. Ward | 2. City | 3. Town | 4. Village |
|---------|---------|---------|------------|
- C. Type of area
- | | |
|----------|----------|
| 1. Urban | 2. Rural |
|----------|----------|

Question 9: How many siblings (including decreased siblings) do you have? If you are married, please circle corresponding details for your husband.

A. Your siblings

Elder brothers _____ persons
Elder sisters _____ persons
Younger brothers _____ persons
Younger sisters _____ persons

B. Your husband's siblings

Elder brothers _____ persons
Elder sisters _____ persons
Younger brothers _____ persons
Younger sisters _____ persons

Question 10: Are you the first-born daughter?

1. Yes 2. No

Question 11: What do you think about the following?

a) Never getting married through life (1 answer)

1. Completely acceptable 2. Acceptable
3. Unacceptable 4. Completely unacceptable
5. Don't know

b) Common-law marriage (1 answer)

1. Completely acceptable 2. Acceptable
3. Unacceptable 4. Completely unacceptable
5. Don't know

c) Unmarried women bearing and rearing children (1 answer)

1. Completely acceptable 2. Acceptable
3. Unacceptable 4. Completely unacceptable
5. Don't know

d) Homosexual relationships (1 answer)

1. Completely acceptable 2. Acceptable
3. Unacceptable 4. Completely unacceptable
5. Don't know

Question 12: What do you think about the following view?

a) If a man and a woman love each other, their pre-marital sexual intercourse is permissible. (1 answer)

1. Agree strongly 2. Agree
3. Disagree 4. Disagree strongly
5. Don't know

b) It is a child's duty to care for aged parents.(1 answer)

1. Agree strongly 2. Agree
3. Disagree 4. Disagree strongly
5. Don't know

c) When personalities do not match, a divorce is reasonable. (1 answer)

1. Agree strongly 2. Agree
3. Disagree 4. Disagree strongly
5. Don't know

d) When a child is small, a mother should stay home without working outside

the home. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

e) Children are important to a successful marriage. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

f) Parent's duty is to do their best for their children, at the expense of their own well-being. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

g) Even after marriage, one should not sacrifice one's own goals in life for one's family. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

h) After marriage, a husband should work outside the home and a wife should devote herself to housework at home. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

i) It is not essential to get married if it means sacrificing one's own goal in life. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

j) It is better to live with parents after marriage. (1 answer)

- | | |
|-------------------|----------------------|
| 1. Agree strongly | 2. Agree |
| 3. Disagree | 4. Disagree strongly |
| 5. Don't know | |

[Question 13 to 27 are to be answered only by married respondents]

Question 13: When did you get married?

Year _____ Month _____

Question 14: Which is your marriage type?

1. Arranged marriage
2. Love marriage
3. Other

Question 15: What type of area did you live in just before marriage?

- | | |
|----------|--------------|
| You | Your husband |
| 1. Urban | 1. Urban |

2. Rural
3. Foreign country

2. Rural
3. Foreign country

Question 16: Did you live with your parents just before marriage?

- You
1. Yes
 2. No

- Your husband
1. Yes
 2. No

Question 17: What type of area did you live in at the start of your marriage?

1. Urban
2. Rural
3. Foreign country

Question 18: Did you live with your husband's parents or your own parents at the start of your marriage?

1. Lived with my father
2. Lived with my mother
3. Lived with my parents
4. Lived with my husband's father
5. Lived with my husband's mother
6. Lived with my husband's parents
7. Did not live with any parents

Question 19: Do you live with your husband's parents or your own parents at present?

1. Lived with my father
2. Lived with my mother
3. Lived with my parents
4. Lived with my husband's father
5. Lived with my husband's mother
6. Lived with my husband's parents
7. Did not live with any parents

Question 20: What kind of work did you and your husband do before marriage?

A. Your work

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction worker, etc.)
6. Housework
7. Student
8. Not working
9. Other ()

(Only those who chose 1, 2, 3, 4 or 5)

B. Type of working status

1. Full-time
2. Part-time
3. Day labourer, temporary
4. Other ()

C. Your husband's work

1. Agriculture, forestry, or fisheries
2. Proprietor of small business or self-employed family enterprise other than in agriculture, forestry, or fisheries
3. Professional or managerial work
4. Clerical, sales, service work and the like
5. Factory work and other manual work (craftsperson, driver, construction

- worker, etc.)
 6. Student
 7. Not working
 8. Other ()

(Only those who chose 1, 2, 3, 4 or 5)

- D. Type of working status
 1. Full-time 2. Part-time 3. Day labourer, temporary 4. Other ()

(Only those who worked except housework in Question 20)

Question 21: Have you continued to work after getting married

1. Yes
2. Quit before marriage
3. Quit after marriage
4. Quit during first pregnancy
5. Quit after first child
6. Quit after second child
7. Quit after third child
8. Quit after fourth or more child
9. Others

Question 22: How many children is ideal for you?

1. None
2. One
3. Two
4. Three
5. Four
6. Five or more

Question 23: How many children have you ever borne? If you have never borne a child, please write '0'.

Sons	_____ persons
Daughters	_____ persons
Surviving children	_____ persons
Dead children	_____ persons

(Only those who have born more than one child)

Question 24: Please fill in the sex and the date of birth of your children ever-born, and circle whether or not they survive. If you have more than seven children, please fill in until the seventh child.

Birth order	Sex	Date of birth	Survival
First child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Second child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Third child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Forth child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Fifth child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Sixth child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead
Seventh child	1. Male 2. Female	Year _____ Month _____	1. Surviving 2. Dead

Question 25: How many more children would you like to have?

1. None
2. One more
3. Two more
4. Three more
5. Four more
6. Five or more

Question 26: What level of education do you wish (or did you wish) your children to attain?

A. Sons' education

1. Junior high school
2. High school
3. Vocational school after high school graduation
4. 2-year junior College
5. Technical college
6. University or higher
7. Other

B. Daughters' education

1. Junior high school
2. High school
3. Vocational school after high school graduation
4. 2-year junior College
5. Technical college
6. University or higher
7. Other

Question 27: Have you ever practised contraception (including sterilisation)?

1. Now practising
2. Have practised before
3. Never practised

[Question 28 to 33 are to be answered by unmarried respondents]

Question 28: Do you live with your parents at present?

1. Yes
2. No

Question 29: Have you ever been married before?

1. Yes (ended with a spouse's death)
2. Yes (ended with a divorce)
3. No

Question 30: Have you ever experienced cohabitation before?

1. Now cohabiting
2. Have cohabited before
3. Never cohabited

Question 31: If you get married, at what age would you like to marry?

Around _____ years old

Question 32: Would you prefer an arranged marriage or love marriage?

1. Love marriage
2. Arranged marriage

3. Either will be all right

Question 33: How many children would you like to have after marriage?

1. None
2. One
3. Two
4. Three
5. Four
6. Five or more

[Thank you very much for your co-operation]

Bibliography

- Abramson, P. R., & Inglehart, R. (1995). *Value Change in Global Perspective*. Ann Arbor: University of Michigan Press.
- Agresti, A. (1989). "Tutorial on Modeling Ordered Categorical Response Data", *Psychological Bulletin* **105**: 290-301.
- Agresti, A. (1990). *Categorical Data Analysis*. New York: Wiley.
- Akers, D. S. (1967). "On Measuring the Marriage Squeeze", *Demography* **4**: 907-924.
- Aldrich, J. H., & Nelson, F. D. (1984). *Linear Probability, Logit, and Probit Models*. Thousand Oaks: SAGE.
- Allison, P. D. (1984). *Event History Analysis*. Thousand Oaks: SAGE.
- Alther, G. (1992). "Theories of Fertility Decline: a Non-Specialist's Guide to the Current Debate", in J. Gillis, L. A. Tilly, & D. Levine (Eds.), *The European Experience of Declining Fertility, 1850-1970: The Quiet Revolution*. Oxford: Basil Blackwell, pp. 13-27.
- Anderson, K. H., & Hill, M. A. (1983). "Marriage and Labor Market Discrimination in Japan", *Southern Economic Journal* **49**: 941-953.
- Anderson, M. (1976). "Marriage Patterns in Victorian Britain: an Analysis Based on Registration District Data for England and Wales 1861", *Journal of Family History* **1**: 55-78.
- Anderson, M. (1980). *Approaches to the History of the Western Family 1500-1914*. London: Macmillan.
- Anderson, M. (1983). "What is New about the Modern Family: a Historical Perspective", in British Society for Population Studies (Ed.), *The Family*. London: Office of Population Censuses and Surveys, pp. 1-16.
- Anderton, D. L., Tsuya, N. O., Bean, L. L., & Mineau, G. P. (1987). "Intergenerational Transmission of Relative Fertility and Life Course Patterns", *Demography* **24**: 467-480.
- Andorka, R. (1978). *The Determinants of Fertility in Advanced Societies*. London: Methuen.
- Andrews, F., Morgan, J., Sonquist, J., & Klein, L. 1973. *Multiple Classification Analysis* (2nd ed.). Ann Arbor: University of Michigan Press.
- Anzo, S. (1989a). "Kekkon Shijô to Kekkon Kôdô [Marriage Market and Marriage Behaviour: Job Search and Mate Search]", *The Review of Economics & Political Science* **58**: 258-305.
- Anzo, S. (1989b). "Shokon Nenrei no Kettei In [The Determinants of Age at First Marriage: Analysis on Japanese Time Series Data]", *The Review of Economics & Political Science* **57**: 173-204.
- Anzo, S. (1989c). "Shokon Nenrei no Shakai Keizai Teki Yôin [Socio-economic Factors of Age at First Marriage: An Analysis with the 1985 NORC Data]", *The Review of*

Economics & Political Science **57**: 37-62.

- Aoki, H., & Nakano, E. (1967). "Dai 1-4 ji Shussanryoku Chô Kekka no Yôyaku [Summary of the Fertility Surveys in 1940, 1952, 1957 and 1962]", *Institute of Population Problems Research Series* **177**.
- Ariès, P. (1962). *Centuries of Childhood: a Social History of Family Life* (Trans. Robert Baldick). New York: Knopf.
- Ariès, P. (1980). "Two Successive Motivations for the Declining Birth Rate in the West", *Population and Development Review* **6**: 645-650.
- Atoh, M. (1981). "Wagakuni Shusseï Ryoku no Shakaiteki Ketteiin [Social Determinants of Marital Fertility in Japan]", *Journal of Population Problems* **157**: 1-27.
- Atoh, M. (1982). "Kindai Nihon ni okeru Kazoku Keisei Katei no Hensen [The Changes of family formation process in Modern Japan]", in Kazokushi Kenkyû Henshû Iinkai [the Editorial Committee of Family History] (Ed.), *Kazokushi Kenkyû [The Study of Family History]*. Tokyo: Ôtsukishoten, pp. 216-237.
- Atoh, M. (1984). "The Causes for the Recent Decline in Japanese Fertility and its Prospect", *The Journal of Population Problems* **171**: 22-35.
- Atoh, M. (1985). "Determinants and Prospects of Fertility in Asian Countries", in A. Otomo, H. Sagaza, & Y. Hayase (Eds.), *Population Prospects in Developing Countries; Structure and Dynamics*. Tokyo: Institute of Developing Economies, pp. 17-38.
- Atoh, M. (1993). "Nihon no Chô Teishusei Ritu [Hyper-low Birth Rates in Japan]", in A. Naoi, K. Seiyama, & T. Mamada (Eds.), *The Changing Face of Japanese Society*. Tokyo: University of Tokyo Press, pp. 29-53.
- Atoh, M. (1994). "Mikon Ka, Bankon Ka no Shinten [The Recent Rise in the Population Single and the Postponement of Marriage in Japan]", *Kazoku Shakaigaku Kenkyû [Japanese Journal of Family Sociology]* **6**: 5-17.
- Athô, M. (1997). "Nihon no Chô Shôsanka Genshō to Kachi Hendō Kasetsu [Very Low Fertility in Japan and Value Change Hypotheses]", *The Journal of Population Problems* **53**: 3-20.
- Atoh, M. & Ohtani, K. (1983). "Ideal, Intended, and Achieved Fertility for the Japanese Married Couples: Major Findings from the Eight National Fertility Survey", *The Journal of Population Problems* **166**: 1-34.
- Baird, A. J. (1987). "A Note on the Easterlin Model of Fertility in Northwestern Europe and the United States: 1950-1981", *International Journal of Comparative Sociology* **28**: 57-68.
- Balke, N. S. (1991). "Modeling Trends in Macroeconomic Time Series", *Economic Review, Federal Reserve Bank of Dallas* **May**: 19-33.
- Barmby, T., & Cigno, A. (1990). "A Sequential Probability Model of Fertility Patterns",

- Journal of Population Economics* **3**: 31-51.
- Becker, G. S. (1960). "An Economic Analysis of Fertility", in Universities-National Bureau Committee for Economic Research (Ed.), *Demographic and Economic Change in Developed Countries*. Princeton: Princeton University Press, pp. 209-231.
- Becker, G. S. (1973). "A Theory of Marriage: Part I", *Journal of Political Economy* **81**: 813-846.
- Becker, G. S. (1974). "A Theory of Marriage: Part II", *Journal of Political Economy* **82**: S11-S26.
- Becker, G. S. (1975). *Human Capital : a Theoretical and Empirical Analysis, with Special Reference to Education* (2nd ed.). Chicago: University of Chicago Press.
- Becker, G. S. (1976). "Altruism, Egoism and Genetic Fitness: Economics and Sociology", *Journal of Economic Literature* **14**: 817-826.
- Becker, G. S. (1981). *A Treatise on the Family*. Cambridge, Massachusetts: Harvard University Press.
- Becker, G. S., & Lewis, H. G. (1973). "On the Interaction Between Quantity and Quality of Children", *Journal of Political Economy* **81**: S279-S288.
- Behrman, J. R., & Taubman, P. (1989). "A Test of the Easterlin Fertility Model Using Income for Two Generations and a Comparison with the Becker Model", *Demography* **26**: 117-123.
- Bell, D. (1976). *The Cultural Contradictions of Capitalism*. New York: Basic Books.
- Bellah, R. N. (1957). *Tokugawa Religion : the Values of Pre-industrial Japan*. Glencoe: Free Press.
- Bentler, P. M., & Chou, C. P. (1987). "Practical Issues in Structural Modeling", *Sociological Methods and Research* **16**: 78-117.
- Berger, P. L., & Berger, B. (1975). *Sociology: a Biographical Approach*. New York: Basic Books.
- Berger, P. L., Berger, P. L., & Luckmann, T. (1967). *The Social Construction of Reality : a Treatise in the Sociology of Knowledge*. London: Penguin.
- Berger, P. L., & Kellner, H. (1964). "Marriage and the Construction of Reality", *Diogenes* **46**: 1-24.
- Blake, J. (1967). "Income and Reproductive Motivation", *Population Studies* **21**: 185-206.
- Blake, J. (1968). "Are Babies Consumer Durables?: a Critique of the Economic Theory of Reproductive Motivation", *Population Studies* **22**: 5-25.
- Bohnsted, G. W., & Knoke, D. (1988). *Statistics for Social Data Analysis* (2 ed.). Ithaca: F.E.Peacock Publisher.
- Bollen, K. A. (1989). *Structural Equations with Latent Variables*. New York: Wiley.
- Bongaarts, J. (1976). "Intermediate Fertility Variables and Marital Fertility Rates",

- Population Studies* **30**: 227-241.
- Bongaarts, J. (1978). "A Framework of Analyzing the Proximate Determinants of Fertility", *Population and Development Review* **4**: 105-132.
- Bongaarts, J., & Potter, R. G. (1983). *Fertility, Biology and Behavior: an Analysis of the Proximate Determinants*. London: Academic Press.
- Bourgeois-Pichat, J. (1986). "The Unprecedented Shortage of Birth in Europe", in K. Davis & M. S. Berstan (Eds.), *Below-Replacement Fertility in Industrial Society: Causes, Consequences, Politics*. New York: Population Council, pp. 3-25.
- Box, G. E. P., Jenkins, G. M., & Reinsel, G. C. (1994). *Time Series Analysis: Forecasting and Control*. Englewood Cliffs: Prentice Hall.
- Boyle, B. (1970). "Path Analysis and Ordinal Data", *American Journal of Sociology* **75**: 461-480.
- Braun, R. (1978). "Early Industrialization and Demographic Change in the Canton of Zürich", in C. Tilly (Ed.), *Historical Studies of Changing Fertility*. Princeton: Princeton University Press, pp. 57-134.
- Brinton, M. C. (1992). "Christmas Cakes and Wedding Cakes: The Social Organization of Japanese Women's Life Course", in T. S. Lebra (Ed.), *Japanese Social Organization*. Honolulu: University of Hawaii Press, pp. 79-107.
- Bulatao, R. A. (1989). "Toward a Framework for Understanding Contraceptive Method Choice", in R. A. Bulatao, J. A. Palmore, & S. E. Ward (Eds.), *Choosing A Contraceptive: Method Choice in Asia and the United States*. Boulder: Westview, pp. 277-304.
- Bulatao, R. A., & Lee, R. D. (1983a). "A Framework for the Study of Fertility Determinants", in R. Bulatao & R. D. Lee (Eds.), *Determinants of Fertility in Developing Countries*. New York: Academic Press, pp. 1-26.
- Bulatao, R. A., & Lee, R. D. (1983b). "An Overview of Fertility Determinants in Developing Countries", in R. Bulatao & R. D. Lee (Eds.), *Determinants of Fertility in Developing Countries*. New York: Academic Press, pp. 757-787.
- Bumpass, L. L. (1969). "Age at Marriage as a Variable in Socio-economic Differentials in Fertility", *Demography* **6**: 45-54.
- Bumpass, L. L., & Mburugu, E. K. (1977). "Age at Marriage and Completed Family Size", *Social Biology* **24**: 31-37.
- Bumpass, L. L., Rindfuss, R. R., & Janosik, R. B. (1978). "Age and Marital Status at First Birth and the Pace of Subsequent Fertility", *Demography* **15**: 75-86.
- Busfield, J. (1972). "Age at Marriage and Family Size: social causation and social selection hypotheses", *Journal of Biosocial Science* **4**: 117-134.
- Butz, W., & Ward, M. (1979). "The Emergence of Counter-cyclical US Fertility", *American Economic Review* **69**: 318-328.
- Caelsso, G. (1966). "Decline of Fertility: Innovation or Adjustment Process", *Population*

Studies 20: 149-174.

- Caldwell, J. C. (1982). *Theory of Fertility Decline*. New York: Academic Press.
- Caldwell, J. C. (1985). "Strengths and Limitations of the Survey Approach for Measuring and Understanding Fertility Change: Alternative Possibilities", in J. G. Cleland & J. Hobcraft (Eds.), *Reproductive Change in Developing Countries: insights from the World Fertility Survey*. Oxford: Oxford University Press, pp. 45-63.
- Caldwell, J. C. (1993). "The Asian Fertility Transition: its Implications for Transition Theories", in R. Leete & I. Alam (Eds.), *The Revolution in Asian Fertility*. Oxford: Clarendon Press, pp. 299-316.
- Carter, H., & Glick, P. C. (1976). *Marriage and Divorce: a Social and Economic Study* (Revised ed.). Cambridge, Mass.: Harvard University Press.
- Chan, K. C. (1976). "The Role of the Family Planning Association in Hong Kong's Fertility Decline", *Studies in Family Planning* 7: 284-289.
- Chen, A. J., Emmanuel, S. C., Ling, S. L., & Kwa, S. B. (1985). "Legalised Abortion: the Singapore Experience", *Studied in Family Planning* 16: 170-178.
- Cherline, A. J. (1992). *Marriage, Divorce, Remarriage*. Cambridge, Mass.: Harvard University Press.
- Choe, M. K., & Park, I. H. (1989). "Patterns and Covariates of Contraceptive Method Choice in the Republic of Korea", in R. A. Bulatao, J. A. Palmore, & S. E. Ward (Eds.), *Choosing a Contraceptive: Method Choice in Asia and the United States*. Boulder: Westview, pp. 105-125.
- Cigno, A., & Ermisch, J. (1989). "A Microeconomic Analysis of the Timing of Births", *European Economic Review* 33: 737-760.
- Clark, S., Diamond, I., Spicer, K., & Chappell, R. (1993). "The Relationship between Marital Breakdown and Childbearing in England and Wales", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 123-136.
- Cleland, J., & Wilson, C. (1987). "Demand Theories of the Fertility Transition: an Iconoclastic View", *Population Studies* 41: 5-30.
- Cliquet, R. L. (1991). *The Second Demographic Transition: Fact or Fiction?* Strasbourg: Council of Europe.
- Coale, A. J. (1969). "The Decline of Fertility in Europe from the French Revolution to World War II", in S. J. Behrman, L. J. Corsa, & R. Freedman (Eds.), *Fertility and Family Planing: A World View*. Ann Arbor: University of Michigan Press, pp. 3-24.
- Coale, A. J., & Watkins, S. C. (Eds.). (1986). *The Decline of Fertility in Europe*. Princeton: Princeton University Press.
- Coleman, D. (1984). "Marital Choice and Geographical mobility", in A. J. Boyce (Ed.), *Migration and Mobility*. London: Taylor and Francis, pp. 19-55.

- Coleman, D. (1988). "Population", in A. H. Halsey (Ed.), *British Social Trend since 1900: a Guide to the Changing Social Structure of Britain*. London: Macmillan, pp. 36-134.
- Coleman, D. (1992). "European Demographic Systems of the Future: Convergence or Diversity?", in *The Eurostat Conference "Human Resources in Europe at the Dawn of the 21st Century"*. Luxembourg: Office for Official Publications of the European Community, pp. 141-179.
- Coleman, D. (1993). "Britain in Europe: International and Regional Comparisons of Fertility Level and Trends", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 67-94.
- Coleman, D. (Ed.). (1996). *Europe's Population in the 1990s*. Oxford: Oxford University Press.
- Coleman, D., & Haskey, J. C. (1986). "Marital Distance and its Geographical Orientation in England and Wales, 1979", *Transactions of the Institute of British Geographers New Series* **11**: 337-355.
- Coleman, D., & Salt, J. (1992). *The British Population: Patterns, Trends, and Processes*. Oxford: Oxford University Press.
- Coleman, S. (1983). *Family Planning in Japanese Society: Traditional Birth Control in a Modern Urban Culture*. Princeton: Princeton University Press.
- Cornell, L. L. (1987). "Hajnal and the Household in Asia: a Comparativist History of the Family in Preindustrial Japan, 1600-1870", *Journal of Family History* **12**: 143-162.
- Cornell, L. L. (1989). "Age at Marriage, Female Labor Force Participation, and Parental Interests", *Anales de Demographie Historique*: 223-231.
- Courseau, D., & Lelièvre, É. (1992). *Event History Analysis in Demography*. Oxford: Clarendon Press.
- Cox, D. R. (1970). *The Analysis of Binary Data*. London: Methuen.
- Cox, D. R., & Oakes, D. (1984). *Analysis of Survival Data*. London: Chapman and Hall.
- Cuthbertson, K., Hall, S. G., & Taylor, M. P. (1992). *Applied Econometric Techniques*. New York: Harvester Wheatsheaf.
- Davis, K. (1945). "The World Demographic Transition", *Annals of the American Academy of Political and Social Science* **No. 237**: 1-11.
- Davis, K. (1955). "Institutional Patterns Favoring High Fertility in Underdeveloped Areas", *Eugenics Quarterly* **2**: 33-39.
- Davis, K. (1963). "The Theory of Change and Response in Modern Demographic History", *Population Index* **29**: 345-366.
- Davis, K., & Blake, J. (1956). "Social Structure and Fertility: an Analytic Framework", *Economic Development and Cultural Change* **4**: 211-235.
- De Cooman, E., Ermisch, J., & Joshi, H. (1987). "The Next Birth and the Labour

- Market: a Dynamic Model of Births in England and Wales", *Population Studies* **41**: 237-268.
- Demaris, A. (1992). *Logit Modeling*. Thousand Oaks: SAGE.
- Dentsu Institute for Human Studies. (1995). *37 Ka Koku Sekai Kachikan Repôto [A Report on 37 Countries' World Values Survey]*. Tokyo: Dentsu Institute for Human Studies.
- Dixon, R. B. (1971). "Explaining Cross-Cultural Variations in Age at Marriage and Proportion Never Marrying", *Population Studies* **25**: 215-233.
- Donaldson, P. J., Nichols, D. J., & Choe, E. H. (1982). "Abortion and Contraception in the Korean Fertility Transition", *Population Studies* **36**: 227-235.
- Dore, R. P. (1953). "Japanese Rural Fertility: Some Social and Economic Factors", *Population Studies* **7**: 62-88.
- Dore, R. P. (1958). *City Life in Japan: a Study of a Tokyo Ward*. London: Routledge & Kegan Paul.
- Draper, N. R., & Smith, H. (1981). *Applied Regression Analysis* (2nd ed.). New York: Wiley.
- Duesenberry, J. S. (1960). "Comment", in A. J. Coale (Ed.), *Demographic and Economic Changes in Developed Countries*. Princeton: Princeton University Press, pp. 231-234.
- Durkheim, É. (1976). *Les formes élémentaires de la vie religieuse [The Elementary Forms of the Religious Life]* (Trans. Joseph Ward Swain). London: Allen and Unwin.
- Easterlin, R. A. (1961). "The American Baby Boom in Historical Perspective", *American Economic Review* **51**: 869-911.
- Easterlin, R. A. (1971). "Does Human Fertility Adjust to the Environment?", *American Economic Review* **61**: 399-407.
- Easterlin, R. A. (1973). "Relative Economic Status and the American Fertility Swing", in E. B. Sheldon (Ed.), *Family Economic Behavior: Problems and Prospects*. Philadelphia: J. B. Lippincott, pp. 170-223.
- Easterlin, R. A. (1976). "The Conflict between Aspirations and Resources", *Population and Development Review* **2**: 417-425.
- Easterlin, R. A. (1978). "The Economics and Sociology of Fertility", in C. Tilly (Ed.), *Historical Studies of Changing Fertility*. Princeton: Princeton University Press, pp. 57-134.
- Easterlin, R. A. (1980). *Birth and Fortune*. London: Great McIntre.
- Easterlin, R. A., & Condran, G. A. (1976). "A Note on the Recent Fertility Swing in Australia, Canada, England and Wales and the United States", in H. Richards & B. Thomas (Eds.), *Population, Factor Movements and Economic Development : studies presented to Brinley Thomas*. Cardiff: University of Wales Press, pp. 140-151.

- Economic Planning Agency. (Ed.). (1992). *Heisei Yoneda Kokumin Seikatsu Hakusho [Annual Report on the National Life for Fiscal 1992]*. Tokyo: Government Printing Office.
- Elder, G. H. (1977). *Children of the Great Depression: Social Change in Life Experience*. Chicago: University of Chicago Press.
- Eldridge, S., & Kiernan, K. (1985). "Declining First Marriage Rates in England and Wales: a Change in Timing or a Rejection of Marriage?", *European Journal of Population* **1**: 327-345.
- Enders, W. (1995). *Applied Econometric Time Series*. New York: John Wiley & Sons.
- Engle, R. F., & Granger, C. W. J. (1987). "Cointegration and Error-Correction: Representation, Estimation and Testing", *Econometrica* **55**: 251-276.
- Erikson, E. H. (1963). *Childhood and Society* (2nd ed.). New York: Norton.
- Erikson, E. H. (1980). *Identity and the Life Cycle*. New York: Norton.
- Ermisch, J. (1970). "Time Costs, Aspirations, and the Effect of Economic Growth on German Fertility", *Oxford Bulletin of Economics and Statistics* **42**: 125-144.
- Ermisch, J. (1979). "The Relevance of the 'Easterlin Hypothesis' and 'New Home Economics' to Fertility Movement in Great Britain", *Population Studies* **33**: 39-58.
- Ermisch, J. (1981a). "Economic Opportunities, Marriage Squeezes and the Propensity to Marry", *Population Studies* **35**: 347-356.
- Ermisch, J. (1981b). "An Emerging Secular Rise in the Western World's Fertility", *Population and Development Review* **7**: 677-684.
- Ermisch, J. (1988). "Econometric Analysis of Birth Rate Dynamics in Britain", *The Journal of Human Resources* **23**: 563-576.
- Ermisch, J., & Ogawa, N. (1994). "Age at Motherhood in Japan", *Journal of Population Economics* **7**: 393-420.
- Ester, P., Halman, L., & de Moor, R. (Eds.). (1994). *The Individualizing Society: Value Change in Europe and North America* (2nd ed.). Netherlands: Tilburg University Press.
- Fawcett, J. T., & Khoo, S. E. (1980). "Singapore: Rapid Fertility Transition in a Compact Society", *Population and Development Review* **6**: 549-579.
- Feeney, G. (1986). *Period Parity Progression Measures of Fertility in Japan*. Tokyo: Nihon University Population Research Institute.
- Feeney, G., & Lutz, W. (1991). "Distributional Analysis of Period Fertility", in W. Lutz (Ed.), *Future Demographic Trends in Europe and North America: What can We Assume Today?* London: Academic Press, pp. 169-195.
- Feeney, G., & Yu, J. (1987). "Period Parity Progression Ratio Measures of Fertility in China", *Population Studies* **41**: 77-102.
- Feinberg, S. E. (1977). *The Analysis of Cross-Classified Categorical Data*. Cambridge,

Mass.: MIT Press.

- Flandrin, J. L. (1979). *Families in Former Times: Kinship, Household, and Sexuality* (Trans. Richard Southern). Cambridge: Cambridge University Press.
- Freedman, D. (1963). "The Relation of Economic Status to Fertility", *American Economic Review* **53**: 414-426.
- Freedman, R. (1961/62). "The Sociology of Human fertility: a Trend Report and Bibliography", *Current Sociology* **10/11**: 35-119.
- Freedman, R. (1979). "Theories of Fertility Decline: a Reappraisal", *Social Forces* **58**: 1-17.
- Freiden, A. (1974). "The U.S. Marriage Market", in T. W. Schultz (Ed.), *Economics of the Family*. Chicago: University of Chicago Press, pp. 352-371.
- Friedlander, S., & Silver, M. (1967). "A Quantitative Study of the Determinants of Fertility Behavior", *Demography* **4**: 30-70.
- Gauthier, A. H. (1991). *Family Policies in Comparative Perspective*. Oxford: Centre for European Studies, Nuffield College.
- Gauthier, A. H. (1993). "Families and Welfare Benefits: the Measured and Unmeasured Effects", in A. Kuijsten (Ed.), *Family Structure and Family Policy*. Amsterdam: PDOD-Paper No. 17, pp. 1-27.
- Gauthier, A. H. (1996a). *The State and the Family*. Oxford: Clarendon Press.
- Gauthier, A. H. (1996b). "The Measured and Unmeasured Effect of Warfare Benefits on Families: Implication for Europe's Demographic Trends", in D. Coleman (Ed.), *Europe's Population in the 1990s*. Oxford: Oxford University Press, pp. 297-331.
- Giddens, A. (1976). *New Rules of Sociological Method*. London: Hutchinson.
- Giddens, A. (1989). *Sociology*. Cambridge: Polity Press.
- Gillis, J., Tilly, L. A., & Levine, D. (Eds.). (1992). *The European Experience of Declining Fertility, 1850-1970: the Quiet Revolution*. Oxford: Basil Blackwell.
- Goode, W. J. (1963). *World Revolution and Family Patterns*. New York: The Free Press.
- Goode, W. J. (1984). "Individual Investments in Family Relationships over the Coming Decades", *The Tocqueville Review* **6**: 51-83.
- Gottman, J. M. (1981). *Time-series Analysis : a Comprehensive Introduction for Social Scientists*. Cambridge: Cambridge University Press.
- Granger, C. W. J., & Newbold, P. (1974). "Spurious Regressions in Econometrics", *Journal of Econometrics* **2**: 111-120.
- Hagle, T. M., & Mitchell, G. E. (1992). "Goodness-of-Fit Measures for Probit and Logit", *American Journal of Political Science* **36**: 762-784.
- Hajnal, J. (1947). "The Analysis of Birth Statistics in the Light of the Recent International Recovery of the Birth Rate", *Population Studies* **1**: 137-164.
- Hajnal, J. (1953). "Age at Marriage and Proportions Marrying", *Population Studies* **7**: 111-136.

- Hajnal, J. (1965). "European Marriage Pattern in Perspective", in D. V. Glass & D. E. C. Eversley (Eds.), *Population in History: Essays in Historical Demography*. London: Arnold, pp. 101-143.
- Hajnal, J. (1983). "Two Kinds of Pre-industrial Household Formation System", in R. Wall, J. Robin, & P. Laslett (Eds.), *Family Forms in Historic Europe*. Cambridge: Cambridge University Press, pp. 65-104.
- Hammel, E. A. (1990). "A Theory of Culture for Demography", *Population and Development Review* **16**: 455-485.
- Hanley, S. B., & Yamamura, K. (1977). *Economic and Demographic Change in Preindustrial Japan, 1600-1868*. Princeton: Princeton University Press.
- Hanushek, E. A., & Jackson, J. E. (1977). *Statistical Methods for Social Scientists*. Orlando: Academic Press, Inc.
- Happel, S., Hill, J., & Low, S. (1984). "An Economic Analysis of the Timing of Childbirth", *Population Studies* **38**: 299-312.
- Harvey, A. C. (1990). *The Econometric Analysis of Time Series* (2nd ed.). London: Philip Allan.
- Harvey, A. C., Henry, B., Peters, S., & Wren-Lewis, S. (1986). "Stochastic Trends in Dynamic Regression Models: an Application to the Output-employment Equation", *Economic Journal* **96**: 975-985.
- Hashimoto, M. (1974). "Economics of Postwar Fertility in Japan", *Journal of Political Economy* **82**: S170-S194.
- Hashimoto, M. (1980). "Demand for Children in Japan during Modernization", *Research in Population Economics* **2**: 295-320.
- Hashimoto, S., & Takhashi, K. (1994). "Nihonjin no Ishiki no 20-nen (1) [Twenty Years Trend of Japanese Values (Part 1)]", *The NHK Monthly Report on Broadcast Research* **5**: 2-17.
- Havighurst, R. J. (1953). *Human Development and Education*. New York: Longmans, Green.
- Hawthorn, G. (1970). *The Sociology of Fertility*. London: Collier-MacMillan.
- Hayami, A. (1973). *Kinsei Nôson no Rekishi Jinkôgakuteki Kenkyû [A Study of Historical Demography in Early Modern Villages]*. Tokyo: Tôyô Keizai Shinpô Sha.
- Hayami, A. (1978). *Edo no Nôumin Seikatsu Shi [Life Histories of Farmers in the Edo Era]*. Tokyo: NHK books.
- Hayami, A. (1986). "Population Changes", in M. B. Jansen & G. Rozman (Eds.), *Japan in Transition from Tokugawa to Meiji*. Princeton: Princeton University Press.
- Hayami, A. (1992). *Kinsei Nôbi Chihô no Jinkô, Keizai, Shakai [Population, Economy and Society in Early Modern Japan: A Study of the Nobi Region]*. Tokyo: Sôbunsha.
- Hayami, A., & Uchida, N. (1972). "Size of Household in a Japanese County throughout

- the Tokugawa era", in P. Laslett & R. Wall (Eds.), *Household and Family in Past Time*. Cambridge: Cambridge University Press, pp. 473-516.
- Hecht, J., & Leridon, H. (1993). "Fertility Policies: a Limited Influence?", in D. Noin & R. Woods (Eds.), *The Changing Population of Europe*. Oxford: Blackwell, pp. 62-75.
- Heckman, J. J., & Walker, J. R. (1990). "The Relationship between Wages and Income and the Timing and Spacing of Birth: Evidence from Swedish Longitudinal Data", *Econometrica* **58**: 1411-1441.
- Heckman, J. J., & Willis, R. J. (1975). "Estimation of a Stochastic Model of Reproduction: an Economic Approach", in N. E. Terleckyj (Ed.), *Household Production and Consumption*. New York: National Bureau of Economic Research, pp. 99-138.
- Herr, D. M. (1966). "Economic Development and Fertility", *Demography* **3**: 423-444.
- Heer, D. M. (1968). *Society and Population*. Englewood Cliffs: Prentice-Hall.
- Henry, L. (1953/1980). *Fécondité des Mariages: Nouvelle Methode de Meaure [Fertility of Marriage: A New Method of Measurement]*. New York: United Nations, Economic and Social Commission for Asia and the Pacific.
- Hinde, A. P. R. (1989). "The Marriage Market in the Nineteenth-century English Countryside", *Journal of European Economic History* **18**: 383-392.
- Hiroshima, K. (1991). "Coresidence with Parents and Marriage in Recent Japan", *The Journal of Population Problems* **47**: 53-70.
- Hirschman, C. (1994). "Why Fertility Changes", *Annual Review of Sociology* **20**: 203-233.
- Hirschman, C., & Rindfuss, R. R. (1982). "The Sequence and Timing of Family Formation Events in Asia", *American Sociological Review* **47**: 660-680.
- Hodge, R. W., & Ogawa, N. (1991). *Fertility Change in Contemporary Japan*. Chicago: University of Chicago Press.
- Hoem, B., & Hoem, J. (1989). "The Impact of Women's Employment on Second and Third Birth in Modern Sweden", *Population Studies* **43**: 47-67.
- Hoem, B. (1992). *The Compatibility of Employment and Childbearing in Contemporary Sweden*. Stockholm: Stockholm University.
- Hoem, J. M. (1990). "Social Policy and Recent Fertility Change in Sweden", *Population and Development Review* **16**: 735-748.
- Hoem, J. M. (1992). "Public Policy as the Fuel of Fertility: Effects of a Policy Reform on the Pace of Childbearing in Sweden in the 1980s", *Acta Sociologica* **36**: 19-31.
- Honda, T. (1977). "The Effect of Induced Abortion and Contraceptive Practice on Martial Fecundity in Pre- and Post-war Japan", in Economic and Social Commission for Asia and the Pacific (Ed.), *Population Studies Translation Series No. 1*. New York: United Nations.
- Hong, M. S., Yi, S. Y., Chang, Y. S., Oh, Y. H., & Kye, H. B. (1994). *1994 National Fertility and Family Health Survey*. Seoul: Korea Institute for Health and Social

Affairs.

- Hong, S. (1988). "South Korea", in P. Sachdev (Ed.), *International Handbook on Abortion*. New York: Greenwood Press, pp. 302-316.
- Hosmer, D. W., & Lemeshow, S. (1989). *Applied Logistic Regression*. New York: John Wiley.
- Imada, S., & Hirata, S. (1992). "Female Labour Force Participation and Fertility", *Nihon Keizai Kenkyû [JCER Economic Journal]* **22**: 1-18.
- Inglehart, R. (1977). *The Silent Revolution: Changing Values and Political Styles among Western Publics*. Princeton: Princeton University Press.
- Inglehart, R. (1990). *Culture Shift in Advanced Industrial Society*. Princeton: Princeton University Press.
- Ito, S. (1993). "An Analysis of Mortality in Meiji Cities", *Japan forum* **5**: 37-51.
- Itoh, T. (1978). "Nuptiality, Fertility and Reproductivity in Japan: Hypothetical Studies on Recent Trend of Fertility", *The Journal of Population Problems* **148**: 24-43.
- Itoh, T. (1981). "Recent Trends of Marriage Cohort Fertility by Age of Wife at Marriage", *The Journal of Population Problems* **160**: 44-60.
- Johansson, S. R., & Mosk, C. (1987). "Exposure, Resistance and Life Expectancy: Disease and Death during the Economic Development of Japan 1900-1960", *Population Studies* **41**: 207-235.
- Johnston, J. (1984). *Econometric Methods* (3rd ed.). New York: McGraw-Hill.
- Jones, E. F. (1981). "The Impact of Women's Employment on Marital Fertility in the U.S., 1970-75", *Population Studies* **35**: 161-173.
- Joshi, H. (1989). "The Changing Form of Women's Economic Dependency", in H. Joshi (Ed.), *The Changing population of Britain*. Oxford: Basil Blackwell, pp. 157-176.
- Kalbfleisch, J. D., & Prentice, R. L. (1980). *The Statistical Analysis of Failure Time Data*. New York: Wiley.
- Kaneko, R. (1991). "Demographic Analysis of First Marriage Process", *The Journal of Population Problem* **47**: 3-27.
- Keeley, M. (1977). "The Economics of Family Formation", *Economic Inquiry* **15**: 238-250.
- Keeley, M. C. (1979). "An Analysis of the Age Pattern of First Marriage", *International Economic Review* **20**: 527-544.
- Kirk, D. (1996). "Demographic Transition Theory", *Population Studies* **50**: 361-387.
- Kito, H. (1983). *Nihon Nisennen no Jinkô Shi [Japanese Population History over Two Thousand Years]*. Kyoto: PHP Kenkyû Jo.
- Knodel, J. (1977). "Family Limitation and the Fertility Transition: Evidence from the Age Patterns of Fertility in Europe and Asia", *Population Studies* **31**: 219-249.
- Knodel, J., & van de Walle, E. (1979). "Lessons from the Past: Policy Implications of Historical Fertility Studies", *Population and Development Review* **5**: 217-245.
- Knodel, J. E. (1974). *The Decline of Fertility in Germany, 1871-1939*. Princeton:

- Princeton University Press.
- Knodel, J. E. (1988). *Demographic Behavior in the Past: a Study of Fourteen German Village Populations in the Eighteenth and Nineteenth Centuries*. Cambridge: Cambridge University Press.
- Kojima, H. (1989). "Intergeneration Household Extension in Japan", in F. K. Goldscheider & C. Goldscheider (Eds.), *Ethnicity and the New Family Economy*. Boulder: Westview Press, pp. 163-184.
- Kojima, H. (1993). "A Policy-Oriented Analysis of Fertility Behaviors and Attitudes in Japan", *Journal of Population Problems* 49: 29-50.
- Kojima, H. (1995). "Kekkon Shussan Ikuji oyobi Shûgô [Marriage, Childbearing, Child-caring, and Employment]", in H. Obuchi (Ed.), *Josei no Raifu Saikuru to Shûgô Kôdô [Women's Life Cycle and Employment]*. Tokyo: Ministry of Finance, pp. 61-87.
- Kono, S. (1986). "Comment", in K. Davis, M. S. Bernstam, & R. Ricardo-Campbell (Eds.), *Below-replacement Fertility in Industrial Societies*. New York: The Population Council, pp. 171-175.
- Kôseishô Daijinkanbô Tôkei Jôhoku Bu [Statistics and Information Department, Ministry of Health and Welfare]. (1995). *Yûsei Hogo Tôkei Hôkoku [Eugenic Protection Statistics Report]*. Tokyo: Government Printing Office.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare]. (1988). *The Official Report of the Ninth Japanese Fertility Survey*. Tokyo: Institute of Population Problems, Ministry of Health and Welfare.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare]. (1994a). *Dokushin Seinen Sô no Kekkon Kan to Kodomo Kan [Views of Marriage and Child of Single Youth] : The Official Report of the Tenth Japanese Fertility Survey*. Tokyo: Health and Welfare Statistics Association.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare] (1994b). *Nihon Jin no Kekkon to Shussan [Marriage and Birth of Japanese People] : The Official Report of the Tenth Japanese Fertility Survey*. Tokyo: Health and Welfare Statistics Association.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare]. (1994c). *Jinkô Tôkei Shiryô Shû [Latest Demographic Statistics]*. Tokyo: Institute of Population Problems, Ministry of Health and Welfare.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare]. (1995). *Jinkô Tôkei Shiryô Shû [Latest Demographic Statistics]*. Tokyo: Institute of Population Problems, Ministry of Health and Welfare.
- Kôsei Shô Jinkô Mondai Kenkyû Jo [Institute of Population Problems, Ministry of Health and Welfare]. (1996). *Jinkô Mondai ni Kansuru Ishiki Chôsa [The Second Public Opinion Survey on Population in Japan, 1995]*. Tokyo: Health and Welfare

Statistics Association.

- Kravdal, Ø. (1992). "The Weak Impact of Female Labour Force Participation on Norwegian Third-birth Rates", *European Journal of Population* **8**: 247-263.
- Krzanowski, W. J. (1990). *Principles of Multivariate Analysis : a User's Perspective*. Oxford: Clarendon Press.
- Krämer, W., & Neusser, K. (1984). "The Emergence of Countercyclical U.S. Fertility: Note", *The American Economic Review* **74**: 201-202.
- Kurosu, S. (1992). "Koka Sannen Hinoeuma ['Hinoeuma' in Koka 3 (1846): Regional Variation of Culture and Population]", *Bulletin of International Research Center for Japanese Studies* **6**: 35-55.
- Langbein, L. I., & Lichtman, A. J. (1978). *Ecological Inference*. Thousand Oaks: SAGE.
- Langford, C. M., & Wilson, C. (1985). "Is There a Connection between a Woman's Fecundity and That of Her Mother ?", *Journal of Biosocial Science* **17**: 437-443.
- Laslett, P. (1976). "The Wrong Way through the Telescope: a Note on Literary Evidence in Sociology and in Historical Sociology", *British Journal of Sociology* **27**: 319-342.
- Laslett, P. (1983). *The World We Have Lost: Further Explored*. London: Methuen.
- Laslett, P. (1992). *Yôroppa no Dentôteki Kazoku to Setai [The Traditional European Household]* (Trans. Sakata Toshio, & Okuda Nobuko). Tokyo: Libro.
- Laslett, P., & Wall, R. (Eds.). (1972). *Household and Family in Past Time*. Cambridge: Cambridge University Press.
- Le Bras, H. (1991). *Marianne et les lapins: l'obsession démographique* (Trans. de Luchi, Christopher). Paris: Olivier Orban.
- Le Bras, H. (1997). "The Demographic Argument in France: Coherence, Reference and Metaphors", in M. Cross & S. Perry (Eds.), *Population and Social Policy in France*. London: Pinter, pp. 19-33.
- Leasure, J. W. (1989). "A Hypothesis about Decline of Fertility", *European Journal of Population* **5**: 105-117.
- Lee, D. K. C., & Gan, C. L. (1989). "An Economic Analysis of Fertility, Market Participation and Marriage Behaviour in Recent Japan", *Applied Economics* **21**: 59-68.
- Lee, R. D. (1976). "Demographic Forecasting and the Easterlin Hypothesis", *Population and Development Review* **2**: 459-468.
- Leete, R. (1987). "The Post-demographic Transition in East and South-East Asia: Similarities and Contrasts with Europe", *Population Studies* **41**: 187-206.
- Leete, R., & Alam, I. (1993). *The Revolution in Asian Fertility*. Oxford: Clarendon Press.
- Leibenstein, H. (1974). "An Interpretation of the Economic Theory of Fertility: Promising Path or Blind Alley?", *Journal of Economic Literature* **12**: 457-479.
- Leibenstein, H. (1975). "The Economic Theory of Fertility Decline", *Quarterly Journal of Economics* **89**: 1-31.

- Leibenstein, H. (1981). "Economic Decision Theory and Human Fertility Behavior: A Speculative Essay", *Population and Development Review* **7**: 381-400.
- Lesthaeghe, R. (1971). "Nuptiality and Population Growth", *Population Studies* **25**: 415-432.
- Lesthaeghe, R. (1977). *The Decline of Belgian Fertility, 1800-1970*. Princeton: Princeton University Press.
- Lesthaeghe, R. (1980). "On the Social Control of Human Reproduction", *Population and Development Review* **6**: 527-548.
- Lesthaeghe, R. (1983). "A Century of Demographic and Cultural Change in Western Europe", *Population Development review* **9**: 411-436.
- Lesthaeghe, R. (1991). "The Second Demographic Transition in Western Countries: an Interpretation", *IPD-Working Paper* **2**: 1-31.
- Lesthaeghe, R. (1995). "The Second Demographic Transition in Western Countries: an Interpretation", in K. O. Mason & A. M. Jensen (Eds.), *Gender and Family Change in Industrialized Countries*. Oxford: Clarendon Press, pp. 1-18.
- Lesthaeghe, R., & Meekers, D. (1986). "Value Changes and the Dimension of Familism in the European Community", *European Journal of Population* **2**: 225-268.
- Lesthaeghe, R., & Surkyn, J. (1988). "Cultural Dynamics and Economic Theories of Fertility Change", *Population and Development Review* **14**: 1-45.
- Lesthaeghe, R., & Wilson, C. (1986). "Modes of Production, Secularization and the Pace of the Fertility Decline in Western Europe, 1870-1930", in A. J. Coale & S. C. Watkins (Eds.), *The Decline of Fertility in Europe*. Princeton: Princeton University Press, pp. 261-292.
- Levine, D. (1977). *Family Formation in an Age of Nascent Capitalism*. New York: Academic Press.
- Levy, M. J. (1966). *Modernization and the Structure of Societies: a setting for international affairs*. Princeton: Princeton University Press.
- Lindenberg, S. (1991). "Social Approval, Fertility and Female Labour Market", in J. J. Siegers, J. de Jong-Gierveld, & E. van Imhoff (Eds.), *Female Labour Market Behaviour and Fertility : a Rational-choice Approach*. Berlin: Springer-Verlag, pp. 32-58.
- Lloyd, C. B. (Ed.). (1975). *Sex, Discrimination, and the Division of Labor*. New York: Columbia University Press.
- Lutz, W. (1989). *Distributional Aspects of Human Fertility: a Global Comparative Study*. London: Academic Press.
- Lyons, M., & Carter, T. M. (1971). "Further Comments on Boyle's Path Analysis and Ordinal Data", *American Journal of Sociology* **76**: 1112-1132.
- MacDonald, M. M., & Rindfuss, R. R. (1981). "Earnings, Relative Income, and Family Formation", *Demography* **18**: 123-136.

- Macfarlane, A. (1978). *The Origins of English Individualism*. Oxford: Basil Blackwell.
- Macfarlane, A. (1979). "Review of 'The Family, Sex and Marriage in England 1500-1800 by Lawrence Stone'", *History and Theory*, **18**: 103-126.
- Macfarlane, A. (1987). *The Culture of Capitalism*. Oxford: Basil Blackwell.
- Maddala, G. S. (1992). *Introduction to Econometrics* (2nd ed.). New York: Macmillan.
- Mainichi Shimbunsha Jinkômondai Chosakai [Population Problems Research Council, The Mainichi Newspapers]. (Ed.). (1990). *Kiroku, Nihon no Jinkô [The Record of Japanese Population]*. Tokyo: Mainichi Shimbunsha.
- Mainichi Shimbunsha Jinkômondai Chosakai [Population Problems Research Council, The Mainichi Newspapers] (Ed.). (1992). *Kiroku, Nihon no Jinkô [The Record of Japanese Population]* (Revised ed.). Tokyo: Mainichi Shimbunsha.
- Mainichi Shimbunsha Jinkômondai Chosakai [Population Problems Research Council, The Mainichi Newspapers]. (Ed.). (1994). *Atarashii Kazokusô wo Motomete [In Search of the New Family Model: Summary of Twenty-second National Survey on Family Planning]*. Tokyo: Mainichi Shimbunsha.
- Malinowski, B. (1930). "Parenthood: the Basis of Social Structure", in V. F. Calverton & S. D. Schmalhausen (Eds.), *The New Generation: the Intimate Problems of Modern Parents and Children*. London: George Allen & Unwin, pp. 113-168.
- Marini, M. M. (1978). "The Transition to Adulthood: Sex Difference in Educational Attainment and Age at Marriage", *American Sociological Review* **43**: 483-507.
- Marini, M. M., & Hodsdon, P. J. (1981). "Effect of the Timing of Marriage and First Birth of the Spacing of Subsequent Birth", *Demography* **18**: 529-548.
- Maslow, A. (1954). *Motivation and Personality*. New York: Harper and Row.
- Matsumoto, Y. S., Koizumi, A., & Nohara, T. (1972). "Condom Use in Japan", *Studies in Family Planning* **3**: 251-255.
- Matsushita, K. (1986). "Kekkon no Keizai Bunseki ni tsuite [Economic Analysis of Marriage: Survey and Reconsideration]", *Journal of Population Problems* **180**: 11-22.
- McDonald, J. (1983). "The Emergence of Countercyclical U. S. Fertility: a Reassessment of the Evidence", *Journal of Macroeconomics* **5**: 421-436.
- McKellvey, R. D., & Zavoina, W. (1975). "A Statistical Model for the Analysis of Ordinal Level Dependent Variables", *Journal of Mathematical Sociology* **4**: 103-120.
- McKeown, T. (1976). *The Modern Rise of Population*. London: Edward Arnold.
- McNicoll, G. (1980). "Institutional Determinants of Fertility Change", *Population and Development Review* **6**: 441-462.
- Mills, T. C. (1990). *Time Series Techniques for Economists*. Cambridge: Cambridge University Press.
- Mincer, J. (1963). "Market Prices, Opportunity Costs and Income Effects", in C. F. Christ, M. Friedman, L. A. Goodman, Z. Griliches, A. C. Harberger, N. Liviatan,

- J. Mincer, Y. Mundlak, M. Nerlove, D. Patinkin, L. G. Telser, & H. Theil (Eds.), *Measurement in Econometrics: Studies in Mathematical Economics and Econometrics in Memory of Yehuda Grunfeld*. Stanford: Stanford University Press, pp. 67-82.
- Mincer, J. (1985). "Intercountry Comparisons of Labor Force Trends and of Related Developments: An Overview", *Journal of Labor Economics* **3**: S1-S32.
- Mitterauer, M., & Sieder, R. (1982). *The European Family: Patriarchy to Partnership from the Middle Ages to the Present* (Trans. Karla Oosterveen, & Manfred Hörzinger). Chicago: University of Chicago Press.
- Monbushô [Ministry of Education]. (1991). *Gakkô Kihonchôsa Hôkokusho [Report on the Basic Survey of Schools]*. Tokyo: Government Printing Office.
- Monbushô [Ministry of Education]. (1994). *Gakushûjuku ni kansuru Jittaichôsa [Investigation into the Actual Conditions of Cram Schools]*. Tokyo: Government Printing Office.
- Moore, W. E. (1974). *Social Change* (2nd ed.). Englewood Cliffs: Prentice-Hall.
- Morgan, S. P., & Hiroshima, K. (1983a). *The Persistence of Extended Family Residence in Japan: Anachronism or Alternative Strategy*. Chapel Hill: Carolina Population Center, University of North Carolina.
- Morgan, S. P., & Hiroshima, K. (1983b). "The Persistence of Extended Family Residence in Japan: Anachronism or Alternative Strategy?", *American Sociological Review* **48**: 269-281.
- Morgan, S. P., & Rindfuss, R. R. (1984). "Household Structure and the Tempo of Family Formation in Comparative Perspective", *Population Studies* **38**: 129-139.
- Morgan, S. P., Rindfuss, R. R., & Parnell, A. (1984). "Modern Fertility Patterns: Contrasts between the United States and Japan", *Population and Development Review* **10**: 19-40.
- Mosk, C. (1979). "The Decline of Marital Fertility in Japan", *Population Studies* **33**: 19-31.
- Mosk, C. (1980). "Nuptiality in Meiji Japan", *Journal of Social History* **13**: 474-489.
- Mosk, C. (1981). "Fertility and Occupation: Mining Districts in Prewar Japan", *Social Science History* **5**: 293-315.
- Mosk, C. (1983). *Patriarchy and Fertility: Japan and Sweden, 1880-1960*. New York: Academic Press.
- Mosk, C., & Johansson, S. R. (1986). "Income and Mortality: Evidence from Modern Japan", *Population and Development Review* **12**: 415-440.
- Murakami, Y., Kumon, S., & Sato, S. (1979). *Bunmei to shiteno Ie Shakai [Ie Society as Civilisation]*. Tokyo: Chuô Kôron Sha.
- Muramatsu, M. (1960). "Effect of Induced Abortion on the Reduction of Births in Japan", *Milbank Memorial Fund Quarterly* **38**: 153-166.

- Muramatsu, M. (1974). "The Japanese Experience", in H. P. David (Ed.), *Abortion Research: International Experience*. Lexington, Mass.: Lexington Books, pp. 133-136.
- Muramatsu, M. (1988). "Japan", in P. Sachdev (Ed.), *International Handbook on Abortion*. New York: Greenwood Press, pp. 293-301.
- Murphy, M. (1987). "Differential family formation in Great Britain", *Journal of Biosocial Science* **19**: 463-481.
- Murphy, M. (1989). "Housing the People: From Shortage to Surplus", in H. Joshi (Ed.), *The Changing Population of Britain*. Oxford: Basil Blackwell, pp. 90-109.
- Murphy, M. (1992). "Economic Models of Fertility in Post-war Britain: a Conceptual and Statistical Re-interpretation", *Population Studies* **46**: 235-258.
- Murphy, M. (1993a). "The Contraceptive Pill and Women's Employment as Factors in Fertility Change in Britain 1963-1980: a challenge to the conventional view", *Population Studies* **47**: 221-247.
- Murphy, M. (1993b). "Time-series Approaches to the Analysis of Fertility Change", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 51-66.
- Murphy, M., & Berrington, A. (1993). "Constructing Period Parity Progression Ratios from Household Survey Data", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 17-32.
- Murphy, M., & Sullivan, O. (1985). "Housing Tenure and Family Formation in Contemporary Britain", *European Sociological Review* **1**: 230-243.
- Nakata, Y., & Mosk, C. (1987). "The Demand for College Education in Postwar Japan", *Journal of Human Resources* **22**: 377-404.
- Nelson, C. R., & Kang, H. (1981). "Spurious Periodicity in Inappropriately Detrended Time Series", *Econometrica* **49**: 741-751.
- Nelson, C. R., & Kang, H. (1984). "Pitfalls in the Use of Time as an Explanatory Variables in Regression", *Journal of Business and Economic Statistics* **2**: 73-82.
- Nelson, C. R., & Plosser, C. I. (1982). "Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications", *Journal of Monetary Economics* **10**: 139-162.
- NHK Yoron Chôsa Bu [Department of Public Opinion Survey, the Japan Broadcasting Corporation] (Ed.). (1985). *Gendai no Kazokuzô [Images of Contemporary Families]*. Tokyo: Nihon Hôso Shuppan Kyôkai.
- NHK Yoron Chôsa Bu [Department of Public Opinion Survey, the Japan Broadcasting Corporation] (Ed.). (1991). *Gendai Nihonjin no Ishikikôzô [Consciousness Structure of Contemporary Japanese People]*. Tokyo: NHK Books.
- Nishihira, S. (1985). *Tôkei Chôsa Hô [Statistical Research Method]* (Revised ed.). Tokyo: Baifûkan.

- Nohara, M. (1976). "Shusseï no Shakai Keizai Riron [Socio-Economic Theories of Fertility]", *Journal of Population Problems* **139**: 1-18.
- Nohara, M. (1977). "Comparative Analysis of Japanese Fertility Declines in Prewar Period and in Postwar Period", *The Annual Reports of the Institute of Population Problems* **22**: 26-29.
- Nohara, M. (1979). "The Usefulness of the Intended Number of Children for Fertility Prediction in Japan", *The Journal of Population Problems* **149**: 16-31.
- Notestein, F. W. (1953). "Economic Problems of Population Change", in *Proceedings of the Eighth International Conference of Agricultural Economists*. London: Oxford University Press, pp. 13-31.
- Ní Bhrolcháin, M. (1984). "Birth Intervals and Women's Economic Activities", *Journal of Biosocial Science* **17**: 31-46.
- Ní Bhrolcháin, M. (1986a). "The Interpretation and Role of Work-associated Accelerated Childbearing in Post-war Britain", *European Journal of Population* **2**: 135-154.
- Ní Bhrolcháin, M. (1986b). "Women's Paid Work and the Timing of Births. Longitudinal Evidence", *European Journal of Population* **2**(1): 43-70.
- Ní Bhrolcháin, M. (1987). "Period Parity Progression Ratios and Birth Intervals in England and Wales, 1941-1971: a Synthetic Life Table Analysis", *Population Studies* **41**: 103-125.
- Ní Bhrolcháin, M. (1992). "Period Paramount? A Critique of the Cohort Approach to Fertility", *Population and Development Review* **18**: 599-629.
- Ní Bhrolcháin, M. (1993a). "Describing Time-trends in Fertility Using Maternity History Information", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 33-50.
- Ní Bhrolcháin, M. (1993b). "How to Answer the Fertility/Employment Question (and How not to)", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 151-157.
- Ní Bhrolcháin, M. (1993c). "Recent Fertility Differentials in Britain", in M. Ní Bhrolcháin (Ed.), *New Perspectives of Fertility in Britain*. London: OPCS, pp. 95-109.
- Sôrifu [Prime Minister's Office]. (1972, 1979, 1987, 1990). *Jyosei ni kansuru Yoron Chôsa [Opinion Survey on Women]*. Tokyo: Government Printing Office.
- Ogawa, N., & Mason, A. (1986). "An Economic Analysis of Recent Fertility in Japan: an Application of the Butz-Ward Model", *Journal of Population Studies* **9**: 5-14.
- Ogawa, N., & Retherford, R. D. (1993). "The Resumption of Fertility Decline in Japan: 1973-92", *Population and Development Review* **19**: 703-741.
- Ogura, S., & Dekle, R. (1992). "1970-nen Ikô no Shusshôritsu no Teika to sono Gen'in [Explaining the Declining Fertility of Japanese Women since 1970 through Prefectural Cohort Data]", *Nihon Keizai Kenkyû [JCER Economic Journal]* **22**: 46-76.

- Ohashi, T. (1993). *Mikonka no Shakaigaku [Sociology of Non-marriage]*. Tokyo: NHK Books.
- Ohbuchi, H. (1976). "The Demographic Transition in the Process of Japanese Industrialization", in P. Hugh (Ed.), *Japanese Industrialization and its Social Consequences*. Berkeley: University of California Press, pp. 329-361.
- Ohbuchi, H. (1982). "Empirical Tests of the Chicago Model and the Easterlin Hypothesis: a Case Study of Japan", *Journal of Population Studies* **5**: 8-16.
- Ohbuchi, H. (1988a). *The Economics of Fertility*. Tokyo: Chuô University Press.
- Ohbuchi, H. (1988b). "The Quantity and Quality of Children, Labor Supply and Wages of Married Women in Post War Japan", *Journal of Population Studies* **11**: 5-14.
- Okazaki, Y. (1982). "An Analysis of Recent Fertility Decline", *The Journal of Population Problems* **161**: 1-17.
- Okazaki, Y. (1987). *Gendai Nihon Jinkô Ron [Studies of Contemporary Japanese Population]*. Tokyo: Konjyaku Shoin.
- Oppenheimer, V. K. (1976). "The Easterlin Hypothesis: Another Aspect of the Echo to Consider", *Population and Development Review* **2**: 433-457.
- Oppenheimer, V. K. (1988). "A Theory of Marriage Timing", *American Journal of Sociology* **94**: 563-591.
- Osawa, M. (1988). "Working Mothers: Changing Patterns of Employment and Fertility in Japan", *Economic Development and Cultural Change* **36**: 623-650.
- Osawa, M. (1993). *Keizai Henka to Jyoshi Rôdô [Economic Change and Women's Labour]*. Tokyo: Nihon Hyôron Sha.
- Otani, K. (1986). "1960 Nendai Ikô Kekkon Kouhôtô no Proportional Hazards Model Bunseki [Proportional Hazards Model Analysis of Birth Intervals among Marriage Cohorts Since the 1960s]", *The Journal of Population Problems* **181**: 14-30.
- Otani, K. (1991). "Time Distributions in the Process to Marriage and Pregnancy in Japan", *Population Studies* **45**: 473-487.
- Otani, K. (1993). *Gendai Nihon Shusseiryoku Bunseki [The Analysis of Fertility in Contemporary Japan]*. Osaka: Kansai University Press.
- Parsons, T., & Bales, R. F. (1955). *Family, Socialization and Interaction Process*. Glencoe: The Free Press.
- Pindyck, R. S., & Rubinfeld, D. L. (1991). *Econometric Models and Economic Forecasts* (3rd ed.). New York: McGraw-Hill.
- Pollak, R. A., & Watkins, S. C. (1993). "Cultural and Economic Approaches to Fertility: Proper Marriage or Mésalliance?", *Population and Development Review* **19**: 467-496.
- Preston, S. H., & Richards, A. T. (1975). "The Influence of Women's Work Opportunities", *Demography* **12**: 209-222.

- Preston, S. H. (1976). *Mortality Patterns in National Populations*. New York: Academic Press.
- Preston, S. H. (1986). "Changing Values and Falling Birth Rate", in K. Davis & M. S. Berstan (Eds.), *Below-Replacement Fertility in Industrial Society: Causes, Consequences, Politics*. New York: Population Council, pp. 176-200.
- Ratnam, S. S., & Prasad, R. N. V. (1988). "Singapore", in P. Sachdev (Ed.), *International Handbook on Abortion*. New York: Greenwood Press, pp. 402-415.
- Razin, A. (1980). "Number, Birth Spacing and Quality of Children: a Micro-economic Viewpoint", *Research in Population Economics* **2**: 279-293.
- Retherford, R., & Ogawa, N. (1978). "Decomposition of the Change in the Total Fertility Rate in the Republic of Korea, 1966-1970", *Social Biology* **25**: 115-127.
- Retherford, R., Ogawa, N., & Sakamoto, S. (1996). "Values and Fertility Change in Japan", *Population Studies* **50**: 5-25.
- Retherford, R. D. (1985). "A Theory of Marital Fertility Transition", *Population Studies* **39**: 249-268.
- Retherford, R. D. (1987). "An Integration of Two Fertility Analysis Frameworks", *Genus* **43**: 1-18.
- Retherford, R. D., & Choe, M. K. (1993). *Statistical Models for Causal Analysis*. New York: John Wiley & Sons.
- Rindfuss, R., Parnell, A., & Hirschman, C. (1983). "The Timing of Entry into Motherhood in Asia: a Comparative Perspective", *Population Studies* **37**: 253-272.
- Rindfuss, R. R., & John, C. S. (1983). "Social Determinants of Age at First Birth", *Journal of Marriage and the Family* **45**: 553-565.
- Rindfuss, R. R., & Morgan, S. P. (1983). "Marriage, Sex, and the First Birth Interval: the Quiet Revolution", *Population and Development Review* **9**: 259-278.
- Robinson, W. S. (1950). "Ecological Correlations and the Behavior of Individuals", *American Journal of Sociology* **15**: 351-357.
- Rôdôshô [Ministry of Labour]. (1995). *Chingin Kôzô Kihon Tôkei Chôsa [Basic Survey on Wage Structure]*. Tokyo: Government Printing Office.
- Ryder, N. B. (1956). "Problems of Trend Determination during a Transition in Fertility", *Milbank Memorial Fund Quarterly* **34**: 5-21.
- Ryder, N. B. (1980a). *The Cohort Approach: Essays in the Measurement of Temporal Variations in Demographic Behavior*. New York: Aron Press.
- Ryder, N. B. (1980b). "Components of Temporal Variations in American Fertility", in R. W. Hiorns (Ed.), *Demographic Patterns in Developed Societies*. London: Taylor and Francis, pp. 15-54.
- Ryder, N. B. (1980c). "Where do Babies Come from?", in H. M. Blalock (Ed.), *Sociological Theory and Research: a Critical Appraisal*. New York: The Free Press, pp. 189-202.

- Ryder, N. B. (1990). "What is Going to Happen to American Fertility?", *Population and Development Review* **16**: 433-454.
- Saito, O. (1983a). "A Note on Household Size in a Japanese Proto-industrial Region: Suwa County in the Nineteenth Century", *Journal of Family History* **8**: 45-54.
- Saito, O. (1983b). "Population and the Peasant Family Economy in Proto-industrial Japan", *Journal of Family History* **8**: 30-45.
- Saito, O. (1984). "Review of 'Patriarchy and Fertility: Japan and Sweden, 1880-1960 by Carl Mosk'", *Journal of Japanese Studies*, **10**: 495-504.
- Saito, O. (1985). *Puroto Kôgyôka no Jidai [The Age of Proto-industrialization: Western Europe and Japan in Historical and Comparative Perspective]*. Tokyo: Nihon Hyôron Sha.
- Saito, O. (1987). *Shôka no Sekai, Uradana no Sekai [The World of Merchants, the World of Shop Keepers]*. Tokyo: Libro.
- Saito, O. (1992a). "Infanticide, Fertility and 'Population Stagnation': the State of Tokugawa Historical Demography", *Japan Forum* **4**: 369-381.
- Saito, O. (1992b). "Kazokushi to Rekishi Jinkôgaku [Family History and Historical Demography]", in Shakai Keizai Shi Gakkai [The Socio-Economic History Society] (Ed.), *Shakai Keizai Shi no Kadai to Tenbô [Problems and Prospects of Socio-Economic History]*. Tokyo: Yûhikaku, pp. 368-377.
- Saito, O. (1996a). "Historical Demography: Achievements and Prospects", *Population Studies* **50**: 537-553.
- Saito, O. (1996b). "Population", in S. Nishikikawa, K. Odaka, & O. Saito (Eds.), *Nihon Keizai no 200 nen [The Japanese Economy over 200 Years]*. Tokyo: Nihon Hyôron Sha, pp. 37-54.
- Saito, O. (1997). "Asia's Population History: an Overview", *The Economic Review* **48**: 59-79.
- Samuelson, P. A. (1976). "An Economist's Non-linear Model of Self-generated Fertility Waves", *Population Studies* **30**: 243-247.
- Sanderson, W. C. (1976). "On Two Schools of the Economics of Fertility", *Population and Development Review* **2**: 469-478.
- Santos, F. P. (1975). "The Economics of Marital Status", in C. B. Lloyd (Ed.), *Sex, Discrimination, and the Division of Labor*. New York: Columbia University Press, pp. 244-269.
- Scheuch, E. K. (1990). "The Development of Comparative Research: towards Causal Explanations", in E. Øyen (Ed.), *Comparative Methodology: Theory and Practice in International Social Research*. London: SAGE, pp. 19-37.
- Schofield, R. (1989). "Family Structure, Demographic Behaviour, and Economic Growth", in J. Walter & R. Schofield (Eds.), *Famine, Disease and the Social Order in Early Modern Society*. Cambridge: Cambridge University Press, pp. 279-304.

- Schultz, T. W. (1973). "The Value of Children: an Economic Perspective", *Journal of Political Economy* **81**: S2-S13.
- Schultz, T. W. (1974a). "Birth Rate Changes over Space and Time: a Study of Taiwan", in T. W. Schultz (Ed.), *Economics of the Family*. Chicago: University of Chicago Press, pp. 255-291.
- Schultz, T. W. (Ed.). (1974b). *Economics of the Family*. Chicago: University of Chicago Press.
- Shakai Hoshô Kenkyû Jo [the Social Development Research Institute]. (Ed.). (1994). *Gendai Kazoku to Shakai Hoshô [Contemporary Family and Social Security: Marriage, Birth, and Child Care]*. Tokyo: University of Tokyo Press.
- Shinpo, H., Hayami, A., & Nishikawa, S. (1975). *Sûrô Keizaishi Nyûmon [An Introduction to Cliometrics]*. Tokyo: Nihon Hôron Sha.
- Shorter, E. (1975). *The Making of the Modern Family*. New York: Basic Books.
- Silver, M. (1966). "Births, Marriages, and Income Fluctuation in the United Kingdom and Japan", *Economic Development and Cultural Change* **14**: 302-315.
- Simons, J. (1982). "Reproductive Behaviour as Religious Practice", in C. Höhn & R. Mackensen (Eds.), *Determinants of Fertility Trends : theories re-examined* . Liège: Ordina, pp. 133-145.
- Simons, J. (1986a). "Culture, Economy and Reproduction in Contemporary Europe", in D. Coleman & R. Schofield (Eds.), *The State of Population Theory*. Oxford: Basil Blackwell, pp. 256-278.
- Simons, J. (1986b). "How Conservative are British Attitudes to Childbearing?", *Quarterly Journal of Social Affairs* **2**: 415-429.
- Smelser, N. J. (1959). *Social Change in the Industrial Revolution : an Application of Theory to the Lancashire Cotton Industry, 1770-1840*. Chicago: University of Chicago Press.
- Smith, D. P. (1980). "Asian Marriage Patterns in Transition", *Journal of Family History* **5**: 58-96.
- Smith, D. P. (1981). "A Consideration of Easterlin Cycles", *Population Studies* **35**: 247-264.
- Smith, H. (1989). "Integrating Theory and Research on the Institutional Determinants of Fertility", *Demography* **26**: 171-184.
- Smith, P. C. (1983). "The Impact of Age at Marriage and Proportions Marrying on Fertility", in R. A. Bulatao & R. D. Lee (Eds.), *Determinants of Fertility in Developing Countries*. New York: Academic Press, pp. 473-531.
- Smith, R. M. (1979). "Some Reflections on the Evidence for the Origins of the 'European Marriage Patterns' in England", in C. Harris (Ed.), *The Sociology of the Family: New Directions for Britain*. Keele: University of Keele, pp. 74-112.
- Smith, R. M. (1981). "Fertility, Economy and Household Formation in England over

- Three Centuries", *Population Development and Review* **7**: 595-622.
- Smith, R. M. (1986). "Transfer Incomes, Risk and Security", in D. Coleman & R. Schofield (Eds.), *The State of Population Theory*. Oxford: Basil Blackwell, pp. 188-211.
- Smith, T. C. (1977). *Nakahara: Family Farming and Population in a Japanese Village, 1717-1830*. Stanford: Stanford University Press.
- Stone, L. (1975). "The Rise of the Nuclear Family in Early Modern England: the Patriarchal Stage", in C. Rosenberg (Ed.), *The Family in History*. University of Pennsylvania Press.
- Stone, L. (1979). *The Family, Sex and Marriage in England 1500-1800*. New York: Harper & Row.
- Sun, T., Lin, H., & Freedman, R. (1978). "Trends in Fertility, Family Size Preference, and Family Planning Practice: Taiwan, 1961-76", *Studies in Family Planning* **9**: 54-70.
- Szreter, S. (1993). "The Idea of Demographic Transition and the Study of Fertility Change: a Critical Intellectual History", *Population and Development Review* **19**: 659-701.
- Tai-Hwan, K. (1993). "Exploring Socio-cultural Explanations of Fertility Transition in South Korea", in R. Leete & I. Alam (Eds.), *The Revolution in Asian Fertility*. Oxford: Clarendon Press, pp. 41-53.
- Taueuber, I. B. (1958). *The Population of Japan*. Princeton: Princeton University Press.
- Taueuber, I. B. (1960a). "Japan's Demographic Transition Re-examined", *Population Studies* **14**: 28-39.
- Taueuber, I. B. (1960b). "Urbanization and Population Change in the Development of Modern Japan", *Economic Development and Cultural Change* **9**: 1-28.
- Taueuber, I. B. (1971). "Chinese Populations in Transition: the City States", *Population Index* **38**: 3-34.
- Teachman, J. D., & Heckert, D. A. (1985). "The Declining Significance of First-Birth Timing", *Demography* **22**: 185-198.
- Teitelbaum, M. S. (1984). *The British Fertility Decline*. Princeton: Princeton University Press.
- Teitelbaum, M. S., & Winter, J. M. (1985). *The Fear of Population Decline*. Orlando: Academic Press.
- Teitelbaum, M. S., & Winter, J. M. (forthcoming). *Broken Boundaries: Low Fertility, High Immigration and Rising Nationalism*. New York: Hill and Wang.
- Thompson, W. (1929). "Population", *American Journal of Sociology* **34**: 959-975.
- Thornton, A., & Lin, H. (1994). *Social Change and the Family in Taiwan*. Chicago: University of Chicago Press.
- Tilly, C. (Ed.). (1978). *Historical Studies of Changing Fertility*. Princeton: Princeton

University Press.

- Toda, T. (1937). *Kazoku Kousei (Family Structure)*. Tokyo: Kôbun Dô.
- Tôkei Sûri Kenkyûjyo [Institute of Statistical Mathematics]. (1994. "Kokuminsei no Kenkyû Dai 9 kai Zenkoku Chôsa [A Study of the Japanese National Character: the Ninth Nationwide Survey]", *Tôkei Sûri Kenkyûjo Kenkyû Ripôto* **75**.
- Trumbach, R. (1978). *The Rise of the Egalitarian Family*. New York: Academic Press.
- Trumbach, R. (1979). "Europe and its Families: a Review Essay of Lawrence Stone, the Family, Sex and Marriage in England 1500-1800", *Journal of Social History* **13**: 136-143.
- Trussell, J., & Hammerslough, C. (1983). "A Hazard Model Analysis of the Covariates of Infant and Child Mortality in Sri Lanka", *Demography* **20**: 1-26.
- Trussell, J., Martin, L. G., Feldman, R., Palmore, J. A., Concepcion, M., & Bakar, D. (1985). "Determinants of Birth-interval in the Philippines, Malaysia, and Indonesia: a Hazard-model Analysis", *Demography* **22**: 145-168.
- Trussell, J., & Richards, T. (1985). "Correcting for Unmeasured Heterogeneity in Hazard Models using the Heckman-Singer Procedure", in N. Tuma (Ed.), *Sociological Methodology 1985*. San Francisco: Jossey-Bass, pp. 242-276.
- Tsubouchi, Y. (1970). "Changes in Fertility in Japan by Region: 1920-1965", *Demography* **7**: 121-134.
- Tsui, A. O. (1982). "The Family Formation Process among U.S. Marriage Cohorts", *Demography* **19**: 1-27.
- Tsuya, N. (1991). "Rethinking of Demographic Transition Theory", *Journal of Population Studies* **14**: 49-66.
- Tsuya, N. O., & Mason, K. O. (1995). "Changing Gender Roles and Below-Replacement Fertility in Japan", in K. O. Mason & A. M. Jensen (Eds.), *Gender and Family Change in Industrialized Countries*. Oxford: Clarendon Press, pp. 139-167.
- Tzannatos, Z., & Symons, J. (1989). "An Economic Approach to Fertility in Britain since 1860", *Journal of Population Economics* **2**: 121-138.
- Udry, R. J. (1983). "Do Couples Make Fertility Plans One Birth at a Time", *Demography* **20**: 117-128.
- van de Kaa, D. J. (1980). "Recent Trend in Fertility in Western Europe", in R. W. Hiorns (Ed.), *Demographic Patterns in Developed Societies*. London: Taylor and Francis, pp. 55-83.
- van de Kaa, D. J. (1987). "Europe's Second Demographic Transition", *Population Bulletin* **42**.
- van de Kaa, D. J. (1996). "Anchored Narratives: the Story and Findings of Half a Century of Research into the Determinants of Fertility", *Population Studies* **50**: 389-432.
- Vogel, E. F. (1990). *The Four Little Dragons: the Spread of Industrialization in East Asia*.

- Cambridge, Mass: Harvard University Press.
- Wachter, M. L. (1975). "A Time Series Fertility Equation: The Potential for a Baby Boom in the 1980's", *International Economic Review* **16**: 609-624.
- Wall, R. (Ed.). (1983). *Family Forms in Historic Europe*. Cambridge: Cambridge University Press.
- Ward, M., & Butz, W. (1980). "Completed Fertility and Its Timing", *Journal of Political Economy* **88**: 917-940.
- Watanabe, Y. (1992). "Jinkô Tenkan Ki ni okeru Nihon no Kôhôte Shusshôryoku Teika Katei [A Cohort Analysis of Fertility Decline in Japan at the Time of Demographic Transition]", in S. Kono (Ed.), *Hatten-Tojôkoku no Shusshôritu Teika: Tenbô to Kadai [Fertility Decline in Developing Countries: Trends, Causes, Issues]*. Tokyo: The Institute of Developing Economics, pp. 229-255.
- Watanabe, H., & Kondo, H. (1990). "Kekkon to Kaisouketsugô [Marriage and the Linkage of Strata]", in H. Okamoto & M. Naoi (Eds.), *Gendai Nihon no Kaisô Kouzô [Stratification Structure in Modern Japan]*. Tokyo: University of Tokyo Press, pp. 119-146.
- Watkins, S. C. (1989). "The Fertility Transition: Europe and the Third World Compared", in J. M. Stycos (Ed.), *Demography as an Interdiscipline*. New Brunswick: Transaction Publishers, pp. 27-55.
- Watkins, S. C. (1991). *From Provinces into Nations*. Princeton: Princeton University Press.
- Weller, R. H. (1977). "Wife's Employment and Cumulative Family Size in the United States, 1960 and 1970", *Demography* **14**: 43-65.
- Westoff, C. F. (1983). "Fertility Decline in the West: Causes and Prospects", *Population and Development Review* **9**: 99-104.
- Westoff, C. F., Hammerslough, C. R., & Paul, C. (1987). "The Potential Impact of Improvements in Contraception and Fertility in Western Countries", *European Journal of Population* **3**: 7-32.
- Westoff, C. F., & Ryder, N. B. (1977). *Contraceptive Revolution*. Princeton: Princeton University Press.
- Wilkinson, M. (1973). "An Econometric Analysis of Fertility in Sweden, 1870-1965", *Econometrica* **41**: 633-642.
- Willis, R. J. (1973). "A New Approach to the Economic Theory of Fertility Behavior", *Journal of Political Economy* **81**: S14-S64.
- Willis, R. J. (1987). "The Family. What Have We Learned from the Economics of the Family", *American Economic Review* **77**: 68-81.
- Wilson, A. (1980). "The Infancy of the History of Childhood: an Appraisal of Philippe Ariès", *History and Theory* **19**: 132-153.
- Wilson, C., & Woods, R. (1991). "Fertility in England: a Long-term Perspective",

Population studies 45: 399-415.

- Winegarden, C. R. (1984). "Women's Fertility, Market and Marital Status: a Test of the New Household Economics with International Data", *Economica* 51: 447-456.
- Wolf, A. P., & Hanley, S. B. (1985). "Introduction", in S. B. Hanley & A. P. Wolf (Eds.), *Family and Population in East Asian History*. Stanford: Stanford University Press, pp. 1-12.
- Woods, R. (1992). *The Population of Britain in the Nineteenth Century*. London: Macmillan.
- Woods, R. I. (1987). "Approach to the Fertility in Victorian England", *Population Studies* 41: 283-311.
- Woods, R. I., & Hinde, P. R. A. (1985). "Nuptiality and Age at Marriage in Nineteenth-Century England", *Journal of Family History* 10: 119-144.
- Wright, R. E. (1989). "The Easterlin Hypothesis and European Fertility Rate", *Population and Development Review* 15: 107-122.
- Wrigley, E. A. (1969). *Population and History*. New York: McGraw-Hill.
- Wrigley, E. A. (1977). "Reflections on the History of the Family", *DÆDALUS* Spring: 71-85.
- Wrigley, E. A. (1987). *People, Cities and Wealth*. Oxford: Blackwell.
- Wrigley, E. A., & Schofield, R. (1989). *The Population History of England 1541-1871: a Reconstruction*. Cambridge: Cambridge University Press.
- Yamaguchi, K. (1991). *Event History Analysis*. London: SAGE.
- Yamamura, K., & Hanley, S. (1975). "Ichi hime, ni Tarô: Education Aspirations and the Decline of Fertility in Postwar Japan", *Journal of Japanese Studies* 2: 83-125.