

Gender, Discrimination and Inequality in China: Some Economic Aspects

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Oxford

Thesis submitted for the degree of Doctor of Philosophy
Department of Economics
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Abstract

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With the move to a more market-oriented economy in China, there is evidence of increased inequality in the incomes earned by men and women. To explore this outcome, we turn to an aspect of Chinese society that is pervasive in both economic and social contexts, namely, the Chinese variant of social capital, *guanxi*. It appears that in an imperfect labour market characterised by frictions, such as restricted mobility, costly job search, and limited employment alternatives, the cultivation of *guanxi* is important in reducing these transaction costs. The notion that investing in social capital can enhance an individual's opportunities leads to the development of a theory of discrimination that may explain the gender inequalities accompanying marketisation in China, and might be more generally relevant. The model of earnings discrimination is premised on imperfect product and labour markets. Under these conditions, we show that differential wages for similarly productive workers is a profit maximising outcome for firms.

We apply this theory in an attempt to explain the trend of increasing gender inequality in earned income in urban China during the current reform period. First, pre-labour market gender inequality is investigated through developing a model of parental investment in children's human capital to discern whether there are productive differences between men and women prior to entering employment. In 1995, household expenditure on children's education is affected by perceived future earnings differentials and support of parents in retirement. Regarding labour markets, an original survey designed to test our model of social capital was administered in urban China in early 2000 and pertained to 1999. We find that there are differences between men and women in their investment in *guanxi* that correspond to gender inequalities in earned income and rates of re-employment. Both empirical chapters provide evidence in accordance with the predictions of the theory.

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Acknowledgements

My appreciation goes to Professor John Knight for his unmatched supervision, superb guidance and unwavering support. I also want to thank SKOPE Director Ken Mayhew for his invaluable time and insight. To the faculty, staff and students at St. Edmund Hall, the Department of Economics and the University of Oxford, thank you for making this time one of the most enjoyable of my life.

The support of the Department for International Development is gratefully acknowledged, as is the time and assistance of Professor Li Shi and the members of the Institute of Economics, Chinese Academy of Social Sciences. Please know my gratitude for making my part of the survey possible. The grants from the George Webb Medley Fund are also very much appreciated.

To my siblings – Amy, Kelly and William – thank you for providing me with balance! Finally, to my parents, John and Patty, please know that without you nothing in my life would be possible.

Part I

Introduction

Chapter 1

Introduction

Women fared better post-1949 under the Communist economic regime than in dynastic China (D.W. Chang 1988; Hsü 1995 [1970]). In spite of the many shortcomings of the planned system, there were numerous improvements in the position of women in fundamental areas, such as education and employment (Pepper 1987; Riskin 1987; UNESCO 1999). These policies resulted in a general level of gender equality in earned income, where China does relatively well by international comparison (World Bank 2000*a*, 2000*b*; see also UN 1997).

However, accompanying the economic reforms begun in 1978 through the large-scale reform of the state-owned sector in the late 1990s is evidence of increased inequality in the incomes earned by men and women (Knight and Song 1993*b*, 1999*b*, 1999*d*; Yao 1999; Appleton, Knight, Song and Xia 2000; Gustafsson and Li 2000). It is not clear why marketisation should be accompanied by more pronounced gender inequality.

1.1 Motivation

These concerns motivate our research into aspects of pre-labour market and within-labour market gender inequality in urban China in the current reform

period. We introduce our research with a brief overview of the immense economic growth of China since 1978, and then present some indicators of gender differences in the current reform period.

From 1980 to 1989, China's GDP grew at an average annual rate of 10.2%, while the average for the world's economies over the same period was 3.2% (World Bank 2000*b*).¹ During the period 1990-1997, China's GDP growth rate was 11.6%, as compared with the average world rate of 2.4%. As a further basis of comparison, the United States – during what is widely acknowledged as a period of economic expansion – experienced GDP growth of 3.0%. China's GDP (US\$991.2 billion) in 1999 ranks it as the seventh largest economy in the world – after the United States, Japan, Germany, France, the United Kingdom and Italy – in that order.²

The effect of this rapid growth on the position of women is our focus. In 1999, there are 641.9 million males (50.98%) and 617.2 million females (49.02%) out of a total population of 1.26 billion (NBS 2000*a*). Approximately 388.9 million (31% of the total population) live in urban areas, while the bulk of the people live in rural areas. As our focus is on urban China, we provide urban statistics where possible. National figures, however, can depict a broader picture of the position of women.

¹ GDP at purchasers' prices is the sum of the gross value added by all residents and nonresident producers in the economy plus any taxes and minus any subsidies not included in the value of the products. Growth is measured by the increase in value added (World Bank 2000*b*).

² China also ranked seventh in the world in 1999 in gross national product (US\$980.2 billion), defined as the sum of gross value added by all resident producers plus any taxes (less subsidies) that are not included in the valuation of output plus net receipts of income from abroad (World Bank 2000*b*).

Table 1.1
 Overview of Gender Statistics in China, 1999
 (in persons and percentages)

	Men	Women
Educational Attainment (for persons aged 6 and over)		
College and Above	21,568,000 (62.0%)	13,181,000 (38.0%)
Upper Secondary School	69,126,000 (57.0%)	51,296,000 (43.0%)
Lower Secondary School	218,032,000 (56.5%)	168,025,000 (43.5%)
Primary School	215,597,000 (49.8%)	217,331,000 (50.2%)
Less than Primary School	45,578,000 (30.3%)	104,761,000 (69.7%)
Urban Labour Force	75,168,000 (62.0%)	46,134,000 (38.0%)
Urban Unemployed Persons	2,479,000 (49.6%)	2,523,000 (50.4%)

Sources: NBS (2000*a*, 2000*b*).

Table 1.1 provides an overview of some educational and employment indicators disaggregated by gender from the China Statistical Yearbook for 1999, the most recent year available (NBS 2000*a*, 2000*b*). There is evidence of gender differences in educational attainment. Some 60 million more women than men have a less than primary education. The proportion of women relative to men decreases after primary school and women are little more than one-third of the college-educated in China. Regarding employment, years of planning and encouragement of women to work have resulted in a relatively high rate of female participation in the labour force by international comparison (World Bank 2000*a*).³ In 1998, the ratio of participation rates of women and men was 0.8, while it was 0.7 on average for the world and in

some developed countries, such as the European Union.⁴ However, women constitute 38.0% of the urban labour force,⁵ but are slightly more than half (50.4%) of the unemployed. This does not take into account the other forms of nonemployment that we will discuss in this thesis, including those who are “not in post” – a phenomenon associated with the recent downsizing of the state-owned sector. This provides a snapshot of the position of women in the current reform period.

The contextual background of our investigation of the position of women in urban China is the underdeveloped labour market. In the 1980s and 1990s, following the main economic reform programmes, the state monopoly of labour allocation was replaced by a more decentralised system geared toward developing a labour market (Knight and Song 1995, 1999*b*, 1999*c*). The yet underdeveloped labour market has become more evident in light of the large-scale reform of the state-owned sector, which has resulted in massive layoffs of workers (Zhu 1999).

In urban areas,⁶ an estimated 6% of urban workers have lost their previously secure lifelong jobs since approximately 1995 (Ma and Wong 1999⁷; see

³ See Mao Zedong’s often cited quote that women “hold up half the sky” (D.W. Chang 1988).

⁴ The most recent year available for international comparisons of female participation rates in employment is 1998 (World Bank 2000*a*).

⁵ This excludes privately owned firms, for which gender proportions are not available (NBS 2000*b*).

⁶ These issues are not unique to any part of China, but they tend to be concentrated in the urban areas, where a majority of SOEs are located, and are particularly severe in the Northeast, such as in Liaoning – one of the provinces covered by our 1999 survey – on account of its concentration on heavy industry.

⁷ Ma and Wong (1999: 166) identify the period of 1996-1998 as the third period of a high rate of unemployment since 1949. The first period was from 1949 until 1953 when there were 3.3 million unemployed persons, and the second was in the aftermath of the Cultural Revolution in 1980. On account of youth returning from the countryside, there were 5.4 million unemployed persons.

also Mo 1999; Zhang 2000). Some of these workers are officially registered as unemployed⁸ and others are *xiagang* – a status that renders a worker to be effectively unemployed but still registered as employed with the work unit. Therefore, although the official urban unemployment rate was 3.1% in 1999 (corresponding to 5.7 million individuals), when those who are *xiagang* are included, the figure increases by 8.8 million individuals, *i.e.*, more than double the official unemployment rate (Ma and Wong 1999; NBS 2000a). Moreover, unlike the official unemployment rate that rose from 2.9% in 1995 to 3.1% in 1996 and remained constant thereafter, the number of *xiagang* workers is rising. Accordingly, Ma and Wong (1999) argue that the large number of *xiagang* workers means that the true level of unemployment is no longer moderate (see also Li 1999).

These changes may contribute to the growing income inequality between men and women. The layoffs associated with the downsizing of the state-owned sector appear to have disparate gender effects. A nationwide survey in the 1990s conducted by the All China Federation of Trade Unions finds that women account for 37% of all state sector workers, but they are 60% of the *xiagang* and the unemployed (see Lee 1998b). Appleton, Knight, Song and Xia (2000) find that in 1999, women in urban China had disproportionately experienced unemployment in the

⁷ Ma and Wong (1999: 166) identify the period of 1996-1998 as the third period of a high rate of unemployment since 1949. The first period was from 1949 until 1953 when there were 3.3 million unemployed persons, and the second was in the aftermath of the Cultural Revolution in 1980. On account of youth returning from the countryside, there were 5.4 million unemployed persons.

⁸ The unemployment rate is defined as the number of registered urban unemployed persons over the sum of total urban employed persons and the registered urban unemployed persons times 100 (NBS 2000a: 115, 163). NBS does not report national unemployment figures, only for urban areas.

previous five years. They constituted 61% of the sample of workers who had been unemployed.

On the whole, gender differences in post-1978 China are not well understood and remain largely unexplored in the literature with the notable exceptions of Gao (1994), Lee (1998*a*, 1998*b*), Knight and Song (1993*b*, 1999*b*, 1999*d*), Yao (1999), Gustafsson and Li (2000), and some aspects by Bian (1994*a*, 1994*b*). Gao (1994) and Yao (1999) find an increase in occupational crowding of women into less desirable positions in rural enterprises. For urban China, Knight and Song (1999*d*) estimate that the significant and negative coefficient on the female gender dummy variable in earnings functions increased from 0.093 to 0.148 as between 1988 and 1995. Gustafsson and Li (2000) find, on average, a 15.6% gender earnings gap in 1988 that rose to 17.5% in 1995 in urban China.

In an attempt to understand these issues, we turn to one aspect of Chinese society that remains important from the pre-1949 era through the current reform period – in economic as well as noneconomic life. This is the importance of social networks and *guanxi*, the Chinese variant of social capital. Social networks encompass certain amounts of social capital, which we posit is most usefully conceptualised as individual investment of time and resources in relationships with other people. The importance of social capital is best understood as a function of the complex mixture of history, culture, tradition and socio-economic-political development that characterises a society.

Its significance in the economic arena is far from unique (see Putnam, Leonardi and Nanetti 1993 for the importance of social networks in the differential economic growth of northern and southern Italy; Amin, Becker and Bayes 1998 and Pitt and Khandker 1998 for the importance of social groups in the success of rural credit programmes among women in Bangladesh). However, social capital is particularly noteworthy for its emphasis in Chinese economic transactions (Oi 1989, 1999; Leung 1993; Bian 1994*a*, 1994*b*; Bruun 1995; Wank 1995; Pearson 1997) as well as social life (Yang 1994; Yan 1996; Kipnis 1997). The pervasiveness of *guanxi* in China cannot be overstated. Bian (1994*a*) finds that *guanxi* is important in employment even under the planned system of allocated jobs. The close relationship between social capital and employment suggests that they need to be analysed in tandem. It may be that social capital generates different opportunities for equally productive individuals, which affects the labour supplied to firms and causes unequal employment outcomes for otherwise comparable workers. Social capital thus motivates us to examine the role of differential opportunities in explaining the persistence of economic discrimination (see Arrow 1998).

1.2 Analytical Approaches

We draw upon the theories of discrimination and imperfect competition, as well as the evolving field of social capital, to gain an understanding of gender inequality in the reform period in urban China. Investigating these approaches leads to the conclusion that there are many inter-linkages that can be formulated into a dynamic theory to explain gender discrimination.

First, existing economic theories of discrimination in labour markets do not appear adequate to explain the persistence of earnings differentials among equally productive persons (Akerlof 1984; Cain 1986; Loury 1995, 1998; Arrow 1998; Blau and Kahn 2000).⁹ The predominant model is the “taste for discrimination” theory developed by Becker (1971 [1957]; see Goldberg 1982 for a nepotism version), in which agents [sometimes employers, sometimes fellow employees, sometimes customers] are thought to have a taste for discrimination and engage not in profit but utility maximisation. The major alternative model, known as the statistical theory of discrimination, relaxes the assumption of perfect information (Phelps 1972; Arrow 1972*b*, 1973). The premise of this theory is consistent with efficiency as employers are thought to use gender or race as a proxy for determining productive ability when the relevant information is imperfect and costly to obtain. In this way, discrimination serves as an efficient, screening device. These approaches to racial discrimination, from which theories of gender discrimination draw, and others are discussed in detail in Chapter 2. In short, they appear to fail to explain how discrimination can persist since competition should force employers to engage in profit and not utility maximisation and screening cannot explain the changes in discriminatory practices over time.

⁹ “Discrimination, along with unemployment, is one of the few major economic phenomena for which market-clearing models of demand and supply offer insufficient explanation” (Akerlof 1984: 4). In a survey of the literature, Cain (1986: 781) concludes that the “economics of discrimination is a particularly complex subject. My judgment is that the theories of discrimination have been useful in providing definitions and for suggesting measurements of discrimination but not for providing convincing explanations of the phenomenon nor its patterns. The econometric work has also been useful, but to my eyes more so for its descriptive content than for testing hypotheses or for providing estimates of causal relations.”

For instance, it is at times noted that certain groups, such as Jews (Chiswick 1983), have been able to overcome discriminatory practices in the labour market. On the other hand, there are groups – such as blacks and women – who seem not to have come as far (Reich 1981; Blau 1996, 1998). Existing theories do not offer a compelling explanation as to why some groups and not others have been able to achieve a degree of economic equality. Moreover, the notion of discrimination as stemming from private taste that is carried over into the economic arena appears to be at odds with the usual conception of firm profit-maximisation.

We start from the premise that discrimination is compatible with profit-maximisation when there exists imperfect competition. In seeking to understand discrimination from both the demand and supply sides, we combine the theories of firm market power with frictions in imperfect labour markets. Frictions will cause labour supply to be inelastic or upward sloping with respect to a firm. Imperfect competition in product markets will allow some firms to hold a degree of market power, rather than assuming that all firms are price-takers, which enables rents to be obtained from labour.¹⁰ Rents are defined as the surplus that is gained by a firm when it pays a wage that is below the value of labour's marginal product.

Firms gain differential rents by acting on the *relative* elasticities of the labour supplies of heterogeneous groups. The rent-maximising calculus will compel each firm to set wages at the monopsonistic rate for each group – such as men and

¹⁰ The theory of the “core” (see Telser 1978, 1987, 1996) and the industrial organisation concept of “mutual dependence” (see Mason 1957; Bain 1956, 1967; Caves 1967; Caves and Porter 1977) both formalise aspects of imperfect product market competition.

women – differently (Robinson 1969 [1933]; Samuelson 1947, 1976 [1948]). This will result in men and women of equal productive abilities receiving unequal wages. This behaviour is motivated, however, not by animus but by the profit advantages inherent in differing labour supplies. In other words, women are not singled out for lower pay because they are disliked, but because they have less elastic labour supplies than men when supplying labour to a firm. The literature and theory are discussed in detail in Chapter 2.

In brief, we will argue that the elasticities of labour supplies stem from frictions in factor markets that differ for individuals (Acemoglu 1997; Dickens, Machin and Manning 1999; Stevens 2000). Once a person is employed in a firm, there are constraints on mobility (Pissarides 1994; Black 1995) and costs associated with changing jobs (Salop 1973; Diamond 1981, 1982). Women, who tend not to be the primary income earners in the household, may be more constrained than men in their employment choices by their spouse's job and the need to keep their families in one location (Hakim 1998). These limitations on the ability of employed women to change jobs may contribute to decreasing the elasticities of their labour supplied to a firm. If elasticities differ, then there can be earnings differentials between men and women with otherwise similar productive characteristics.

Informal relationships can reduce transaction costs in a market characterised by frictions and thus increase employment opportunities. These opportunities can take the form of information (Granovetter 1985, 1995 [1974]; Waldinger 1996) or access to jobs through contacts (Datcher 1983; Lin and Dubin

1986; Montgomery 1991; Mortensen and Vishwanath 1994; Collier and Garg 1999). As mentioned before, such relationships are known as *guanxi* in the Chinese context (Bian 1994a; Lee 1998b). These informal relationships can be thought of as a form of social capital (Coleman 1988, 1990) that a person invests in and seeks returns from, akin to the process of human capital accumulation and use. If men and women have unequal amounts of social capital (Moore 1990; Burt 1998) that differentially decrease the frictions they experience in labour markets, then dissimilar employment outcomes are possible.

1.3 Thesis Outline

This thesis will investigate aspects of pre-labour market and within-labour market gender inequality in urban China. In attempting to understand the puzzle of the increasing earnings differentials that are evident in the current reform period, we investigate the roles of human capital and social capital. Both these factors – productivity and opportunity in our formulation – can cause differential labour market outcomes for men and women. Unequal human capital will cause differences in productive ability, while social capital can affect the possible range of returns to labour.

The thesis is structured in four parts. The first part is this introduction. Part II consists of a proposed theory of discrimination presented as a formal model with testable hypotheses. Part III applies this theory to women in urban China and describes the data sets used, including an original survey conducted in early 2000 and

pertaining to 1999 that was designed to test our theory. The conclusion in Part IV will assess the findings of pre-labour market and within-labour market gender differences to investigate whether there is evidence of discrimination. We then evaluate the position of women in urban China and discuss the welfare and policy implications.

Part II comprises the theory portion of the thesis, in which we attempt to explain the persistence of discrimination as a consequence of imperfect competition under even perfect information. The theory focuses on the supply side to investigate the effects of social capital and employment opportunities on the labour supplied to a firm, with an emphasis on gender differences. The model of earnings discrimination is presented in static and dynamic forms, including an appendix relaxing the assumption of perfect information. The dynamic model offers an explanation as to why some groups and not others have been able to overcome discrimination in the long run.

Part III begins with a chapter dedicated to an overview of the Chinese economy during the current reform period and the position of women in the labour market. We also explore why existing theories of discrimination do not appear to explain gender economic inequality in urban China and turn to the potential of *guanxi* to aid our understanding. Two empirical chapters follow, which explore the relevance of our theory of earnings discrimination with respect to aspects of pre-labour market and within-labour market gender differences. Both chapters find evidence that accords with the predictions of the theory.

The first of the empirical chapters models the parental decision to invest in children's education as a function of expected returns to the children's human capital and transfers to parents – both of which are affected by anticipated future gender earnings differentials. One innovation in our model is to consider the investment decision when there is a third period of parents living in retirement (see also Becker 1993). This introduces a second rate of return. The analysis therefore differs from assessing only the rates of return to education that drive most models of parental investment in children's human capital. Different expectations of the returns that will go to the children and to supporting parents in the third period will affect the decision to spend on children's education in the current period. To the extent that human capital stock is accumulated during a time in which the decision lies largely with parents, this model may contribute to understanding differential investments in the education of sons and daughters. We test this theory using a 1995 urban Chinese household data set with a further innovation of linking the decision to forgo current consumption to invest in children with empirical models of intrahousehold resource allocation that seem well-suited to test this premise.

Whereas the first empirical chapter investigates potential differences in productivity between men and women prior to entering the labour market, the second explores the role of social capital in making available opportunities within the labour market. Opportunities are posited to be one form of returns to social capital. Social capital can reduce labour market frictions experienced by workers when search is costly and there are limits on mobility. Given these economic returns (as well as noneconomic returns), individuals may choose to invest their time and resources in

accumulating social capital. The pre-eminence of *guanxi* in all facets of economic and noneconomic life in China provides a strong basis on which to formalise the concept of employment opportunities.

We develop a model of individual investment in social capital and investigate it by means of an original survey, administered in China in February/March 2000 and pertaining to 1999, which includes a module we designed to measure stocks and returns to social capital. We then test the hypotheses concerning social capital and labour market outcomes, with a focus on gender differences in returns. Moreover, our measures of social capital may contribute to a better understanding of this form of capital that has become increasingly important in theories of economic development and growth (for example, see Narayan and Pritchett 1997).

Part IV concludes with a summary of the main findings of gender inequality in urban China in 1995 and 1999, and evaluates whether there is evidence of discrimination. We then explore the social welfare and policy implications for women in urban China in light of the evidence. Finally, we conclude with a discussion of possible future directions of research – in the areas of human capital, labour market opportunities, and social capital.

Part II

Theory

Chapter 2

A Theory of Earnings Discrimination

This chapter will review the literature on the economics of discrimination and present a model that offers an explanation for the persistence of discrimination under imperfectly competitive conditions. This model is developed with respect to gender and tested on urban China, but may be read to have general applicability.

2.1 The Economics of Discrimination

There are two major theories of the economics of discrimination, both based on neoclassical assumptions. They are the “tastes” model and the statistical theory, which form the primary basis for current theories of gender discrimination and the focus of our literature review. There are also numerous theories explaining earnings differentials, the relevant strands of which we will also review, including job competition, segmented labour markets and efficiency wage theory. The section concludes with a discussion of monopsony, the classical explanation for wage differentials.

2.1.1 Theories of Gender Discrimination

With regard to gender discrimination, one of the first articles dates back to 1892. In response to an article by Webb (1891), Fawcett (1892) points out that the alleged differences in wages between men and women are not solely due to differences in productivity, but that pay may be unequal for equal work because compensation is also influenced by the quality and wage of employment alternatives open to women. Thus, the problem may not be solely of lower productivity, but of gender discrimination (see also Fawcett 1918; Edgeworth 1922). Early explanations of gender discrimination were based on monopsony (Robinson 1969 [1933]; Madden 1973). Since that time, the theories have been largely derived from the “taste” model for racial discrimination by Becker (1971 [1957]), and statistical discrimination by Phelps (1972) and Arrow (1972*b*, 1973; see also Aigner and Cain 1977; Cornell and Welch 1996), which we will discuss in detail in the next sections. The “taste” for discrimination model, based on racial animus, was criticised by Thurow (1969, 1975), as inadequate to explain discrimination against women. Instead, he proposed a theory of job discrimination in which he refined the concept of statistical discrimination to incorporate the demand-side characteristics of set job categories and on-the-job training that tend to place women at a disadvantage in the labour market (Thurow 1975). This theory, along with some others, is reviewed in the next sections.

The predominant focus of the literature on gender discrimination has been, and continues to be, on the empirical estimation of wage gaps (Bergmann 1974; Abowd and Killingsworth 1983; Johnson and Solon 1986; Blau 1984, 1998; Goldin 1990; Hellerstein, Neumark and Troske 1997; Darity and Mason 1998) and on the

measurement and decomposition of observed wage differentials into productivity-related and nonproductivity-related factors, the latter of which are thought to serve as possible evidence of discrimination (Oaxaca 1973; Brown, Moon and Zoloth 1980; Sorenson 1990; Groshen 1991; Even and Macpherson 1993; Neumark and McLennan 1995; Appleton, Hoddinott and Krishnan 1996; Fortin and Lemieux 1998). Other varieties of evidence come from experimental data (Goldin and Rouse 1997) and audit studies (Neumark, Bank and Van Nort 1995).

Recently, the literature has returned to examining the possible theories that could explain the persistence of gender wage differentials (see Blau and Kahn 2000 for an overview). Among the models put forward, some have emphasised the importance of wage structures (Blau and Kahn 1996), others focus on the household division of labour (François 1998), as well as the impact of monopsonistic practices (see Barth and Dale-Olsen 1999 for a re-examination of the theories of Robinson 1969 [1933]). To date, there does not seem to be a unified or complete theory of discrimination – either racial or gender – that explains the change in discriminatory outcomes for different groups of labour over time (see Altonji and Blank 1999).

2.1.2 A “Taste” for Discrimination

The predominant theory in this area is the “taste” for discrimination model. Most closely associated with Becker (1971 [1957]; see also Welch 1967; Goldberg 1982), the model is concerned with the economic consequences of discrimination. It takes as given that some individuals have a taste for discrimination

against members of another group that is based on non-market preferences and then evaluates the resulting economic consequences. Becker (1971 [1957]) assumes that an employer will seek to maximise not monetary profits, but a utility function of profits and satisfaction of discriminatory tastes. He posits that the utility gained by the employer from not hiring individuals of a certain race outweighs the loss in profit from employing individuals of another race at a higher wage.¹¹ The “taste for discrimination” model predicts that in a perfectly competitive market, firms that discriminate will be less competitive than non-discriminators. If there are a sufficient number of non-discriminating firms, then discriminatory practices will not survive. Alternatively, if product markets are not perfectly competitive and some entry is possible, then discrimination will also not persist if there are nondecreasing returns to scale and at least one potential employer with nondiscriminatory tastes. In the case of total barriers to entry in product markets, even with decreasing returns to scale, if businesses are fungible and there is a potential nondiscriminating employer, discrimination will not endure as a result of competition in the marketplace for ownership of firms. The other predictions concern co-worker and consumer discrimination. In the instance when employees discriminate against fellow workers, the long-run outcome will be the elimination of wage differentiation but the existence of segregated workplaces. Similar predictions are made regarding discrimination by consumers.¹²

However, as Arrow (1998) and numerous others have noted, the long-run predictions of this model have not been borne out. Possible reasons include that

¹¹ This model assumes that the worker being discriminated against has at least an equal, if not greater, marginal value product than the worker who is not the subject of discrimination.

¹² Holzer and Ihlanfeldt (1998) find that industries with comparatively more customer contact have fewer black employees.

this is not yet the “long-run” state of the world or that there exists some form of market failure such that the assumptions that sustain perfect competition do not hold. As a long-run outcome in which perfect competition is attained, the predictions of the model should hold in that there is no room for anything other than profit-maximising behaviour on the part of firms.

2.1.3 The Theory of Statistical Discrimination

The other major theory alters the informational assumption of the neoclassical model (Phelps 1972; Arrow 1972*a*, 1972*b*, 1973) and seeks to explain discrimination as an efficient screening mechanism used in employment decisions where there is imperfect information (Aigner and Cain 1977; Altonji and Pierret 1997; Berk 1999). The employer who seeks to maximise expected profits will discriminate against blacks or women if the employer believes that blacks or women as a group are less qualified, less reliable, etcetera, on average than whites and men, and if there are positive costs associated with gaining information about individual applicants. Not having perfect information, employers rely on skin colour or gender as a proxy for data not collected on individual productivity where there exists an overlapping distribution of capabilities. When informational asymmetries exist, employers making hiring decisions rely on a proxy for ability, *i.e.*, by using a screening mechanism. The sources of belief that form these proxies could stem from the employer’s previous experience with the two groups, *i.e.*, members from the less favoured groups might have been and continue to be hired on less favourable terms, or could be due to prevailing social perceptions that blacks and women grew up in disadvantaged circumstances because of

prejudice toward them in the society and have lower average productive characteristics than whites and men, for instance. In which case, the discrimination becomes self-perpetuating. Phelps (1972) argues that this theory, which is based on the assumption of imperfect information, is applicable to “liberal” employers and workers who do not have distaste for hiring and working alongside black and female employees. However, these prior notions regarding the average ability of the group could actually be based on discriminatory beliefs.

Arrow (1973) refined the statistical model significantly by identifying the three conditions under which the model will hold: (1) the employer must be able to distinguish, at a low cost, between categories of workers, *e.g.*, white and black workers; (2) there must be some cost to the employer to discover the true productivity of employees; and (3) the employer must have some idea or preconception of the distribution of productivity within each category of workers. Discrimination is not taste, but expectations of the comparative productivity of black and white, or other groups, of workers. The “screen” uses an applicant’s education or other characteristics such as race or gender as a proxy to estimate that applicant’s productivity. The costs of obtaining perfect information on every applicant, which would ensure that each person is individually judged, are prohibitive. Screening, therefore, is an efficient decision-making mechanism under imperfect information. Arrow’s formulation of this theory may go far in explaining the persistence of discrimination. Even if an employer is “prejudice-free,” he or she makes hiring decisions based on a perception of the average productivity of a group because this is less costly than obtaining information extensively on one particular individual. This screening enables employers to make hiring decisions in an efficient manner.

In the case in which the average perception is correct, the theory suggests that employers are making hiring decisions based on ability-based judgements of the applicant to the extent of information that is attainable without incurring excessive costs. Then, it is argued that differential employment outcomes may be due to different average abilities of heterogeneous groups of labour. In this instance, these outcomes are not due to discrimination but are the result of pre-market causes of differences in productive ability or other factors that affect the perceived average productivity of a group of workers.

A problem arises, however, when the perception of the average ability of the group is wrong. If the perception of the group is incorrect, then the use of a screen or proxy for ability may result in discrimination in the hiring process. Capable individuals may be inefficiently “screened” out of employment. It is then expected that an employer with more information or the better information will hire those individuals and reap the benefits of their higher productivity. The expectation is that the less accurate screeners are at somewhat of a disadvantage and suffer consequences of decreased firm productivity. Inaccurate screening will persist until the market for firms eliminates these less efficient firms.

The statistical theory of discrimination, however, does not adequately explain disparities within firms or industries (Arrow 1998). Empirical studies have shown, for instance, that greater male-female wage disparities are found within industries and firms rather than among different industries and firms (Blau 1984; Johnson and Solon 1986; Sorenson 1990; Groshen 1991). Beyond the initial

screening, it could be that informational asymmetries still exist regarding the ability of the group that can cause the employer to be “blind” to their actual productivity and cause them to be compensated at a lower wage or fail to receive promotions.

Moreover, if a firm does not pay or promote an individual in accordance with her marginal product, her exit from the firm is expected. The firm will suffer some loss in competitiveness if individuals who have demonstrated productivity on the job leave to work for other firms.

In addition, the statistical theory fails to provide a complete explanation of the dynamic nature of discrimination, *i.e.*, why some groups seem better able to overcome discrimination than others. Even if the predominant group is better able to screen members of its own group (Cornell and Welch 1996), it still does not explain why some groups of labour experience less discrimination over time, while others do not. The theory does, however, provide a compelling way to view discrimination as an efficient response to imperfect information.

2.1.4 Alternative Approaches to Discrimination

Job Competition Theory

A theory proposed by Thurow (1969) specifically to explain gender discrimination is known as “job competition.” Thurow (1969) posits that competition among workers is not for wages but for jobs. This theory assumes that the number and types of job are technologically determined and that workers’ skills (*i.e.*, their productive abilities) and offered and reservation wages are nearly irrelevant in

determining the number of types of job position actually filled. Wages are assumed to be rigid and queues of workers employable at fixed wages constitute the supply of labour. Imperfect information is assumed, so employers use screening devices.

Although fluctuations in macroeconomic policies affect demand and lead to changes in the lengths of the queues, the theory emphasises the internal labour market as the locus of decisions about promotions and on-the-job training, all which are relatively insulated from the external labour market.

Thurow (1969) argues that this statistical screening for internal employment decisions will tend to magnify discrimination against women because, if the perceived average ability of women is lower than that of men, an efficient screener will choose to promote or train men rather than women. Female workers with ability that is higher than the group average for women will be penalised. The contribution of this approach is to consider the structure of jobs on offer and the dynamics of internal labour markets, thus moving the statistical theory of discrimination beyond the initial hiring decision. However, the reliance on screening to explain the persistence of discrimination meets with some of the same difficulties as the statistical theory.

Two other influential approaches, whose primary intent is not to explain discrimination but have relevant implications, are segmented labour markets and efficiency wages. We turn to discuss each in turn.

Segmented Labour Markets

Segmented labour market theory argues that there is a primary and a secondary labour market, in which the jobs in the primary labour market are better paid with more promotion opportunities, better working conditions, and more stability (Bluestone 1970; Doeringer and Piore 1971; Harrison 1972). The secondary labour market, which roughly overlaps large sections of the external labour market, contains the lower paid and generally thought of as less desirable jobs.

There are many aspects of dual market theory not applicable here,¹³ but one implication for gender discrimination is that for reasons of perhaps statistical screening or other concerns, such as women having more child-related labour market interruptions, women are more likely than men to be relegated to the secondary labour market. However, operationally meaningful evidence in support of this model tends to be weak (see Cain 1976 for an overview). But, an aspect of segmented markets worth considering is developed in efficiency wage theory.

Efficiency Wage Theory

The origins of efficiency wage theory were to explain the persistence of involuntary unemployment as an equilibrium outcome under asymmetric information (Salop 1979; Solow 1979; Shapiro and Stiglitz 1984; Yellen 1984; Krueger and

¹³ For instance, “dual theory” also treats the amount of work effort as endogenous to the labour market and believes that such “taste for work” can be reinforced by technological changes that maintain the position of lower-skilled workers (see Cain 1976).

Summers 1988). Since then, many themes and sub-themes have emerged, some of the coherence of which are in debate (see Akerlof and Yellen 1986 for an review). We proceed with examining one mainstream aspect that has implications for gender discrimination, namely, minimising the costs of turnover¹⁴ (Shapiro and Stiglitz 1984; Weiss 1980).

Generally, efficiency wage theory posits that imperfect and costly monitoring of employees by employers necessitates unemployment in equilibrium (Shapiro and Stiglitz 1984). Employers pay wages above the market rate – “efficiency wages” – to discourage turnover or shirking, or for other concerns. Since the primary labour market is characterised by “efficiency wages,” there are not enough jobs for workers who are willing to work at the primary labour market wage. Instead, the job opportunities open to them are in the secondary labour market where wages are paid in a market-clearing fashion but within a relatively less desirable workplace, *e.g.*, less job prestige, limited or no benefits, decreased or no job security, etcetera. There will be some individuals who choose not to work rather than work in the secondary labour market, and so become unemployed.¹⁵

We find the notion of efficiency wages is relevant to a discussion of discrimination in suggesting another set of economic motivations for the existence of

¹⁴ We discuss the turnover rationale only, although the monitoring cost variant of efficiency wage theory is relevant to the demand side of our model in explaining why employers may demand labour with lower monitoring costs even under perfect information. Our focus in the thesis is the supply side, but we mention some aspects of the demand side.

¹⁵ The generally accepted definition of involuntary unemployment in this context is given by Shapiro and Stiglitz (1984), as when an unemployed worker is willing to work for less than the wage received by an equally skilled employed worker and yet cannot obtain a job.

wage differentials. A formal presentation of the model for exposition purposes follows (see Yellen 1984). Each firm in a perfectly competitive economy has a production function of the form $q = f(e(w)n)$, where n is the number of employees, e is effort per worker, and w is the real wage. A profit-maximising firm will offer a real wage, w^e , which satisfies the Solow condition: the elasticity of effort with respect to the wage is unity¹⁶ (Solow 1979). The wage, w^e , is the efficiency wage and minimises labour cost per efficiency unit. As long as the aggregate demand for labour is less than the aggregate supply of labour and w^e is above labour's reservation wage, the firm will be unconstrained in choosing this level of wages and the market equilibrium will be characterised by involuntary unemployment. Firms will not lower the wage because any reduction will increase wage cost per unit of output.

Two possible sources of wage differentials among equally productive individuals can result. First, if firms are not identical, there will be wage dispersion in the economy: if the relationship between wages and effort differs among firms, then each firm's efficiency wage will vary. In equilibrium, therefore, there will be a distribution of wage offers for workers of identical characteristics.

Second, efficiency wage theory can also attempt to explain discrimination among workers with different observable characteristics in a variant of the statistical theory of discrimination. Under imperfect information, employers may know that the function relating effort to wages differs among groups. Then, each

¹⁶ There have been accounts that relax the Solow condition, see Annable (1984) for example. The labour efficiency unit representation of the production function suggests that the harm done by shirking workers is limited to labour's own input. In relaxing this assumption, it is assumed also that

group will have its efficiency wage and corresponding “efficiency labour cost” or labour cost per efficiency unit (Akerlof and Yellen 1986). If these costs differ, then firms will hire only workers in the group with the perceived lowest efficiency labour costs and unemployment will be confined to the group with the highest efficiency labour costs. In addition, if there are fluctuations in the demand for labour, then this group will also bear the burden of layoffs. In this manner, the explanation for wage differentials is similar to the statistical theory of discrimination, in which employers act on available information on the perceived average productive abilities of a group.

Exploring these aspects with respect to gender discrimination, there are some arguments as to why men and women can have different “efficiency labour costs.” For instance, if labour turnover is costly, then firms will attempt to hire workers who have lower quit rates. Under imperfect information, an employer may not be able to determine each employee’s potential quit rate and will use statistical screening to make that judgement. Women are thought to be less responsive to changes in the wage because turnover is often accompanied by job search. Search costs may be higher for women because of their larger share of household responsibilities or because they tend not to be the primary income-earner and so are more likely to remain with their families than move to another locale. It suggests that women are less likely than men to leave their job and have lower turnover. However, women as a group may have higher quit rates or more labour market interruptions than men because of childbearing and childrearing. In other words, quits as a function of

there is productivity damage done to other inputs, such as poor use of other inputs or even destruction of capital assets. The effort-wage elasticity is thus less than unity in equilibrium.

the offered wage, are both flatter and higher for women than for men. This suggests that women will have higher efficiency labour costs than men.

The empirical evidence on efficiency wages offers some support for the general outcome of above-market wages (Pencavel 1972; Dickens and Katz 1987; Raff and Summers 1987). Regarding gender, there has also been some evidence that differences in quit rates may explain earnings differentials (Black 1995; Bowles 1997).

However, positive search costs imply that there are frictions in the labour market. Frictions cause labour supply curves to become upward sloping with respect to firms and to generate monopsony power. However, monopsony leads not to efficiency wages, but wages lower than the value of labour's marginal product. Thus, monopsony power should cause firms to offer below-market and not above-market wages.

While it seems plausible that women will receive lower wages and be hired less often relative to men on account of differences in perceived turnover rates, it is less obvious to conclude that efficiency wages will be paid. The labour turnover rationale may have more potential explanatory power if it can be encompassed generally into a model of labour supply. As an explanation for discrimination, the different turnover rates for groups of labour are still treated as given in these models, rather than as factors that affect the labour supplied to firms that can change over time and with circumstances. Differences in labour supplies may provide the key to understanding why some wage differentials persist, and others do not.

2.1.5 Monopsony

Robinson (1969 [1933]) proposes a model of monopsony in which gender wage differentials are explained by factor market power held by firms resulting from geographical control and severe limits on labour mobility. This approach had been recently revived on the basis that frictions causing upward-sloping labour supply curves to firms are supply-driven more than demand-driven (see *e.g.*, Card and Krueger 1994; Stevens 1994, 2000; Acemoglu 1997; Dickens, Machin and Manning 1999). However, the approach has been primarily used to explain the impact of minimum wages or limited transferable skills, rather than discrimination.

In order to establish gender discrimination under monopsony, women must have less elastic labour supply curves than men. One recent paper attempts to make this argument based on turnover rates, not unlike the variant of efficiency wages explored earlier.¹⁷ Barth and Dale-Olsen (1999: 20) argue “the turnover of women is less elastic with respect to wages than the turnover of men, implying that the elasticity of labour supply facing each firm is less elastic for women than for men.” They make a novel argument for discrimination based on job turnover but do not, as a theoretical matter, present a model of monopsonistic competition as they do not show how monopsony power is held or how employers differentiate between men and women in

¹⁷ Our approach is developed independently and encompasses some of the same notions regarding the importance of labour turnover. However, we propose a more general model of monopsonistic competition that captures the multitude of factors affecting labour supply, including alternative opportunities, and we treat do not treat turnover as exogenous to the labour supply decision. Our model is presented in the next section.

their wage policies.¹⁸ As their model is based on statistical determination of the probability of quits for men and women, they encounter a problem with respect to employee differentiation because the employer's assessment of quit rates is for the group as a whole and not for each individual employee. This is consistent with a model of imperfect information, but faces the same inability as the statistical theory of discrimination to explain individual differences in employment outcomes or to provide a long-run explanation concerning the changing patterns of discrimination. Barth and Dale-Olsen (1999: 16-17) acknowledge these points in the presentation of their model¹⁹ and leave the proof for empirical evidence rather than theoretical argument.²⁰ Using a Norwegian data set with matched employer-employee data, they conclude that the turnover of women with respect to wages is less elastic than that of men.

The use of turnover to assess the labour supplied to a firm is similar to the approach that we use in the following model. The primary difference lies in the

¹⁸ They assume that men and women operate in "completely segregated labour markets," or "two types of occupational groups with no inter-occupational mobility in the short-run," a dubious empirical assumption (Barth and Dale-Olsen 1999: 8).

¹⁹ "It remains to be argued that the model in the preceding chapter is relevant for gender issues. Basically, such relevance requires that a) the level of labour market friction is higher for women than for men, and b) that employers may distinguish between men and women in their wage setting. The empirical part of this paper produces evidence in favour of both these conditions" (Barth and Dale-Olsen 1999: 17).

²⁰ They do not estimate the wage elasticity for men and women by the traditional definition of labour supply elasticity, understood to be the change in the hours supplied given a change in the wage (Killingsworth 1983). Instead, they calculate the labour supply of each gender towards the firm as $L(w) = \delta \lambda n / q(w)^2$, where n is the measure of workers over all firms, $q(w)$ is the quit or separation rate of the firm, $L(w)$ is the labour supply to any one firm, δ is an exogenous separation rate, and λ is the probability that an unemployed worker receives a wage offer (Barth and Dale-Olsen: 6-7, 34). They then present the elasticity of labour supply with respect to wages as equal to "minus two times the elasticity of quits and separations with respect to wages" (Barth and Dale-Olsen 1999: 34). The elasticity of quits and separations with respect to wages is "simply two times the derivative of the quit function with respect to the wage premium over the quit rate" (Barth and Dale-Olsen 1999: 34). Barth and Dale-Olsen (1999: 26) present the wage premium as "deviations from the employment weighted means of the coefficients of the occupational dummies in a wage regression also including education, experience, seniority and their squares as well as a gender dummy. The share of females is calculated from the observations in the sample."

treatment of alternative employment opportunities. The turnover logic implicitly relies on women having lower turnover rates due to more frictions in the labour market, such as fewer alternative employment options, in addition to the constraints on mobility due to familial obligations. This approach, however, still takes as exogenous the existence of employment options without attempting to incorporate this potentially endogenous variable into the expected turnover rate. Our approach is broader and encompasses the notion of turnover rates in examining the labour supplied to a firm as determined not only by the probability of leaving the firm if the wage changes but also the possibility of adjusting hours worked (the traditional notion of own-wage elasticity). The contribution of this model is in identifying factors that create opportunities, *e.g.*, social capital, which reduce labour market frictions, and whether differences in possessing and investing in this form of capital can explain the long-run course of discrimination.

The next section presents a theory of earnings discrimination that ties together some of the existing approaches and explains wage differentials as a result of the intersection of labour demand under imperfect competition and labour supplied to firms when there exists supply-side frictions. We then formulate a formal model of earnings discrimination under these conditions, and explore the notion of opportunities as affecting the labour supplied to firms.

2.2 A Theory of Discrimination

We present an explanation of earnings discrimination – defined as when equally productive persons are paid unequally – as an equilibrium outcome consistent with profit maximisation when there exist imperfect product and factor markets. There are no “tastes” for discrimination in that any private “taste” for discrimination held by employers is not carried over into the labour market. Moreover, the model holds under perfect information so the statistical theory is not applicable.

Some firms, because of technology, barriers to entry or product differentiation, are better positioned to claim a larger share of product markets than others and are not price-takers.²¹ Product markets are thus not perfectly competitive, but exhibit concentrations of market power in certain industries.²² Within those industries, entry and exit are not costless and each firm aims to maximise profits within the given market structure. This market power is what allows firms to engage profitably in rent-seeking behaviour. The definition of rent used in this thesis is the gain to a firm from paying a factor less than the value of its marginal product (VMP).

²¹ For instance, in the view of Robinson (1969 [1933]) and others (see *e.g.*, Diamond 1981, 1982 for search models in monopolistically competitive markets), markets are simply not perfectly competitive. It is likely that certain firms are dominant in product markets. This could be the result of accidents of history, in that some were first in the market, some held patents and still others were dependent on the extraordinary entrepreneurship of its founder (see Becker’s 1971 [1957] example of Henry Ford).

²² Product market power is used synonymously with market share in product markets unless otherwise noted.

One form of rent is extracted from labour. Imperfectly competitive firms face a downward sloping demand curve for its products.²³ By equating marginal revenue product and labour's marginal cost, because marginal revenue product (MRP) is less than VMP, less labour is demanded than under perfect competition. These firms pay labour its supply price that is lower than VMP. This difference constitutes rents that are obtained even when labour supply to the firm is perfectly elastic.

On the supply side, each individual has an elasticity with respect to his supply of labour to a firm, which can result in heterogeneous groups of workers providing labour to a firm at different supply elasticities. Labour supplies are characterised by varying degrees of frictions – a result of limits to mobility and positive transaction costs of changing jobs, such as the direct and opportunity costs of search. These frictions can be reduced by opportunities made available through contacts or social capital. Once labour is employed, the labour supplied to firms is not perfectly elastic and differs systematically among groups according to their available opportunities or set of employment alternatives.

Individuals with equal productive characteristics can receive different wages when they have different labour supply elasticities. If a woman has a less elastic labour supply than a similarly productive man, she will receive a lower wage. However, labour supply elasticity can be altered by opportunities. For instance, a worker with more employment options will be more sensitive to wage levels than

²³ There are multiple forms of imperfect competition resulting from product market power, including duopolies, oligopolies, and monopolistic competition. We posit a general form of imperfect competition in which firms share the characteristic of facing a downward-sloping demand curve for its product, which can be due to various sources of market power stemming from differentiated products, barriers to entry, technology, patents, being first in market, etcetera.

another who have fewer opportunities available to them. Opportunities can be created by individuals through investment of time and resources in contacts or social capital. Increasing the amount of social capital can make opportunities possible, such as hearing about jobs, receiving a referral or raising capital to enter into self-employment. We will later explore in detail the reasons why women may have less elastic labour supply curves with respect to a firm relative to men and the contribution of differential amounts of social capital.

Finally, opportunities can be related to the community to which an individual belongs. In communities in which there are more relationships and mutual assistance, *i.e.*, more social capital, there will likely be more opportunities to access financial capital and start a business, for example.²⁴ In the U.S., for instance, immigrant communities tend to contain many small business owners (see Takaki 1989).

²⁴ The ability to utilise capital through a social network has implications for the dynamic evolution of discrimination. Immigrants typically have relationships in their homeland before arriving at a new place, which can provide capital for starting self-employment. In addition, some immigrants have capital of their own that are brought over and used to invest in self-employment because at times the educational credentials of a foreign country are not accepted in the new country and they may not be able to obtain a comparable job. For instance, there are numerous Korean white-collar professionals who are grocery store owners in Los Angeles and other urban communities in the United States. Some groups are able to obtain capital for self-employment through either networks from the homeland or ethnic networks in the new community and thus are able to generate alternatives to employment in the mainstream labour market. These businesses or in the case of the Jewish community, even numerous law firms in America, are then in a position to hire other members of their group and provide them with employment alternatives. In this way, these groups increase their opportunities to earn income and are less dependent on the mainstream employment market than other groups. By increasing their opportunities and thus the elasticity of their supply of labour to firms within the mainstream labour market, these groups become more sensitive to wage differentials and as this chapter shows, the greater relative labour supply elasticity will reduce the amount of discrimination. Another noteworthy group is African-Americans who, because of the historical circumstance of their forced migration through slavery and the accompanying constraints, have been noted to not have a strong network from which capital can be raised and alternative employment provided. This is in contrast to Afro-Caribbeans in the U.S. who are typically immigrants and are generally considered to be more upwardly mobile. In this way, the inability of African-Americans to overcome discrimination may have some roots in the structural determinants of their labour supplies, specifically their relative lack of social capital. For excellent overviews of the history of African-Americans, see Myrdal (1944) and Higginbotham (1971, 1996), and for Asian Americans, see Takaki (1989).

Thus, it appears that some groups, such as Jews, have generated their own employment opportunities that over time that increase the elasticity of the labour supplies of its members, so that firms no longer find it possible to extract rents from them (see *e.g.*, Chiswick 1983²⁵). Other groups may be less able to do so, perhaps blacks or women (see *e.g.*, Loury 1995; Blau 1996). In these and other ways (see Waldinger 1996 for the importance of job referrals from ethnic networks²⁶), groups that accumulate social capital are able to overcome discrimination, while the behaviour of firms has not changed from being profit-maximising.

2.2.1 The Conditions for Rent-Seeking

In perfectly competitive product and labour markets, any rents would be eroded by competition. It may be, however, that in an imperfectly competitive setting under certain conditions, firms are able to earn rents from labour (Robinson 1969 [1933]; see also Katz and Autor 1999²⁷). A firm can have some monopsony power in the factor market or some monopoly power in the product market. Monopsony has received some attention as of late (see Sandmo 1994) despite the scepticism regarding firms as being able to possess factor market power. The formulation is of frictions giving rise to firms having monopsony power, as seen in the

²⁵ Chiswick (1983) finds that Jewish men earn 16% more than the average in a U.S. study, standardising for observable characteristics.

²⁶ Waldinger (1996) finds, in a study of blue-collar workers in the United States, that African-Americans are harmed in their job search more by the lack of referrals through ethnic networks than from differences in their human capital, as compared with whites.

²⁷ Katz and Autor (1999) do not specifically argue for imperfect competition as the basis of discrimination, but point out that one component of an offered wage is likely to be a form of rent that could either go to an industry or to labour.

dynamic monopsony models (see *e.g.*, Card and Krueger 1994; Dickens, Machin and Manning 1999).²⁸

Our proposed model of discrimination is based on monopsony primarily due to labour market frictions in conjunction with firms having product market power. These two approaches are alternatives and each is sufficient in its own right to explain different forms of discrimination.²⁹ We consider them jointly with a focus on earnings differentials. Thus, although we cover the instance in which employment discrimination can occur under perfect labour markets but imperfect product markets, our focus is on earnings discrimination as an equilibrium outcome when there is monopsony. Further, if there are imperfections in the labour market that cause heterogeneous groups to have different labour supply elasticities, then rents will be greater for some groups than others and different wages will be offered to equally productive individuals. These cases are illustrated separately in the following sections.

²⁸ Our approach differs from the dynamic monopsony models in that those models are primarily interested in the employment effects of minimum wage policies or, in other words, they analyse changes in employment levels for given labour supplies. We are similar in accepting that some degree of monopsony power stems from frictions in labour markets, but differ by explicitly modelling labour supplies.

²⁹ There is an alternative basis of employment discrimination that can arise from firms having product market power. Robinson (1969 [1933]) points out that the offered wage will be less than the value of labour's marginal product where there is imperfect competition in the product market. This can constitute rents to the firm and cause employment levels to differ for similarly productive workers if they have different labour supplies and reservation wages. That is, if heterogeneous groups have perfectly elastic labour supplies but different reservation wages, the group with the lowest reservation wage will be hired.

2.2.2 Imperfect Factor Market/Perfect Product Market

A monopsonist facing a perfectly competitive product market demands labour at the point where the marginal cost curve for labour, MC_L , intersects the demand curve for labour or the value of labour's marginal product, $VMP (= MRP)$. A monopsonist demands L^P of labour, which is less than L^C , the competitive quantity of labour demanded. It pays W^P , which is less than the competitive wage, W^C . The rent extracted from labour is equivalent to the area given by $L^P(W^* - W^P)$, where W^* reflects the value of labour's marginal product at L^P .

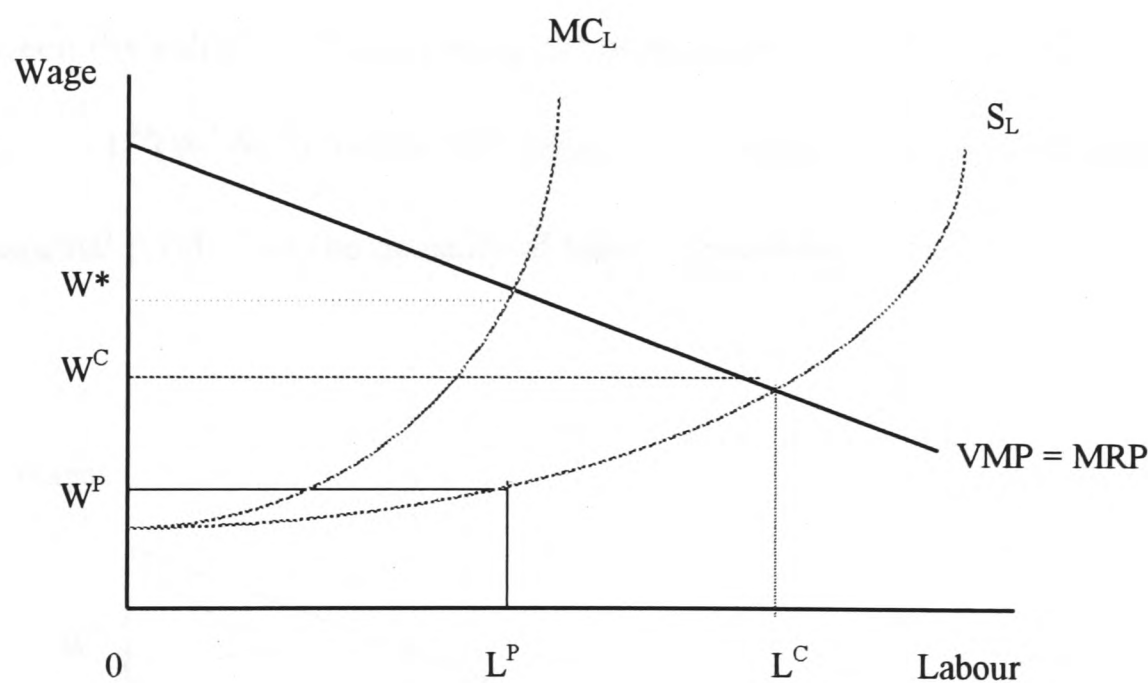


Figure 2.1

Figure 2.1 shows that power in factor markets can be exercised irrespective of perfect competition in product markets. Alternatively, the following cases illustrate how product market power can translate into the firm earning rents from labour in the absence of monopsony power in labour markets.

2.2.3 Perfect Factor Market/Imperfect Product Market

Market power in product markets can generate rents as seen in Figure 2.2. Rents are possible even if the supply curve of labour were perfectly elastic since the firm demands labour at the point where its demand curve, which equals the MRP curve, intersects the labour supply curve (Robinson 1969 [1933]). A firm with market power would demand a suboptimal amount of labour and retain the rent that is the difference between the value of labour’s marginal product and the offered wage, W^M . This rent is equal to $L^M(W^*-W^M)$, where W^* denotes the wage that would compensate labour at its marginal product at the quantity of labour demanded.

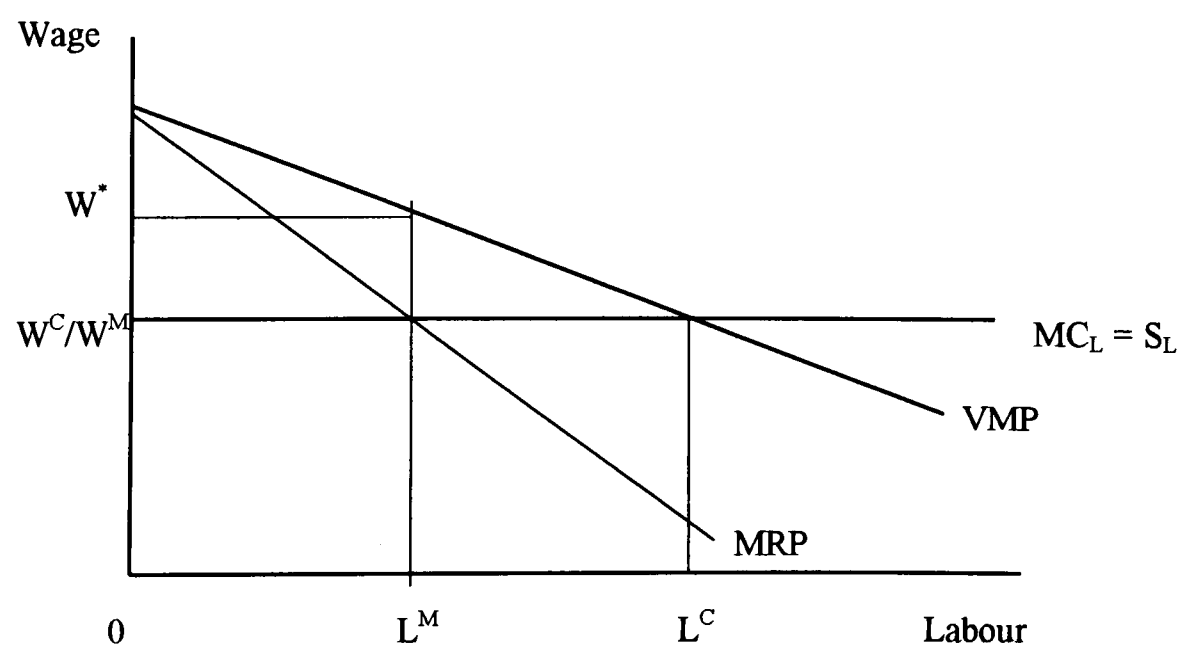


Figure 2.2

2.2.4 Imperfect Factor Market/Imperfect Product Market

Figure 2.3 illustrates that if there are imperfections in both factor and product markets, there are more rents than under either of the previous cases. The wage offered, W^I , is lower than W^M and W^P , with an amount, L^I , of labour demanded, which is also less than L^P and L^M .³⁰ The difference between VMP and W^I for the quantity, L^I , constitutes rents.

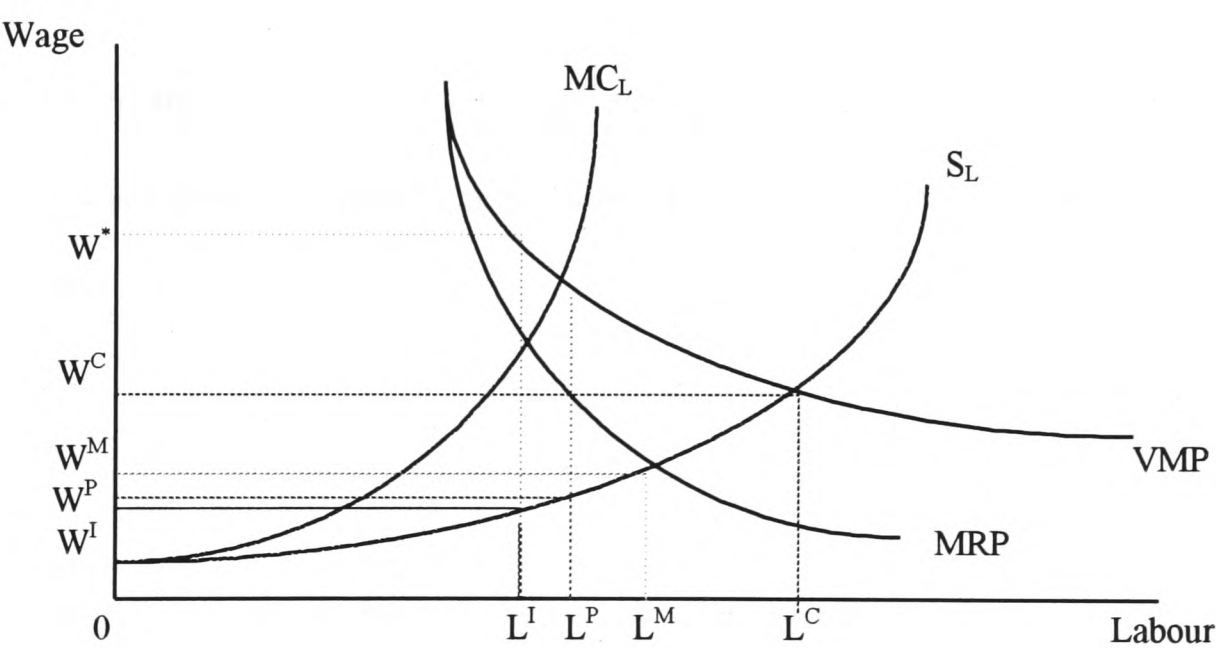


Figure 2.3

These cases illustrate the relationships among market power in product and factor markets and rent-seeking behaviour. We now turn to examine rents and wage differentials when there are heterogeneous groups of labour.

³⁰ The offered wages under monopsony and product market power are approximated for comparison.

2.2.5 Rents from Heterogeneous Groups of Labour

With respect to discriminating among heterogeneous groups of labour, it is possible with only product market power to extract rents from perfectly elastic labour supplies, as shown earlier. If there are differentiable labour supplies – some groups have higher reservation wages than others – then there will be employment level differentials. When there are supply-side frictions, wage differentials will result. In both instances, firms earn rents. We focus on the effects of the combined imperfections of product and factor markets on the earnings of heterogeneous groups of labour, namely, men and women. We assume that men and women are perfect substitutes and firms are able to differentiate between them based on observable characteristics.

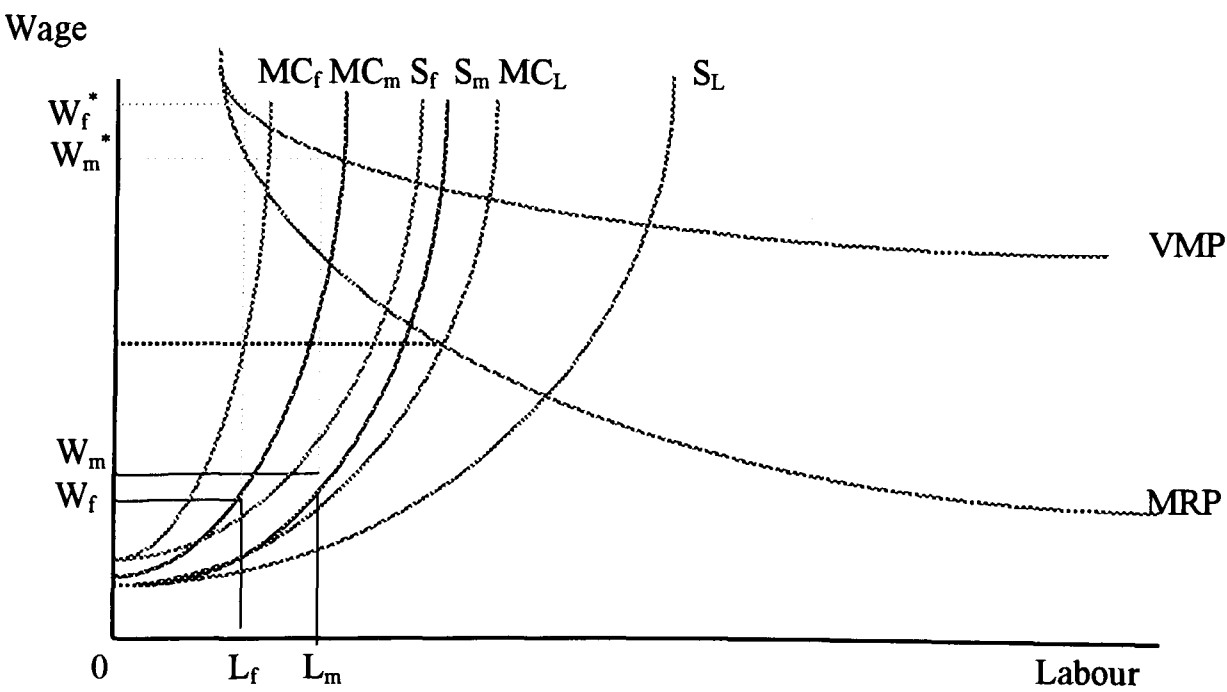


Figure 2.4

In Figure 2.4, the firm equates MRP and MC_L and hires labour from both groups. The employer demands women at L_f , the point where the aggregate marginal cost curve for labour is equal to the marginal cost curve associated with the female labour supply curve, MC_f , and intersects the labour demand curve given by MRP. This results in an offered wage for women at W_f . Likewise, the offered wage for men is W_m and the quantity demanded is L_m when the marginal cost curve for the male labour supply curve, MC_m , is considered. The firm retains the differential between the wage that would have equalled VMP and the offered wages, $L_m(W_m^* - W_m) + L_f(W_f^* - W_f)$, as rents. Labour is suboptimally demanded and compensated with a resultant social deadweight loss.³¹ In the next section, we formally present a model of earnings discrimination based on this combination of demand-side and supply-side imperfections.

2.3 A Model of Discrimination

A model of earnings discrimination under conditions of imperfect competition is presented in static and then dynamic form. The premise is that markets (both product and factor) are imperfectly competitive, and there is a distribution of firms with market power and heterogeneous groups of labour. Firms are able to resist the arbitraging away of rents because the monopsony power is largely supply-side

³¹ We will return to this point later since social deadweight loss suggests possible welfare improvements.

generated and firms are assumed to take the labour supply as given.³² Their profit-maximising position is stable.

The model is presented from the demand and the supply sides, with a section in the appendix allowing for imperfect information. We begin by characterising firm decisionmaking under static conditions. Then, a model of individual search with positive costs illustrates how factors, such as opportunity that reflect social capital differentials, can affect the relative elasticities of the labour supplies of heterogeneous groups of workers. We close the model by incorporating the search costs of individuals into the wage-setting and employment decisions of a set of firms, thereby altering the simple static model and introducing dynamic elements. In the appendix to this chapter, we model one instance of firm decisionmaking when we relax the assumption of perfect information.³³

The long-run prediction is that discrimination will persist until the market structure changes so that competition flattens out the product demand function and VMP more closely aligns with MRP.³⁴ Alternatively, the elasticities of labour supplies of heterogeneous groups change. If labour supplies are perfectly elastic or

³² As an extension, it is possible to consider whether firms can shift labour supplies to increase the employment of the lowest paid group of workers.

³³ We formulate this model under perfect information, as the motivation for discrimination depends on market and not informational imperfections. It can be modelled under imperfect information with many of the same implications as the statistical theory of discrimination, including the importance of the perceived average characteristics of a group. We model one instance in Appendix 2.1

³⁴ This can apply to even monopolistically competitive firms in long run if product differentiation is not possible when markets are perfectly competitive. But, if product differentiation is possible even in the long run, then discrimination will persist because monopolistic firms earn normal profits and other firms do not have an incentive to enter the market. For firms that are earning above normal profits in the short-run, increased competition will cause them to earn normal profits in the long run and VMP will equal MRP. Discrimination is not expected to persist.

equally inelastic, then there will still be rents from labour but not wage differentials.

One factor that can increase the elasticity of labour supplied to a firm is alternative employment opportunities in the labour market generated by returns to social capital.

2.3.1 A Static Model of Discrimination

The possibility of discriminating for economic advantage depends on differences in the *relative* elasticities of labour supplied to a firm by heterogeneous groups, *e.g.*, men and women. If the elasticities are equal, then there is no economic advantage from discriminating. When the elasticities are different, the amount purchased from the less elastic sources will generate more rents and cause wage differentials. Although both groups are paid less than the value of their respective marginal products, men will be paid more than women if they have a relatively more elastic labour supply.

To show that this outcome depends on the relative supply elasticities of labour, let $\pi = PQ - cQ$ be the profit function of the firm, where P denotes the price of the firm's output, Q is the quantity of the firm's output, and c is the factor cost per unit of output. Also, let R be total revenue or the product of P and Q , and c multiplied by Q is total cost. Define $c = o + t_m + t_f$ as the sum of the cost of capital, r , times the quantity of capital, k , or o , plus the male wage, w_m times the quantity of male labour, L_m , or t_m , and w_f , the female wage times the quantity of female labour, L_f , or t_f . The profit function, π , is assumed to be first order linear homogeneous and twice differentiable, $\pi' > 0$ and $\pi'' < 0$.

The firm maximises

$$PQ-(o+t_m+t_f)Q \quad (2.1)$$

subject to

$$P \geq 0$$

$$Q \geq 0$$

$$c \geq 0$$

$$o \geq 0$$

$$t_m \geq 0$$

$$t_f \geq 0$$

$$P - c \geq 0.$$

The Lagrangian function is

$$\mathcal{L} = PQ - oQ - t_mQ - t_fQ + \lambda(P-c). \quad (2.2)$$

The Kuhn-Tucker conditions for profit maximisation are

$$\partial R/\partial Q - \partial c/\partial Q \leq 0 \quad (2.3a)$$

$$\partial R/\partial o - Q - \lambda \leq 0 \quad (2.3b)$$

$$\partial R/\partial t_m - Q - \lambda \leq 0 \quad (2.3c)$$

$$\partial R/\partial t_f - Q - \lambda \leq 0 \quad (2.3d)$$

$$P - c \leq 0. \quad (2.3e)$$

If $Q > 0$, the firm is engaged in production, and condition (2.3a) requires equality between marginal cost and marginal revenue. If the constraint of nonnegative profits is not binding, $\lambda = 0$, then conditions (2.3b), (2.3c) and (2.3d) imply

$$\partial R/\partial o = \partial R/\partial t_m = \partial R/\partial t_f. \quad (2.4)$$

At the equilibrium position, there is equality between increasing total revenue by hiring labour from both groups and total factor cost, including capital. In other words, the classic result that the firm will hire inputs – including men and women from each labour group – until the point at which their marginal costs are equal. At any given output, moreover, the additional revenue generated must equal the cost of generating that incremental revenue under condition (2.3a). Assuming concavity, the Kuhn-Tucker conditions reduce to ordinary first order conditions for dual optimisation. Then, the same results would hold without relaxing the profit constraint.

Focusing on labour, let us now define f as the incremental cost of hiring an additional woman, $f = w_f + S_f(\partial w_f/\partial S_f)$ or $w_f(1+1/e_f)$, where S_f denotes the female labour supply curve, and m as the incremental cost of hiring an additional man, $m = w_m + S_m(\partial w_m/\partial S_m)$ or $w_m(1+1/e_m)$, where S_m is the male labour supply curve. In terms of wages,

$$w_m/w_f = (1+1/e_f)/(1+1/e_m). \quad (2.5)$$

If $e_m > e_f$, then

$$(1+1/e_m) < (1+1/e_f), \quad (2.6)$$

implying

$$w_m > w_f. \quad (2.7)$$

A firm will pay differential wages in equilibrium so long as the elasticities of the male and female labour supplies are not equal.

2.3.2 A Model of Labour Mobility

On the supply side, we model the supply of labour to a firm with costly search. Labour mobility entails costs that can be, but are not, exclusively linked to information. Information does not eliminate the direct costs of search, such as travel and attendant costs. Opportunity costs of lost family time or the time missed with children can also be involved. One factor that can reduce non-informational search costs is social capital. For instance, social networks may provide a referral system for an individual to gain access to a potential employer, who relies on that reference in the event of deciding between equally productive individuals – the basis of discrimination we are investigating.

The following model of individual search will focus on s , the cost of search, which includes two components – one of which is information and the other is

comprised of direct and opportunity costs. In this way, we use the framework of the search models of imperfect information (Diamond 1981, 1982; Albrecht and Jovanovic 1986; Chalkley 1991), but expand its reach to encompass the notion of the costs of searching for alternative employment once employed. These search costs are associated with frictions in the labour market – due to either geographically based ties or lack of social capital – even within the purview of perfect information. In other words, there are transaction costs when information is perfect (see Stevens 2000³⁵).

An individual is assumed to maximise expected income over a working life that will terminate at time, $t=T$. He knows that there is a distribution of wage offers, $w \in [0, \infty)$, across firms but he cannot tell when a vacancy will occur and which wage will be offered in the future. Let the cumulative probability and probability density functions of the wage offers be denoted by $F(w)$ and $f(w)$, respectively. The cost of search by making contact with a firm is a positive constant s . This cost is composed of the costs of acquiring information (“information costs”) as well as direct and opportunity costs (“mobility costs”). Both types of cost may depend on the quality of an individual’s social capital. The informational benefits of social capital can include hearing about job offers, receiving referrals, and obtaining better assessments of credit. Social capital can also decrease the direct costs of job mobility, including family relations that may provide assistance with child care, generate more sources from which to raise capital to enter into self-employment (particularly in circumstances in which bank loans are scarce), and pooling risk by having resources to call upon under hard or emergency circumstances, such as those who may provide financial

³⁵ Stevens (2000) models wage-tenure contracts under perfect and imperfect information when there exist labour market frictions.

assistance in the event of job loss. These advantages of having invested in social capital exist even under perfect information.

Women are usually not the primary income earner in the household. The corollary is that women also tend to bear more familial responsibilities,³⁶ may be more tied to their location and may have higher mobility costs associated with family ties should they contemplate leaving their present employment.³⁷ These familial obligations also imply that women will have less time and resources with which to invest in social capital. Women may have higher search costs than men on account of these mobility factors that are exacerbated by differences in social capital. Noting the relevance of informational costs as discussed earlier, we proceed to model the non-informational costs of search.

We assume all firms that post vacancies and are contacted within the period make offers at the end of the period for work to begin next period. The offers are good for that period only. The wage, if accepted, will remain constant while the worker stays in the job with the option of quitting. We further assume that if an individual decides not to work in any period, he receives some form of nonwage income of $v \geq 0$.³⁸

³⁶ For single women, restricted geographic mobility resulting from familial ties may be less of a factor than for married women and they could be similar to men. Existing gender earnings differentials, however, still imply that single women will have fewer monetary resources to invest in social capital, given an equal amount of available time and nonmonetary resources.

³⁷ We do not discount the preferences of women in choosing familial responsibilities over paid work. It has the result, though, of causing women to have less income with which to invest in social capital.

An individual once employed has three options: to work, to search while working or to become idle. Consider his position at the end of period, $t-1$ ($< T$). Given the opportunity of earning $w \geq 0$ in period t , his expected income is given by

$$I_t(w) = \max [w + \delta I_{t+1}(w), w - su + \delta \int_0^\infty I_{t+1}(w) \gamma(w; u) dw, w + \delta I_{t+1}(v)], \quad (2.8)$$

where $0 < \delta \leq 1$ is the discount rate and $\gamma(w; u)$ is the probability density function³⁹ of the largest wage offer, w , for a search sample size $u \geq 1$, which is determined by the number of vacancies posted by firms in that period. The first order conditions are

$$\partial I_t(w) / \partial u = -s + \delta \int_0^\infty \partial \gamma / \partial u I_{t+1}(w) dw, \quad (2.9a)$$

$$\partial I_t(w) / \partial s = u. \quad (2.9b)$$

Equations (2.9a) and (2.9b) shows that the optimal search parameter is a function of the cost and expected wage from search, while the search parameter is found from the search cost of an individual.

The individual now chooses the maximum of (2.8). If he works, he will receive w and the discounted value of the opportunity to continue working at w in $t+1$. This is the first term on the right-hand side of equation (2.8). Alternatively, he could choose to search, in which case he will receive w , incur search cost su (the total cost of

³⁸ This could be household income, nonlabour income or unemployment benefits.

³⁹ It is the first order statistic $\gamma(w, u) = uF^{u-1}(w)f(w)$. It is assumed that $\int_0^\infty wf(w)dw$ exists, which ensures that the expected value of w exists for all sample sizes greater than zero.

search is dependent on the search cost and the search sample size), and gain the discounted expected value of the opportunity to work at the highest offer he receives. This is the middle term of equation (2.8). Or, he receives the third term in equation (2.8), which represents w this period and the discounted value of the opportunity to receive nonlabour income v in the next period.

Setting the first two terms of equation (2.8) equal and solving for w gives the reservation wage w^* , provided $w^* \geq v$ and assuming that the income function is increasing monotonically in its argument. If $w^* < v$, the individual will choose to be idle, so v will then constitute the reservation wage. The reservation wage in period t is given by

$$w_t^* = w - su_t^* + \delta \left[\int_0^\infty I_{t+1}(w) \gamma(w; u_t^*) dw - I_{t+1}(w_t^*) \right], \quad (2.10)$$

where u_t^* is the sample size that maximises the benefit from undertaking search and is the optimal search parameter.

An individual's decision to search will also depend on the first two terms of equation (2.8), *i.e.*, the expected values of work and searching from work. He compares $w + \delta I_{t+1}(w)$ with $w - su^* + \delta \int_0^\infty I_{t+1}(w) \gamma(w; u^*) dw$. To see this, we first solve for s ,

$$s = 1/u^* \{ \delta \left[\int_0^\infty I_{t+1}(w) \gamma(w; u^*) dw - \delta I_{t+1}(w) \right] \}. \quad (2.11)$$

His expected income functions for the first two periods is given by

$$I_{t-1}(w) = \max [w + \delta I_t(w), w - su_{t-1}^* + \delta \int_0^\infty I_t(w) \gamma(w; u_{t-1}^*) dw], \quad (2.12)$$

$$I_t(w) = \max [w + \delta I_{t+1}(w), w - su_t^* + \delta \int_0^\infty I_{t+1}(w) \gamma(w; u_t^*) dw]. \quad (2.13)$$

Subtracting the total cost of search in period $t-1$ from that in period t gives

$$\delta \int_0^\infty I_{t+1}(w) \gamma(w; u_t^*) dw - I_t(w). \quad (2.14)$$

An individual will search only if equation (2.14) is nonnegative. The differential between the expected wage from search and the present wage must be greater than the total cost of search. That is, an individual will search until the marginal cost equals the marginal benefit of searching. The total cost of search is dependent on the cost, s , and the search parameter, u , or the number of firms an individual will contact. This further implies that an individual with a higher search cost will stop searching earlier than another person with lower search costs and have a smaller optimal search size.

If a woman has higher search costs than a man on account of more restrictions on her mobility and fewer employment opportunities on account of having less social capital, she will stop searching earlier and have a smaller optimal search parameter, *ceteris paribus*. Assuming that a woman who searches from a job earns a

wage and expects a wage that exceeds her reservation wage, she will choose to undertake search less frequently and thus have a less elastic labour supply with respect to a firm than a man. The expected outcome in this model is that given a distribution of market power among firms, there will be wage dispersion for workers with identical productive characteristics, *i.e.*, a woman will accept an offer at a firm rather than continuing to search until she finds a firm with less market power. In the long run, there will be wage differentials based on the relative elasticities of the labour supplies of men and women.

2.3.3 A Dynamic Model of Discrimination

This formulation differs from the static model in that there is an imperfect process by which jobs are matched with workers. Under a dynamic approach, there is a costly and uncoordinated search process through which firms and individuals respectively make job decisions. As discussed earlier, information is one component of search costs in this model, but the proposed formulation holds under perfect information in consideration of only the direct and opportunity costs of search. The equilibrium solution of this model predicts a dispersion of wages for men and women, which depends on the differential costs of search and the opportunity cost of employment. We largely adapt Burdett and Mortensen (1998), but introduce heterogeneous labour supplies and specifically model the supply-side rather than take labour supply as given.

Assume that there is a large fixed number of employers and workers that participate in a labour market. The number of workers in the labour force is denoted by n . A firm at time t has κ workers. The employment level can change as a result of two possibilities. An employee may quit the firm or one or more applicants may contact the firm and accept an offer of employment. We denote the probability that an individual will quit at time t as $N_q(t)$, and $N_r(t)$ as the probability of a recruitment. Assume that N_r is independent of κ and N_q is a linear function of κ , so that $N_q = \phi\kappa$, where ϕ is a constant. These assumptions arise from the propositions of search with positive costs and exogenous turnovers.⁴⁰ Note also that κ is bounded by 0 and a finite n . This defines an exogenous upper bound on job creation within a firm, allowing for diminishing returns.

Let us further assume that $N_r = s\Omega(w)$ and $\Omega(w)$ is a monotonically increasing function of the firm's wage offer, w . The function Ω captures the probability of acceptance conditional on the offered wage being greater than the applicant's reservation wage, assuming a stochastic distribution of reservation wages.

⁴⁰ This is assumed for the sake of simplicity but can instead be modelled explicitly. If there is net growth in employment of $g\%$ per year and if $q\%$ of all employees quit each year, independent of employment tenure, the probability density function of work experience in years (x) is given by

$$\lambda \int_0^k (q+g)e^{-(q+g)x} dx = 1, \quad (n2.1)$$

where the expression being integrated is the exponential distribution. This equation can be derived from the cumulative age distribution of a stable population with birth rate, B , where the net rate of increase, g , is equal to the birth rate minus the death rate. The term $\lambda = 1/[1 - \exp(-(k)(q+g))]$ is a correction factor to ensure that the sum of the distribution of work experience is one when the integral is truncated at k .

The mean of experience (x) in equation (n2.1) is $[1/(q+g)]$ when $k=\infty$ and is

$$1/(q+g) - k[e^{-k(q+g)}/(1 - e^{-k(q+g)})] \quad (n2.2)$$

for any value of k . Equation (n2.2) is the mean of the untruncated distribution ($1/g$) minus a value that depends on the truncation point.

This is consistent with the standard reservation-wage model of individual job search in which s represents the flow of applicants at a firm that depends on the search process (see Pissarides 1984). The search process is informed by the firm's offered wages and the costs of search of workers.

In addition, we take into account the firm-specific production function. Specifically, the profit accruing to the firm experiencing fluctuating employment depends upon the price of output or demand conditions, factor prices and the production technology. We assume that output $f(\kappa)$ is a monotonically increasing function of employment. At low levels of employment the marginal product of labour may be increasing due to gains from specialisation, while at high levels diminishing marginal productivity occurs due to fixed factors. Given $f(\kappa)$, the profit of a firm with employment, κ , is

$$\pi(\kappa) = Pf(\kappa) - w\kappa - C, \quad (2.15)$$

where P is the price of the product and C denotes fixed costs. Assuming that employment varies stochastically over time, the firm maximises expected per period profit.⁴¹ Further, there exists a monotonic relationship between offered wages and equilibrium employment. Thus, the firm can be thought of as choosing employment and wages subject to a labour supply condition. By positing imperfect product market competition, we assume that the firm has market power and VMP diverges from MRP.

⁴¹ The firm is assumed to have an infinite horizon and does not discount future earnings, for the sake of simplicity.

The firm's marginal revenue product curve is given by

$$\text{MRP} = F[\kappa, f(\kappa)], \quad (2.16)$$

where F is a decreasing function of κ and an increasing function of $f(\kappa)$ because MRP decreases with diminishing returns to labour and increases as output rises. The supply of labour facing the firm in industry b is

$$\kappa = A[f(\kappa), w/w_b] n(w_b), \quad (2.17)$$

where n denotes the aggregate labour supply assumed to be positively related to the average wage in the industry given by w_b . This is implied by our search model in that higher wages will attract more workers. If the supply of labour to the firm is perfectly elastic, the function A will be infinitely elastic with respect to the wage. If it is not, then there are differences among heterogeneous supplies of labour based on their inelasticities.

Rewriting equation (2.17) gives the offered wage as a function of the firm's employment level and the industry wage,

$$w = w^*[w_b, f(\kappa), \kappa]. \quad (2.18)$$

In equilibrium, the firm will choose wages and employment to maximise profits. The firm equates marginal revenue product with the marginal cost of labour in the form of

$$F[\kappa, f(\kappa)] = w + \kappa(\delta w / \delta \kappa) = (1+e)w, \quad (2.19)$$

where e is the own-wage elasticity of labour. Introducing heterogeneous labour supplies, $n = n_m + n_f$, equation (2.19) can be rewritten in terms of the elasticity of supply of labour to the firm as

$$A[\kappa, f(\kappa)] = [(1+e_m)w_m, (1+e_f)w_f], \quad (2.20)$$

where $e_{m,f}$ denotes the elasticity of the male and female labour supplies, respectively, and $w_{m,f}$ gives their respective offered wages.

Combining (2.17) and (2.20), the level of employment in the firm is seen in the following equation

$$A[\kappa, f(\kappa)] = (1+e_m)w_m^*[w_b, f(\kappa), \kappa] + (1+e_f)w_f^*[w_b, f(\kappa), \kappa]. \quad (2.21)$$

The firm sets MRP equal to the marginal cost of the aggregate labour supply and hires labour at the point where marginal costs are equal for the two groups.

The offered wage for each group of labour, men and women, is found from (2.21) as follows

$$w_m = w_m^* \{w_b, f(\kappa), n_m[f(\kappa), w_b]\}, \quad (2.22a)$$

$$w_f = w_f^* \{w_b, f(\kappa), n_f[f(\kappa), w_b]\}. \quad (2.22b)$$

In equilibrium, the offered wage will be a function of the average wage of the industry, the specific firm production function, and the labour supplies of men and women. Because the processes of hiring and quits are stochastic, each decision is a result of the conditions of labour supply and demand as well as the firm's production function.

The labour supplies of men and women are functions of the firm-specific production function and the average wage in the industry *faced by the groups*, respectively. If women have less elastic labour supply curves than men, when a firm equates MRP and the marginal cost of total labour needed, they will receive lower wages, as shown in the static model. The second factor affecting labour supplied to a firm is the expected average wage in the industry faced by each group of labour. The group better able to decrease frictions, such as through opportunities generated by social capital, will have lower search costs and expect a more favourable set of wage offers, as seen in the model of labour mobility. Thus, the differential search costs of men and women are built into the first and second order profit-maximisation conditions of the firm in the dynamic model. The assumption underlying n , that labour supply, is positively related to the average wage of an industry, generates the expectation that

workers with lower search costs and more employment alternatives will receive higher wages. If men as a group have lower search costs and more employment options, then they will expect higher wages as compared with women with similar productive characteristics. This model formalises this outcome, which is efficient and expected to persist when there are imperfect markets.

In conclusion, the dynamic model combines the demand and supply sides of the labour market, taking into account firm production functions, diminishing returns to labour, individual costs of search and heterogeneous groups of labour with different supply elasticities. This formulation of labour market discrimination can explain long-run dynamics under perfect information. Under these conditions of imperfect competition, we have shown that discrimination is both an expected and profitable outcome. The resulting social welfare losses will be explored briefly in the concluding chapter of this thesis. Finally, we include in the appendix to this chapter a section relaxing the assumption of perfect information. A model of differential rates of promotion is presented to illustrate one implication, among many, of imperfect information in this model.

We turn now to discuss the variables of social networks and social capital that we posit can generate economic opportunities but perhaps differentially for men and women.

2.4 Social Network and Social Capital Variables

There are various effects attributed to social capital and social networks.⁴² Among these are better information (Rees and Schultz 1970; Granovetter 1985, 1995 [1974]; Waldinger 1996), decreased transaction costs (Abraham and Medoff 1983; Eccles and Crane 1988), increased efficiency (Putnam, Leonardi and Nanetti 1993; Barr 1996, 2000; Knack and Keefer 1997; Fafchamps and Minten 1999), or as embodiments of trust and other normative values (Akerlof 1980, 1982, 1997; Zucker 1986).

From an informational perspective, Granovetter (1985) argues that each person is “embedded” in a network because of interactions with other people and consequently she is constrained to some extent by the network and her position within it. These relationships are an efficient mechanism for addressing informational imperfections. Granovetter (1985: 61) states four reasons as to why information obtained through networks is “better” information: (1) it is cheap; (2) individuals trust their own information because it could be richer, more detailed and known to be accurate; (3) individuals with continuing relationships have an economic motivation to be trustworthy so as to not discourage future transactions; and (4) continuing economic relations often become overlaid with social content that carries strong

⁴² There are numerous studies concerning the network effects of inter-firm linkages. For example, Durlauf (1993) shows that linkages across U.S. industries create sequential complementarities that build up over time to affect aggregate behaviour. He concludes that leading sectors, defined as industries that trade with many other industries, can reduce production costs and cause a sequence of spillover effects leading to economy-wide growth. Our focus here is on the literature pertaining to individuals.

expectations of trust and abstention from opportunism.⁴³ Its relevance to labour markets has been through the importance of networks of friends and acquaintances in job search. Studies in the U.S. show that a large percentage of jobs are filled by referrals by current employees (Rees and Shultz 1970; Granovetter 1995 [1974]). In a search model context, Mortensen and Vishwanath (1994) show that equally productive individuals can earn different wages through the ability of some workers to gain information about employment opportunities through contacts. Waldinger (1996) concludes that poor blacks in New York City suffer less from the racism of employers than from the fact that they do not have access to the ethnic networks through which workers are recruited for jobs in construction and other service industries. For Japan, Rebick (2000) finds that less than 50% of all hires of university graduates can be explained by random open market processes using five-year data from 1991-1996.

In terms of transaction costs, there have been case studies that trace how boundaries and internal organisations of firms change with realignments of network ties among producers, customers and markets (Eccles and Crane 1988). Landa (1994) applies a transaction cost approach in developing a theory of ethnically homogeneous middleman groups in Southeast Asia, which are club-like structure/network of traders.⁴⁴ She argues that the Malaysian and Singapore businesspeople in her study are best conceived as middlemen-entrepreneurs linking producers and final consumers in networks of exchange, a form of private ordering in

⁴³ Many firms, large and small, are connected through interlocking directorates so that relationships among directors of firms are densely knit. That business relationships spill over into sociability and vice versa, especially among business elites, is one of the best-documented facts in the sociological studies of businesses (for example, see Dornhoff 1971; Useem 1979).

⁴⁴ Landa's (1994) study is based on a survey of Chinese traders in Singapore and Malaysia.

response to an incomplete legal order. Her theory holds under two conditions: contract uncertainty and positive transaction costs. Trades in this network economise on transaction costs via informational savings and a lower probability of opportunistic behaviour. Because the network in her model is bounded by ethnicity or kinship, outsiders must substitute reputation for kinship/ethnic ties to use the network.

With respect to the vertically integrated firm, there are conflicting views on the effects of social networks on the internal labour market. Abraham and Medoff (1983) estimate that in approximately 60% of the 392 U.S. firms surveyed, senior level employees were favoured for promotions even though more junior employees were thought to be more productive. In one-third of the firms employing largely unionised hourly employees, the junior workers were never promoted regardless of productivity differentials (Abraham and Medoff 1983: 9). Their results suggest that factors other than productivity may affect wages, such as age or perhaps social networks built up with seniority. Williamson, Wachter and Harris (1975) counter that although wages and productivity may not correspond closely at “points of entry,” productivity differentials will be recognized over time and a closer correspondence can be expected for high-level assignments in the internal labour market hierarchy, giving a lesser role to seniority or networks. In the most straightforward sense, Bartlett and Miller (1985) find a wage premium for 132 female executives as compared with male executives in their analysis of Fortune’s top 1000 firms in the U.S. in 1982. Holding personal and firm characteristics constant, they find that being a member of a corporate board has a

39% positive effect on wages while being a member of a private club is associated with a 22% wage premium.⁴⁵

Moving from networks to the notion of the value of the capital generated by the networks, Coleman (1988) and others termed it social capital. Coleman (1990) views social capital as a form of human capital shared by all members of that group; he argues that it alters an individual's opportunity set and has significant effects on behaviour, human capital formation and labour market outcomes. He uses the relationship between networks and social capital to motivate his explanation as to why certain children perform better in school. Children perform better if they have a tight network in which friends, teachers and parents are all strongly connected to each other. These pressures from teachers and parents have positive long-term consequences for children by forcing them to focus on their education. Similarly, Borjas (1992) finds that the process of accumulating human capital is in part determined by the ethnic capital of the prior generation. Burt (1992, 1998) likewise argues that social capital is the contextual complement to human capital. In his formulation, social capital predicts that returns to intelligence, education and seniority depend in some part on a person's location in the social structure of a market or hierarchy. While human capital refers to productivity acquired through investment in the individual's ability, Burt (1998) views social capital as referring to opportunity. He argues that some portion of the value that a manager adds to a firm is his ability to coordinate other people to better identify opportunities for adding value within an

⁴⁵ The other determinants with large coefficients included being a graduate of an Ivy League school (17% wage premium) and being active in college sports (16% wage premium). They conclude that the premise of the paper – that “who you know” is as important as “what you know” – is supported (Bartlett and Miller 1985: 270).

organisation and getting the right people together to develop those opportunities. Knowing whom, when and how to coordinate is a function of the manager's network of contacts within and beyond the firm. Therefore, managers with more social capital receive higher returns to their human capital because they are positioned to identify and develop more rewarding opportunities. Montgomery (1991) presents an adverse selection model in which a referral system through employees in a social network will result in higher profits for the firm that uses such social ties as well as benefit those employees who have the requisite social contacts to make referrals and are rewarded with higher wages.

Burt (1998) further argues that there are gender differences in social capital, and that these differences are severe enough that a woman must "borrow" social capital or, in other words, use the social capital of male colleagues to gain opportunities. Moore (1990) finds that women's networks in the U.S. tend to have more kin than men even though the sizes of their networks were similar. Finally, a well-known example of gender-specific social capital is the Grameen Bank in Bangladesh. Goetz and Gupta (1996) find that despite the socio-cultural constraints faced by women, they are good credit risks as characterised by a manifestly high propensity to repay loans, thought to be due to the pressures exerted by their social networks. However, they find that a significant portion of the loans to women is invested by male relatives, while the women remain liable for repayment (see also Amin, Becker and Bayes 1998; Pitt and Khandker 1998).

The main challenge of social capital lies in measuring its "stock" and its "flow." Studies by Borjas (1992) and Collier and Garg (1999) show that there is some

demonstrable return to “ethnic” capital. In the U.S., Borjas (1992) finds that “ethnic” capital, *i.e.*, one’s ethnic heritage and environment during childhood, proxied by the network of the previous generation, adversely affects the acquisition of skills for certain racial groups in the U.S. He suggests that this form of social capital acts as a negative externality in the accumulation of human capital of the subsequent generation. Similar to measuring the effects of “ethnic” capital, Collier and Garg (1999) find in their study in Ghana that kin relations alone are not enough to generate a premium on wages; rather, it is membership in a local dominant kinship group.

There are only a small number of empirical studies of the returns to social capital to date, each of which finds that the hypothesis that this form of capital induces a positive efficiency gain cannot be rejected (Putnam, Leonardi and Nanetti 1993; Barr 1996, 2000; Knack and Keefer 1997; Fafchamps and Minten 1999). Putnam, Leonardi and Nanetti (1993) compare the differences in memberships in formal groups as an indicator of social capital and find that there is an efficiency return to this capital reflected in the differential development of northern and southern Italy. Knack and Keefer (1997) find that the measure of social capital used by Putnam, Leonardi and Nanetti (1993) is not associated with improved national economic performance. They use alternative measures of social capital based on three questions regarding trust and civic norms from a survey of 29 market economies. Knack and Keefer (1997) find that trust and social norms are higher in those countries in which there is higher and more equal income, a better educated and an ethnically more homogeneous population, and where there are formal institutions to protect property and contract rights. These indicators are associated with improved economic performance, and not associational membership in their study. Interestingly, they find

that Eastern Europe and the ex-Soviet countries have low values of social capital, but that China has a value that ranks it among the highest in the survey.⁴⁶ China is not within the purview of their analysis, but reflects the importance of the Chinese variant of social capital, *guanxi*, explored in depth in the next chapter. Finally, Brown and Ashman (1996) find that social capital is correlated with 13 successful non-governmental organisations' programmes in Asia and Africa, not including China.

2.4.1 Defining Social Capital⁴⁷

The definition of social capital is varied⁴⁸ (for examples, see Bourdieu 1985; Coleman 1988; Portes 1998) and is broadly encompassed within two approaches: (1) shared norms and (2) that which is embodied within social network structures (see Narayan and Cassidy 1999 for a discussion). The former approach is adopted by writers such as Coleman (1988, 1990), Putnam, Leonardi and Nanetti (1993), and Knack and Keefer (1997), while the latter includes Boorman (1975), Montgomery (1991), Borjas (1992), Barr (1996, 2000), and Fafchamps and Minten (1999). The first group of theorists envisions social capital as norms of trust, civic

⁴⁶ The survey question on which the trust indicator is measured asked if a respondent thought that most people can be trusted. The mean value is 35.8% with a standard deviation of 14%. In the World Values Survey used by Knack and Keefer (1997), China has a mean of 60.3%. However, China is not included in their analysis of economic performance so inferences cannot be drawn.

⁴⁷ Social networks and social capital are used interchangeably throughout much of the literature. We remain faithful to the terms and variables as used by the various authors despite the possibility of better distinguishing the concepts.

⁴⁸ Social capital is the "sum of resources, actual and virtual, that accrue to an individual or a group by virtue of possessing a durable network or less institutionalised relationships of mutual acquaintance and recognition" (Bourdieu 1985). Coleman (1988) defines social capital as follows: "It is not a single entity, but a variety of different entities having two characteristics in common: they all consist of some aspect of social structure and they facilitate certain actions of individuals who are within the structure." Finally, Portes (1998) views social capital as "the ability of actors to secure benefits by virtue of memberships in social networks or other social structures."

norms and associational memberships. In contrast, those who view it as inherent in the structure of social networks tend to see social capital as a product of dense versus less dense networks. Within the structural approach, presumably norms exist but are not necessarily measured or taken explicitly into account in estimating the amount of social capital. Conversely, within the norms approach, the structure of the surrounding social network is still relevant although not quantified.

Of the various definitions given to social capital, an early formulation by Bourdieu (1985) offers a simple view that may be consistent with an investment approach to social capital that is based neither on norms nor structures but rather has an economic derivative, which we propose and formalise in a later chapter of this thesis. Bourdieu (1985) views social networks as constructed through investment strategies that may be used as a source of benefits. Bourdieu (1985: 248-249) defines social capital as composed of two elements: first, the social relationship itself that allows individuals to claim access to resources possessed by their associates; and second, the amount and quality of those resources. We view the first element of his definition of social capital as a measure of the encompassing social network rather than social capital. The second aspect may well be termed social capital since it is comprised of the resources that are potentially available within the structure of a social network.

One of the challenges in rendering social capital a useful concept is to obtain measures of its stock and returns as independent from the surrounding network structure. The above definition offers a starting point toward this objective. In contrast to the existing approaches, a measure of social capital can be distinct from

that of a social network but still remain embodied within it. The norms approach does not measure social capital as functionally derived from social networks but instead as shared values or associated memberships within a community, which has certain structures of social networks. On the other hand, the theorists who measure social capital as synonymous with a certain configuration of social networks for the most part conflate the two concepts and do not distinguish between the structure and the resources generated within the structure. This approach is feasible in certain contexts, such as when it appears appropriate to assume that a less dense network facilitates a greater diversity of information (Burt 1992).

In the broadest sense, a social network is the number of other people that an individual knows (Bartlett and Miller 1985; Wasserman and Faust 1994). Social capital can be the relationships a person maintains within a social network. Portes (1998) posit that transactions involving social capital tend to be characterised by unspecified obligations, uncertain time horizons, and the possible violation of reciprocity expectations. Both Bourdieu (1985) and Coleman (1990) emphasise the intangible character of social capital relative to other types of capital. Whereas economic capital is in people's bank accounts and human capital is in their heads, social capital lies in the structures of their relationships (Portes 1998: 7). To possess social capital, a person must be related to others, and it is those others, not himself, who are the sources of his or her advantage. Communities bound together by a shared ethnicity are one example (Borjas 1992; Collier and Garg 1999).

Based on the definitions considered above, we view social capital as the investment that a person makes in other people by fostering relationships with a view

toward long-term cooperation. As with human capital, the returns from this investment are not always certain, but the potential for returns often makes it worth the risks involved. Formally, our definition of social capital is the time and resources invested in interpersonal relationships. In other words, social capital is the investment that one makes in other people by spending time with them, giving gifts and other inputs that are costly at present in anticipation of potential future returns. Our definition of social networks is the number of persons within an individual's network.

Once we distinguish social capital from social networks, we must further differentiate the possible returns in order for these concepts to be useful in economic theory. The returns to social capital or social networks will much depend on the context in which the returns are sought. Just as the investment may be economic (*e.g.*, cash or gifts) or noneconomic (*e.g.*, time or emotions), the returns could be market-based or social in nature. We give an overview of our formulation of these variables in the following section. A formal model is presented in Chapter 5 of this thesis.

2.4.2 Measuring Social Networks

The measurement of an individual's social network typically encompasses both the network's size and density (Burt 1992; Wasserman and Faust 1994). Size is the number of contacts in a social network and density is its inter-relatedness. For instance, an individual could have a large number of social contacts, but the contacts all know each other, so the network is denser and smaller than another individual's network in which few of the contacts know each other. There are more

potential indirect contacts in the latter network. This measure of network density is one of the two parameters used by Montgomery (1991) in formulating his measure of social network.⁴⁹ He finds that social network is a significant factor in successful job search, as did Granovetter (1995 [1974]). Borjas (1992) includes a measure of the amount of human capital of the ethnic network of an individual's parents and finds that it positively affected his accumulation of human capital. Barr (1996, 2000) creates separate measures for the size and the density of the social network and includes them as independent variables in estimations of a firm's production function. Her measure is intended to capture the effects of the diffusion of knowledge through an entrepreneur's social network; thus, the denser the network, the greater degree of shared information.

We propose that a measure of an individual's social network is the sum of the direct and indirect contacts:

$$N_i = T_{ij} + T_{jq} \quad \text{for } q \neq i, j, \quad (2.23)$$

where T_{ij} measures the number of i 's relationships with persons j and T_{jq} is a measure of the number of q individuals that i knows indirectly through his direct ties through persons j . A measure of a person's social network is the total number of his direct and indirect social ties, N_i , which ranges from zero to $j+q$. A value of zero indicates no contacts and thus no social network. A value of one would suggest that i 's social

⁴⁹ His other measure is "inbreeding bias," an assumption that people of similar ability know each other in greater proportions than those of differing abilities. This is important in his model for the purposes of identifying those individuals who know others of similar ability since there are high and low ability workers. Employers are interested in high ability workers so they seek referrals from other high ability workers (Montgomery 1991).

network consists only of one person and this person has no social network and therefore zero indirect contacts: $N_i = (1+0) = 1$. Individuals with larger networks have larger values of N_i .

Two individuals could have the same number of direct ties but an individual with more indirect ties has a larger social network than a person with the same number of direct ties but fewer indirect ties. For instance, if an individual i has direct contacts with two people (u, v) and u has social ties with w and x , and v has social ties with y and z , then for $j = 2$ and $q = 4$, $N_i = (1+2) + (1+2) = 6$. If an individual k likewise has direct contacts with two people (u, v), but u and v have only one contact each with someone other than k , then for $j = 2$ and $q = 2$, $N_k = (1+1) + (1+1) = 4$. Thus, even though i and k have the same number of direct contacts, i has a larger and less dense network than k . However, for individual k , if u 's one contact is v , then $j = 2$ and $q = 1$ since including u 's relationship with v double counts that relationship in k 's network. Thus $N_k = 3$ and his network is smaller in size. For instance, Granovetter 1995 [1974] finds that approximately 17% of the respondents in his sample of white-collar American workers found their jobs through intermediaries of their friends or kin – indirect contacts that the respondents did not know well or see regularly.

2.4.3 Measuring Social Capital

Turning now to social capital, we argue that it is usefully viewed as distinct from social networks. Some papers that measure social capital include a variable for social networks and make the assumption, for instance, that a denser

network implies more social capital. Maluccio, Haddad and May (1999) assume that social capital increases with the number of memberships in community groups, more heterogeneity in the gender of the groups to which households belong and if the group is viewed as performing well (see also Narayan and Pritchett 1997). Barr (2000) defines social capital as a stock variable that is greater the more developed the network, that is, the denser and stronger the component relationships, for purposes of evaluating flows of knowledge among entrepreneurs in Ghana.

We argue that a social network may consist of the number of a person's direct and indirect contacts but the intensity of each of those relationships cannot be inferred through the density of the network. Instead, the decision can be thought of as an investment so that it is not only how many people an individual has ties with, but also how close or well developed are the relationships. A person can choose to invest in developing closer relationships with some but perhaps not all the other people in his social network. A distant relative is a cogent example of someone whom a person can count as a member of his social network, yet there may not be much social capital in that relationship if, for instance, these two people have met only once at a relation's wedding over the course of their lifetimes. Thus, even ties with kin or co-ethnics (see Collier and Garg 1999) require cost and fulfilment of obligations to maintain and develop. Another point to emphasise is that these investments need not be solely instrumental in nature. Many relationships are cultivated with purely social goals in mind. Even in such relationships, there is a stock of social capital, as a relationship is almost by definition reciprocal in nature. There may not be an occasion to seek economic returns, but social capital exists that may later generate unanticipated economic and social returns. Referring back to the analogy to human capital, a person

may invest in human capital by reading widely, for instance. Some people may read to increase their productive capabilities; however, others may read because they enjoy it and do not anticipate that it will enhance their economic earning power in their jobs.

Thus, it is not only the size or density of a network that is important in estimating the returns from investment in social capital, but also the intensity of each relationship (see generally, Granovetter 1985; Burt 1998 for rank-scale measures that include the closeness of the tie). An individual could know a large number of people but may be able to realise fewer returns than another person who has fewer contacts but has closer relationships. The latter may have more social capital than the former. Social capital is, therefore, a function of both the size of the network and the amount of investment that an individual has made in each of the relationships in the network.

The stock of social capital is measured through the time and monetary and nonmonetary resources invested in the contacts in a social network. A measure is as follows:

$$S_i = I_{ij}T_{ij} + I_{iq}T_{jq} \quad \text{for } q \neq i, j, \quad (2.24)$$

where I_{ij} measures the degree of investment that i has made in his relationships with j individuals, I_{iq} measures the degree of investment that i has made with q individuals measured as a function of the number of indirect contacts i knows through each of the relationships between q and j , T_{ij} measures the number of i 's relationships that are directly invested in persons j and T_{jq} is a measure of the q number of individuals that i

knows indirectly through his direct ties with persons j . Even though the investment calculus is the same, the number of q persons in the network depends on the contacts of each contact j . Thus, the second term reflects i 's investment in persons q , which is a function of the number of persons q known indirectly through persons j . Unlike the network variable, the lower bound on S_i is zero, but the upper bound may be any measure reflecting the total amount of time, monetary and nonmonetary resources an individual chooses to invest in his social capital. These direct and indirect ties are fluid and an individual who previously had been an indirect acquaintance may become a direct contact if the relationship is cultivated. This formulation differs from the models of Granovetter (1995 [1974]) and Boorman (1975) in that rather than assume that a tie is a dichotomous variable (either strong or weak), a relationship can have multiple degrees of intensity. This point is recognised by Boorman (1975: 243-244):

“Throughout the present model, we have assumed exactly two types of ties – strong and weak. An obviously more realistic approach would be to treat the strength of a tie as a continuous variable.” By constructing a separate measure of social capital, we can calibrate the stock of the capital within a social network. There is evidence to suggest that social networks alone are insufficient to understand the potential range of returns to this capital. For instance, Burt (1998) finds that for women and minorities in a U.S. corporation, a small number of close relationships with superiors are more important in getting early promotions than having a large social network.

2.4.4 Returns to Social Capital

Finally, we posit that the returns from these investments are much dependent on the context in which they are sought, *e.g.*, finding a job (economic) or

having many guests at a wedding (noneconomic). The status of the individuals in the network may also be important in assessing the potential range of returns from the investment (see Narayan and Cassidy 1999). Our measures are general and not specific investments, such as giving a gift in direct appreciation for job assistance, in which the status of the contact and the form of the investment are critical. We propose that a general measure is more useful in understanding the stock of social capital and that status (or vertical networks of patron-client relations) are encompassed in a network and evidenced when specific returns are sought. If the expected return is noneconomic, such as having friends to socialise with, then whether that contact is the mayor will have less impact than if one is seeking a job in city hall and makes contact with the mayor. If the return is economic in nature, then there may be instances where cultivating one close relationship with the mayor will generate greater returns than cultivating ten close relationships with neighbours when the goal is to work in city hall.

In terms of returns within the labour market, if an individual has social capital that helps her job search, she can more easily change jobs to one that better reflects her productivity. If she has access to capital through her social network (*e.g.*, the Grameen Bank in Bangladesh), then she may be able to enter into self-employment. In these ways, social capital can increase opportunities and decrease transaction costs in labour markets characterised by frictions. If there is imperfect information, she may hear of job opportunities through formal job market mechanisms (*e.g.*, advertisements, employment centres) or through her network of contacts (Granovetter 1995 [1974]; Lin, Ensel and Vaughn 1981; Campbell, Marsden and Hurlbert 1986; Lin and Dumin 1986). Thus, it is possible for social capital to reduce search costs by providing information regarding jobs. In these and other ways, social capital affects a worker's

sensitivity to wages, *i.e.*, the elasticity of supplying labour to a firm. Thus, labour supply could be affected by social capital that decreases frictions in an imperfect labour market.

We present an investment model of social capital in Chapter 5 and develop the concept of returns to this capital in the form of employment opportunities. In this way, the social capital of heterogeneous groups may contribute to their differing labour supplies and could help explain disparate economic outcomes (Borjas 1992; Collier and Garg 1999). A long-term perspective may shed light on the dynamics of discrimination.

2.5 Hypotheses for Empirical Testing

We investigate the role of social capital in providing differential opportunities in the Chinese labour market for men and women. Insofar as perceived gender earnings differentials affect investment in human capital, less spending on the education of girls relative to boys will cause differences in their productive characteristics prior to entering the labour market. Thus, in our attempt to understand the position of women in urban China in the current reform period, we find it useful to distinguish pre-labour market from within-labour market aspects of gender inequality.

Our hypotheses follow from the model and are as follows:

- *Women, on account of not being the primary income earners in the household and bearing more household responsibilities, will have less time and resources to invest in social capital than men (H_1).*

- *Women, with less social capital, will have fewer opportunities in an imperfect labour market and are less able to reduce the frictions causing the labour they supply to a firm to be upward sloping (H_2).*
- *The group with the relatively less elastic labour supply curve to a firm – women – will experience labour market discrimination (H_3).*

Pre-labour market inequality –

- *The Personal Rates of Return Hypothesis: Given unequal rates of return to education for sons and daughters, parents will invest more in the human capital of the child with the greater expected future personal income (H_4^a).*
- *The Familial Rates of Return Hypothesis: Given an equal likelihood of providing transfers, parents will invest more in the human capital of the child with the greater expected future household income (H_4^b).*

Two forms of labour market inequality –

- *Earned Income: Women will earn less income than men with similar productive characteristics (H_5^a).*
- *Re-employment: Women will be less likely than men to find re-employment after experiencing unemployment (H_5^b).*

Each hypothesis will be tested in Part III, except for hypotheses H_2 and H_3 . We do not have information on hours worked in the 1999 urban Chinese household data set that measured social capital and cannot calculate labour supply elasticities or estimate the effect of *guanxi* in increasing the elasticities of labour supply. Thus, we cannot directly test hypotheses H_2 and H_3 . The inferences regarding labour supplies are indirect and are based on whether the employment outcomes of

men and women are correlated with differences in their respective social networks and amounts of social capital.⁵⁰

⁵⁰ Data on hours worked are available for the sub-sample of migrants. As an exercise, we computed own-wage elasticities and found that women have smaller stocks of social capital than men and relatively less elastic labour supplies. However, rural-urban migrants are not considered to be representative.

Appendix 2.1

A Model of Discrimination under Imperfect Information

There are numerous implications for our model when we relax the assumption of perfect information. We model one aspect, promotions, that can be affected by informational imperfections. When coupled with heterogeneous labour supplies, we expect different employment outcomes for equally productive workers.

Assume that the employee has private information as to his or her productive skills that the employer does not have. Let G_1 be the employer's net gain if he promotes a skilled worker and let G_0 be his net gain if he promotes an unskilled worker. Let p_1 be the probability that a skilled worker is qualified for the promotion, and p_0 be the probability that an unskilled worker is qualified. Assume $p_0 < p_1$. Let E be the employer's estimate of the likelihood that a worker is sufficiently skilled for the promotion. The employer prefers to promote the worker if $EG_1 \geq (1-E)G_0$, or if $E \geq 1/(1+G_0)$.

Let us further assume that there is some probability that the employee who is not promoted will leave the firm.⁵¹ If the probability of leaving the firm is affected by an employee's ability to obtain another job and thus reflected in the elasticity of labour supply, then an employer will assign a higher probability of leaving to an employee with the more elastic labour supply. Let p_m denote the probability that a man will leave the firm, and let p_f denote the probability that a woman will leave. We also assume that there is some proportion of men and women who will not leave the firm if not promoted.

Let g be the fraction of workers whom the employer believes is qualified. Bayes' rule implies

$$E = gp_1/[gp_1 + (1-g)p_0]. \quad (\text{A-2.1})$$

The employer believes that g_m is the number of men who are skilled, g_f the number of women who are skilled, and let $g_m + g_f = g$. Further, assume the proportion of men is close to the proportion of women who are skilled in the belief of the employer. We assume $g_m = g_f$ to establish that persons believed to be equally productive can experience differential employment outcomes under imperfect information.

Since g_f of women are thought to be skilled, the employer's expected loss with respect to the women who were not promoted and have left the firm is given by

$$p_f[EG_1 - (1-E)G_0], \quad (\text{A-2.2})$$

⁵¹ Quit behaviour has been linked to promotions in firms (Lazear and Rosen 1990).

where $E = g_f p_1 / [g_f + (1 - g_f) p_0]$.

Conversely, the expected loss for men is

$$p_m [E G_1 - (1 - E) G_0], \quad (A-2.3)$$

where $E = g_m p_1 / [g_m + (1 - g_m) p_0]$.

Given $g_m = g_f$ and if $p_m > p_f$, then the profit-maximising employer will over-promote men and under-promote women to minimise expected losses. Therefore, based on their different supply elasticities with even equal perceptions of productive ability, men and women can be promoted differentially.

It is assumed that the employer prefers not to lose employees as formal or informal on-the-job training would have increased the employees' firm-specific human capital and experience. It would be a different calculus if the employer intends for certain individuals to leave and thus optimises the number of denied promotions. This model can be applied to bonuses and other job-related compensation. If the determination of the size of the bonus includes considerations of retaining the worker in addition to productivity concerns, then the worker with a more elastic supply curve will be more sensitive to the size of the bonus and thus have a higher probability of leaving than an employee with a less elastic supply curve.

Part III

Empirical Application

Chapter 3

Women, Economic Reform and *Guanxi* in Urban China

Before attempting to explore the issues of gender inequality of a country, it is useful to view it in a comparative perspective. With the nuances inherent in any attempt to understand gender differences, an understanding of the governmental, institutional and cultural setting that have affected education and employment policies is essential. This is especially important when investigating possible economic discrimination in conjunction with social capital, a heavily context-specific concept. In order to analyse in a useful manner the social capital of any society, the factors (cultural, economic, ethnic, historical and social) that underlie those relationships must first be explored.

This chapter will first provide an international perspective on the position of Chinese women, followed by an overview of economic reforms since 1978 that provide the context for our investigation. We examine whether existing economic theories can explain the growing earnings inequality as between men and women that is evident in China's move to a more market-oriented economy. Our focus then shifts to the Chinese variant of social capital, *guanxi*, and the opportunities generated from this form of capital that may affect employment outcomes in an imperfect labour market. A discussion of some economic aspects of gender inequality in urban China concludes.

3.1 Position of Chinese Women by International Comparison

We begin with a demographic overview of women in China before turning to some international comparisons.

Table 3.1
Population Statistics by Gender for China, 1995
(in persons and percentages)

	Men	Women
Population	616,631,000 (51.0%)	591,149,000 (49.0%)
Urban <i>Hukou</i>	175,150,000 (50.4%)	172,370,000 (49.6%)
Rural <i>Hukou</i>	441,481,000 (51.3%)	418,779,000 (48.7%)
Age ⁵²		
0-14	174,700,000 (52.8%)	156,300,000 (47.2%)
15-64	417,000,000 (50.1%)	406,000,000 (49.9%)
64+	39,000,000 (47.0%)	44,000,000 (53.0%)

Source: NBS (1997b).

Table 3.1 shows that women are roughly half of the total population in 1995, with about equal proportions holding urban and rural *hukou*. *Hukou* is a system of household registration established in the 1950s, which determines work and housing

⁵² The figures for the age cohorts are based on a survey of 1% of the population and do not precisely equal the total population figure (NBS 1997b: 2). There are 4.9 million individuals whose ages are not determined and of those, 49.8% are women.

options, among others.⁵³ Women comprise more of the cohort aged 65 and over and less of the population younger than 14. For those aged 15-64, corresponding largely to the working-aged population, gender proportions are almost equal.

Table 3.2
International Female Gross Enrolment Ratios, Selected Years⁵⁴
(gender ratio of girls to boys)

	China			All Developing Countries ⁵⁵			World ⁵⁶		
	1975	1985	1995	1975	1985	1995	1975	1985	1995
Primary	114 (0.88)	114 (0.86)	117 (0.99)	83 (0.82)	91 (0.84)	94 (0.88)	90 (0.85)	92 (0.87)	95 (0.90)
Secondary	38 (0.69)	33 (0.70)	62 (0.89)	24 (0.64)	31 (0.71)	44 (0.81)	39 (0.78)	43 (0.81)	54 (0.87)
Tertiary ⁵⁷	0.4 (0.57)	1.7 (0.44)	2.6 (0.52)	2.7 (0.53)	4.9 (0.60)	6.6 (0.72)	8.9 (0.72)	11.8 (0.84)	14.6 (0.93)

Sources: NBS (1997*c*) and UNESCO (1999).

Table 3.2 provides an international perspective on the educational enrolment of girls. In 1975, 1985 and 1995, the gross enrolment ratio of girls at the primary school level in China was higher than the average for all developing countries

⁵³ An example of the significance of *hukou* is seen through the experience of rural-urban migrants. Beginning in 1994, migrants holding rural *hukou* were allowed to acquire a special *hukou* for residing in towns. This status, however, is not comparable to having an urban *hukou* because they did not receive social securities, housing and food subsidies or labour guarantees. It effectively keeps them as second-class citizens (see Knight and Song 1999*b*).

⁵⁴ Gross enrolment ratio (GER) is defined as total enrolment in a specific level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education in a given school year (UNESCO 1999). GER is used as an alternative indicator to the net enrolment ratio (NER) when data on enrolment by single years of age are not available.

⁵⁵ These figures include China (UNESCO 1999).

⁵⁶ These figures include China and all developing countries (UNESCO 1999).

⁵⁷ The figures for tertiary level are for 1993 because the 1995 gross enrolment ratio of 5.3% for China is not differentiated by gender (UNESCO 1999; see also World Bank 1999 for a similar lack of information for 1995). All tertiary level figures are given for 1993 for comparability.

and the average for the world. At the secondary level but not the tertiary level, China’s gross enrolment ratio is comparable to all developing countries and the world. In terms of gender ratios, China measures well internationally at the primary and secondary levels. Again, China fares less well at the tertiary level by international comparison, falling behind all developing countries and the world in 1995. Table 3.3 presents additional indicators of the position of women internationally.

Table 3.3
International Indicators of the Position of Women, 1997
(gender ratio of female to male)

Indicator	China	All Developing Countries ⁵⁸	World ⁵⁹
Life Expectancy in Years	72.0 (1.06)	66.1 (1.05)	68.9 (1.06)
Adult Literacy Rate in Percentage ⁶⁰	74.5 (0.82)	62.9 (0.79)	71.1 (0.84)
Combined First, Secondary and Tertiary Level Gross Enrolment Ratio in Percentage	67.0 (0.94)	55.0 (0.86)	60.0 (0.90)
Share of Earned Income in Percentage ⁶¹	38.1 (0.62)	32.4 (0.48)	33.7 (0.51)

Sources: UN (1999) and World Bank (1999).

In 1997, China ranked 98 out of 174 countries according to the gender-related development index,⁶² a measure developed by the United Nations to indicate

⁵⁸ These figures include China (UN 1999).

⁵⁹ These figures include China and all developing countries (UN 1999).

⁶⁰ The adult literacy rate is defined as the percentage of persons aged 15 and over who can, with understanding, both read and write a short simple statement on their everyday life (UN 1999).

⁶¹ These figures are for 1995 (World Bank 1999).

⁶² The gender-related development index (GDI) is an adjustment of the human development index (HDI) by taking note of inequalities between men and women. The GDI incorporates a penalty for imbalances in basic health, education and income on the basis of gender. When the disparity between men and women increases, GDI falls relative to HDI (UN 1999).

women's well-being by taking account of life expectancy, adult literacy, educational enrolment, among others (UN 1999). This places China roughly in the middle relative to all countries in the world. Some of these indicators are shown in Table 3.3. A fourth measure, the share of earned income (not included in the gender-related development index) is included for reference. It appears that although men remain the primary income-earners in China, the gender ratio of the share of earned income exceeds the average of all developing countries and of the world, reflecting the comparatively high rate of labour market participation of Chinese women. In China, as in the average for all countries, women have longer life expectancy than men. A combined indicator of gross enrolment ratio for all educational levels shows that girls in China fare better than the average for all developing countries and for the world, comparable to the findings for 1995 in Table 3.2 with the exception of tertiary education. Finally, in terms of adult literacy, China fares better than developing countries and only slightly worse than the world average. Despite the fact that China ranks two places better in its overall human development index than in its gender-based measure (UN 1999), the position of women in China – in terms of life expectancy, educational enrolment, literacy and earned income – is good by international comparison.⁶³

However, the growing gender earnings gap accompanying economic reform in China is a cause for concern. Using data from 1988, 1995 and 1999, the

⁶³ On another measure, known as the Gender Empowerment Measure (GEM), China ranked 33 out of 101 countries (UN 1998). This indicator evaluates the progress of women in terms of political and economic status. GEM consists of four measures, the results of which for China are: seats in parliament held by women (this is not evaluated for China), proportion of female administrators and managers (12%), proportion of female professional and technical workers (45%), and women's share of earned income (38%). Not all of 174 countries are included; thus, the total sample comprises 101 countries. The GDI and the GEM were both introduced in 1995 (UN 1999).

mean female-male income ratio was 0.917 in 1988, 0.795 in 1995 and 0.680 in 1999⁶⁴ (see Chapter 1 for a review of the literature analysing the gender income gap for urban China in the current reform period). The evidence of an increasing inequality in the incomes earned by women and men follows the process of marketisation of the urban economy from roughly the mid-1980s to the present (see also UNICEF 1999⁶⁵). An overview of the reforms of the labour market and wages since 1978 that serve as the context for our empirical investigation is presented in the next section.⁶⁶

⁶⁴ These are based on unstandardised real mean annual income for men and women from urban household data sets in China for 1988, 1995 and 1999. Real income is adjusted by the consumer price index for urban areas with 1978 as the base year (NBS 2000b: 290). Using unstandardised mean annual income, the gender gap in urban China increased in real terms from 160 RMB in 1988 to 326 RMB in 1995 and 483 RMB in 1999.

⁶⁵ The UNICEF study (1999) finds that in the transition to a more market-oriented economy in 27 post-Communist countries of the former Soviet Union, Central and Eastern Europe, the position of women appears to be worsening. Some of the problems faced by women include higher unemployment and lower real income as compared with men, a reduction in the provision of child care, a deterioration of education and health services, high rates of births to teenage mothers, high abortion rates, increasing drug and alcohol abuse, greater spread of sexually transmitted diseases and increasing levels of gender-based violence. Of the 25 million jobs lost in the regions encompassed in the study in the past decade, an estimated 14 million were jobs held by women. Although women gained in some respects (for example, increasing numbers of women are becoming entrepreneurs), UNICEF termed this report “a wake-up call to national leaders that gender equality must be elevated higher on the political agenda if their efforts to revitalise civil society are to succeed.” This report did not encompass China; yet, some of these issues are pertinent and remain unexamined (see Gustafsson and Li 2000).

⁶⁶ An exposition of economic changes since 1949 is beyond the scope of this thesis. The Chinese political economy, broadly delineated, can be roughly generalised by the following periods: (1) the beginning of the socialist economy, including the redistribution of land, from 1949 to 1952; (2) the cooperative movement from 1952 to 1956; (3) the communisation movement from 1956 to 1958; (4) the Great Leap Forward, where industrialisation initially followed the Soviet model of emphasis on heavy industry to the neglect of light industry and agriculture, from 1958 to 1962; (5) a period of economic recovery from 1963 to 1966; (6) the decade of the Cultural Revolution from 1966 to 1976 when economic and other progress stalled; (7) a period of economic reforms geared toward a greater degree of marketisation from 1978 to 1984; and (8) the earnest implementation of market-oriented reforms from 1984 to the present. These broad contours do not do justice to the complexities of the economic changes and policies in China. For an overview until 1984, see Riskin (1987) and Hsü (1995[1970]). From the mid-1980s onward, see Knight and Song (1999b) and Riskin, Zhao and Li (forthcoming). We focus on the position of women in the current reform period.

3.2 Post-1978 Economic Reforms

Following the turmoil of the Cultural Revolution, China embarked on an economic reform program characterised by the Four Modernisations of agriculture, industry, national defence, and science and technology (Riskin 1987; D.W. Chang 1988). At the Third Plenum of the Eleventh Central Committee in December 1978, the Chinese authorities resolved to make economic development a top priority. In urban areas, economic reforms were intensely implemented after 1984 (Riskin 1987). We focus on two primary aspects of these reforms, those pertaining to the labour market and to wages.

3.2.1 Labour Market Reforms

One of the foremost challenges currently facing China is the development of a labour market (Knight and Song 1999*b*). Before the 1980s, state labour agencies exercised a virtual monopoly over the allocation of urban labour (Bian 1994*a*; Knight and Song 1999*d*). Governmental planning, rather than the market, dictated the supply of and demand for labour. Allocations to enterprises were aimed at avoiding unemployment. Job assignments were made without much reference to the needs of enterprises or the characteristics of workers. The initial job assignment was crucial as the first job was typically the only job, the so-called “iron rice bowl.”

When reforms started in the 1980s, the state monopoly of labour allocation was replaced by a somewhat more decentralised system. Central and local labour authorities continued to plan the labour requirements of state and large

collective-owned enterprises and remained responsible for the placement of college graduates. However, labour exchanges began to be established for the registration of job vacancies, job placements and training (Knight and Song 1999*d*). By the 1990s, recruitment quotas for state enterprises were abolished and firms were largely allowed to choose their employees (Bian 1994*b*; Knight and Song 1999*b*).

Even more recently, the attempts to resolve the problem of inefficiency of the state sector include downsizing and layoffs of workers by a quarter or more within four years (1997-2000). This was a drastic change from the official policy of full employment (Yang and Xin 1999). In 1996, an estimated 5.25 million urban state workers were officially registered as unemployed (Lee 1998*b*). By the end of 1998, the official figure of laid-off workers was 17.3 million, which included 8.8 million *xiagang* workers (Appleton, Knight, Song and Xia 2000). Re-employment policies primarily geared toward developing labour-intensive sectors, such as food services, transport, retail and tourism, have been launched by the Chinese government. The success of these policies remains to be seen (Meng 2000; Solinger 2000; Zhang 2000).

3.2.2 Reform of Wages

There were two waves of wage reforms prior to 1978.⁶⁷ We focus on the third wave, which consisted of three sets of reforms promulgated in 1985, 1992

⁶⁷ The first of China's wage system reforms occurred in 1950, one year after the Communist Revolution. It was aimed at transforming the food supply system of wartime communism into a wage system. Under the reformed system, government and military officials and employees in the newly established state-owned enterprises began to receive cash salaries and compensation according to job titles and ranks. The second wage reform in 1956 was part of an overall plan to nationalise the economy. The aim was to regulate wages for an expanded work force in both the state and collective sectors. Salary standards were patterned after the Soviet model and centrally regulated according to

and 1994 (Huang 2000). These wage reforms apply to SOEs and collectively-owned enterprises, but not to private or foreign-owned enterprises.⁶⁸ The latter categories are free to set their wages within the confines of the Labour Law.

In 1985, the budget for wages was linked to economic performance for SOEs and collectively-owned enterprises, and was measured by profitability or a combined indicator of economic returns (Huang 2000; see also MOL 2000*b*). The indicators vary by region and reflect local economic conditions, such as unemployment, the consumer price index and regional growth. The goal is to provide profit-oriented incentives. Under the previous system, these enterprises turned over all profits, and paid workers with wages redistributed by the state. Except for a small amount of bonus funds linked to limited above-quota output, there was little incentive to be profitable. With these reforms, however, wage budgets were linked to an enterprise's profitability and performance. Basic wages and profit quotas were projected from an enterprise's performance from the previous three years and they were allowed to retain, after taxes, above-quota profits for investment in plant capacity, employee welfare programs, "floating" salaries (*i.e.*, bonus-type, temporary salary increases), raises and bonuses. These incentives have stimulated profit-oriented behaviour in state-owned enterprises (see Groves, Hong, McMillan and Naughton 1995 who find positive effects on productivity from introducing managerial incentives in a study of 769 state-owned enterprises from 1980 to 1989).

regions, occupations, industries, sectors (state or collective), level of management of enterprises (central or local), and characteristics of workplace, *e.g.*, technology and size. The core of this wage system was a complex structure of salary standards for more than 300 occupational classifications (Riskin 1987; Bian 1994*b*).

⁶⁸ Government agencies and non-profit institutions – the other large employers in the Chinese economy – are also subject to a different wage system.

In 1992, the State Council issued a circular stating that enterprises were permitted to set their internal wage structure within the confine of the overall wage budget established by the government. There were two methods available to enterprises. The first was that wages would be linked to enterprise performance. If the wage bill exceeded the governmental standard wage bill that would be implied by the aggregate positions established by the Ministry of Labour, the enterprise must pay a Wage Adjustment Tax of 33% to the Department of Taxation.⁶⁹ The second method is for the enterprise to propose a wage budget and then submit it for approval to the Ministry of Labour and the Ministry of Finance, which then consider the proposal in the context of the consumer price index and local wages. The primary difference is that if an enterprise chooses the latter method, it is not liable for the Wage Adjustment Tax. These policies are designed to ensure that profits accrue to the state, but also that profit-oriented incentives are maintained (Huang 2000).

Beginning in 1994-1995, enterprises that are publicly listed companies were permitted to set their own wages subject to two standards (MOL 2000*b*). The first is that the growth rate of total wages must be lower than that of after-tax profitability, and the second is that per capita wage growth is lower than the rate of growth of labour productivity. In addition, the Ministry of Labour suggested to enterprises that wages are set not only according to occupation and rank, but also based on skills and productivity. Of the estimated 100,000 SOEs, approximately

⁶⁹ The government's standard wage is not the same as the minimum wage, which for Beijing was 420-430 RMB per month in late 2000. The standard wage, for instance, was 800 RMB per month for an office worker and varies by occupation and region (Huang 2000).

40,000 have issued shares and set wages under this regime (Huang 2000). Non-stock enterprises are still subject to the previous system.

Regarding individual wages, there was an overhaul that was part of the Ninth Five Year Plan (1996-2000). Previously, there had been six components of the wage in enterprises, including the basic wage, bonuses, benefits and subsidies, overtime wages, supplementary wages and others, primarily based on hardship (Bian 1994*b*). These categories have been replaced by two components of wages, fixed (*guding*) and variable (*huo*). The fixed portion includes the basic wage, seniority wage, insurance (medical, unemployment and pensions) and a housing fund.⁷⁰ The variable portion includes bonuses, based on both individual productivity and enterprise profitability. Enterprises continue to pay for training and other in-kind compensation, such as firm outings and gifts of daily goods. The standard workweek is 40 hours with 50% overtime pay on weekends and 300% overtime pay on national holidays, such as Lunar New Year, for hourly workers. In summary, these reforms are intended to create a more market-oriented wage structure. The rate of compliance by enterprises to the reforms and new regulations is thought to be high (Huang 2000).

3.3 The Economics of Gender in China

As noted, inequality in the earnings of men and women appears to be growing in the current reform period. In many ways the Chinese system differs from

⁷⁰ The system of allocated housing was largely abolished around 1998 and replaced with a housing fund. A deduction from an employee's paycheque is paid into the fund and matched by the enterprise.

the Western economies in the context of which the theories of gender discrimination are developed. Even in Western economies, existing theories do not adequately explain the persistence of gender inequality in labour markets. Increased competition with the move to a more market-oriented economy should be associated with less and not more gender discrimination, according to the “taste” for discrimination model. However, if the previously regulated wage structure largely equalised men and women’s earnings, then a move toward granting firms more discretion in wage setting could result in the resurfacing of any latent taste for discrimination that exists in the general society.

Our model of earnings discrimination based on monopsonistic competition may be better suited to the urban labour market in China. We predicate the model on imperfect competition in product and labour markets, and the Chinese urban labour market is characterised by many imperfections. It is underdeveloped in that there are few employment alternatives and workers still face some restrictions on moving from one city to another on account of the household registration system. These factors of limited alternative employment options and restricted mobility give rise to frictions in the urban Chinese labour market that are encompassed within our model of discrimination.

We theorise that these frictions will generate monopsony power for firms. One way to reduce these frictions is to invest in social capital. Men and women may have unequal amounts of social capital and thus reduce frictions differentially. This can result in gender inequality in the labour market.

The next section analyses the Chinese variant of social capital, *guanxi*.

We build on the general discussion of social capital explored in the last chapter and identify the particular characteristics of *guanxi* and its gender aspects before linking social capital, economic outcomes and gender inequality in China in the final sections.

3.4 The Chinese Variant of Social Capital, *Guanxi*

An aspect of Chinese society that remains important before and after 1978 – in economic as well as in noneconomic life – is *guanxi* (Walder 1986; Oi 1989, 1999; Bian 1994*a*, 1994*b*; Yang 1994; Wank 1995; Yan 1996; Kipnis 1997; Pearson 1997; X. Chang 1999).⁷¹ *Guanxi*, the relationships that an individual has and maintains in social networks, is used synonymously with social capital.⁷²

Guanxi is particularly noteworthy for its emphasis in Chinese economic transactions (Bian 1994*a*; Bruun 1995; Wank 1995; Pearson 1997), as well as social life (Yang 1994; Yan 1996; Kipnis 1997). It may even be considered the “operational code” for how best to get things done (Oi 1989: 132).⁷³ The associated gift economy is prevalent in both urban and rural China (Yang 1994). In rural China, meals or gifts

⁷¹ An example is seen in the many popular accounts of *guanxi* (see *The Economist: A Survey of China* 2000: 7). In China, *guanxi* refers to social capital, while *guanxiwan*, literally translated as a web of *guanxi*, means social networks. In other Chinese communities, such as Taiwan, Hong Kong and overseas diasporas, *guanxi* typically refers to both social networks and social capital.

⁷² We focus on individual-level social ties, but recognise the importance of firm-level connections. For instance, the cooperation of local governmental bureaux is seen as pivotal for business success (Leung 1993; Wank 1995; Pearson 1997; Lee 1998*a*; Oi 1999).

⁷³ The use of personal relationships to pursue individual interests is prevalent to such an extent that it is “almost legal,” according to Oi (1989: 132).

of food are common and effective methods to cement personal relationships or cultivate *guanxi* (Oi 1989; Yan 1996; Kipnis 1997).

In certain respects, the *guanxi* practised in China appears to be affected by the institutional framework, including the lack of a comprehensive legal structure (McMillan 1995; Fukuyama 1996), the inconsistent enforcement of laws (Lee 1998a; Yang 1994), risk minimisation in an uncertain political-economic-social environment (Walder 1986; Oi 1989, 1999), risk spreading through pooled resources in an economy characterised by labour and material shortages (Yan 1996; Kipnis 1997; X. Chang 1999), and information sharing in imperfect markets (Knight and Song 1999b; Knight, Song and Jia 1999).

Market imperfections in China likely contribute to the use and cultivation of *guanxi* as an informal strategy. However, Chinese communities in places with established institutions continue to rely on *guanxi*, thereby suggesting that social capital is not merely a reaction to the lack of formal structures (see Leung 1993 for an example of the prevalence of *guanxi* among Hong Kong investors; Greenhalgh 1984 and Hsiung 1996 for Taiwan; Landa 1994 for Southeast Asia; Takaki 1989 for Chinese-American enclaves in the United States). The benefits of reducing of transaction costs may play a role in motivating investment in *guanxi* regardless of the specific context, but the environment is expected to affect the form of the capital.

There appear to be gender differences in acquiring *guanxi*. In her sociological study of the practice of *guanxi* in urban areas, primarily Beijing, Yang

(1994) finds that women are unable to employ *guanxixue*⁷⁴ for long because of fear of gaining a bad reputation.⁷⁵ There are also class aspects, according to Yang (1994). Women intellectuals and cadres are more involved in practising *guanxi* than working-class individuals. She speculates that women may even obtain higher returns than men for their efforts because they are better able to cultivate *renqing* (feelings).

Yang (1994) and Yan (1996) both view *renqing* as less instrumental than *guanxi* and more social than economic in purpose. Judd (1994) argues that there are factors that limit the ability of women to produce *guanxi*, as separate from the cultivation of *renqing*, which they may be more able to cultivate. She posits that notions of propriety restrict women's extrahousehold activities so that even though women have *guanxi*, they are prevented from consolidating the types of relationships that could produce returns. For example, Kipnis (1997) argues that the exclusion of women from *guanxi*-enhancing activities, such as drinking and banquets, decreases their ability to develop contacts with men who tend to hold positions of influence.

3.5 *Guanxi* and Employment Outcomes

The widespread use of *guanxi* suggests that there are positive returns that justify its costs. A portion of the returns is likely to be noneconomic; however, some may be economic. Yan (1996), in his study of *guanxi* in a northern Chinese

⁷⁴ Literally translated as the practice of *guanxi*, which Yang (1994) terms the “art” of *guanxi*.

⁷⁵ Yang (1994: 79) finds that for unmarried women, the family objects because a negative reputation will harm marriage prospects. For married women, the husband objects because of gossip, such as others are “laughing” if a wife knows many men, in the words of a male carpenter.

village, estimates that as much as 20% of a household's income is spent on gift exchange to maintain a social network. In rural China as compared with urban China, the element of gift giving constitutes a larger share of a household's income, as we find that individual gifts in urban China amount to 1-2% of income (see Chapter 5, table 5.1). Mutual assistance facilitated by relationships plays a larger role in rural China than in urban China. For instance, there is likely to be a greater need to cultivate good relationships with fellow villagers, as rural families may need to rely on neighbours during harvests or when a member of the household falls ill and additional help is needed for farming. Further, a 1996 social anthropological study of a village in rural China finds that cultivating *guanxi* is akin to "fattening" a pig in which the profit is less than the cost of fattening the pig, but the possible future return of this favour warrants the action (X. Chang 1999).

One economic return may take the form of generating opportunities that improve employment outcomes. In urban China, Bian (1994a) argues that *guanxi* was a determinant of employment success even in a system of allocated jobs.⁷⁶ Oi (1989) and others (such as Walder 1986; Wank 1995; Pearson 1997) posit that *guanxi* is important in a range of economic outcomes, from employment options to financial capital for self-employment in urban China. For example, Oi (1989) finds that connections are important in hiring. In one factory in Liaoning, most of the 100

⁷⁶ Bian (1994a) argues that *guanxi* was used most heavily in periods when government control of jobs was the least rigid, especially in the late 1980s, but it was always prevalent. Work units were characterised by differential resources and state labour agencies had the authority to control labour supply and demand. Thus, individuals used *guanxi* to gain favourable assignments.

workers got their jobs either through kinship or friendship ties (Oi 1989: 197).⁷⁷ Bian (1994b) likewise finds that of the 1,008 respondents in a 1988 survey of state-sector workers in Tianjin, just over half (50.3%) of those who had changed jobs used a contact.⁷⁸ He concludes that job opportunities are available to those who have social and personal power in interpersonal relationships, which he terms *guanxi*.⁷⁹

If there are gender differences in social capital, then the relationship between *guanxi* and employment outcomes suggests there may be differential opportunities available to those who invest in relationships. Opportunities can reduce transaction costs in imperfect markets (aiding the job search process and thus facilitating labour mobility) and also increase efficiency on the job (contributing to productivity and successful self-employment). It is difficult to differentiate among these effects, but social capital might be one cause of gender differences in imperfect labour markets.

The following section outlines the ways in which *guanxi* affects some employment outcomes. We focus broadly on labour mobility, earnings and self-employment, detailing potential gender differences. The first two outcomes are explored empirically in our chapter on labour market inequality. Self-employment is

⁷⁷ Many families who now own or contract the formerly collectively-owned factories are cadres, providing further evidence of the continuing importance of *guanxi* in the view of Oi (1989).

⁷⁸ Nearly 63% of the respondents had changed jobs under a broad definition of job change. Job changes described movements between and within work unit sectors (state versus non-state), work unit ranks (5 ranks) and occupations (19 categories).

⁷⁹ His further conclusions are that *guanxi* is used more often at the beginning of a career than toward the end, tend to be used by the better educated, and family networks were found to be more important than friends, acquaintances and others. Moreover, individuals whose fathers worked in high-ranking organisations had more useful contacts.

not fully addressed in this thesis, but a discussion may be useful nevertheless in assessing whether having the option of self-employment can reduce reliance on wage employment and thus affect labour supply.

3.5.1 Labour Mobility

Social networks are thought to reduce the transaction costs – both direct and informational – of selling and engaging labour in an imperfect labour market. Employers can locate reliable personnel with the better quality information obtained through referrals, while workers can obtain needed information on the availability of jobs through contacts (Knight and Song 1999*b*). Lee (1998*a*) finds that managers view social networks as able to reduce transaction costs because referrals from existing employees provide better information regarding the background of potential recruits and decrease the chances of hiring undesirable workers (Lee 1998*a*).⁸⁰ Of 938 state-sector workers in another study in Tianjin by Bian (1994*a*), although 82.3% was assigned their first job, over half of this group (42.3%) reported using *guanxi* as well.⁸¹ This mirrors the findings of his other study discussed earlier.

Changing jobs may also depend on “inside” information and connections (Bian 1994*a*; Lee 1998*a*). Bian (1994*a*) finds that even though a worker may be qualified, a change in job title, moving up to the bureau that manages their work unit or moving into a completely different administrative system into jobs that

⁸⁰ Lee (1998*a*) further argues that recruiting through networks tended to improve management-labour relations as it showed goodwill to workers by hiring their acquaintances.

⁸¹ Bian (1994*a*) also finds that 37% of the contacts who helped with the first job assignment were cadres.

fitted their professional training, typically involved using *guanxi*. Using logit analysis in a study of Tianjin workers, Bian (1994a) estimates that a worker who uses *guanxi* is 50% more likely to change work units, 22% more likely to move to a higher status work unit and 31% more likely to change occupation. He concludes that *guanxi* serves as the “most important mechanism for job change.” These are some of the ways in which social networks facilitate labour mobility for individuals and simultaneously serve as a recruitment mechanism for employers faced with imperfect information and the uncertainty of hiring and firing in an imperfect labour market. It follows that if women have less *guanxi* than men, then it will impinge on their mobility.

Turning to gender differences, labour mobility may be affected by the circumstances of the household. Knight and Song (1999b) find that women tend not to be the first but a subsequent member of a rural household to migrate to an urban area. Lee (1998a) finds that the women in her study tend to work closer to home. For female factory workers in southern China, their families constrain them to stay with particular employers, resulting in an extremely low rate of mobility. This is perhaps a result of familial demands and the availability of kin assistance or family circumstances that confine the timing and location of women’s wage employment. The allocation of household responsibilities has been cited as one reason for the differences in labour market outcomes of men and women (see François 1998 for a recent formulation). It may also affect the time and resources available to women with which to invest in social capital. Women in urban China spent half an hour (32.4 minutes) less at work than men in 1990, but over 2.2 hours more on home work in a given day (NBS 1997c: 473; see also a survey conducted by the Institute of Population Studies of the Chinese Academy of Social Sciences for findings that women spent more time on housework

than men in the 1990s despite relatively equal amounts of time spent at work⁸²). These factors – familial obligations and social capital that reduces search costs – may combine to decrease the mobility of women relative to that of men once employed.

3.5.2 Earnings

Guanxi can also affect earnings, which is related to promotions and management practices. Those with *guanxi* are given leeway in the enforcement of work rules, assignment of tasks, opportunities for promotion and transmission of skills in the factories studied by Lee (1998a). Another finding from Bian's (1994a) study of Tianjin is that *guanxi* increases the probability of promotions for state sector workers by 22%.

Concerning gender, Bian (1994b) finds that female gender is associated with a significant and negative effect on wages and bonuses – holding factors such as education, ownership sector of the work unit and Communist Party membership constant – with a greater disparity in bonuses than in salaries. This may be in part attributed to a popular division of labour described as “one family, two systems,” an arrangement where the husband works in the non-state sector with more risk but higher earnings, while the wife remains in the state system with its subsidies and benefits but lower wages (Lee 1998b). From our fieldwork, we found that it tends to be the husband who “jumps in the ocean” to seek higher wages with its attendant uncertainty while the wife retain the secure job, which may reflect a social perception

⁸² We discuss the data used by IPS (1994) and additional findings in Chapter 4.

that the husband should earn the higher wage. The earnings and promotion effects⁸³ associated with social capital effects may be attributable to gains in efficiency on the job or reduction in the transaction costs of job search so that a worker is more mobile and have a more elastic labour supply with respect to a firm.⁸⁴ Some evidence in support of the latter argument is found in Lee (1998a). Through her interviews with managers, she notes that they are aware of constraints on women's mobility and offer lower wages knowing that women are less likely than men to leave (see also Lee 1993).⁸⁵ Therefore, if women have less *guanxi* than men, then they may be disadvantaged in these respects of earnings and promotions once employed in a firm.

3.5.3 Self-Employment

Regardless of the intent to start an enterprise or become self-employed, the lack of resources makes the prospect unlikely for many in China (Oi 1999). The inadequacy of laws and infrastructure and the informational challenges of locating potential suppliers and customers make survival difficult (McMillan 1995). This suggests a need to rely instead on informal institutions, such as social networks (Oi

⁸³ Lee (1998a) finds that men occupied all the top positions in the factories. One reason is that managers viewed the marriage plans of women as indicating that they are unreliable to be trained for higher positions because of familial obligations. On the other hand, men's plans for marriage and family mean that they are dedicated to climb the company ladder.

⁸⁴ Hakim (1998) finds for Britain in the 1990s that mobility is associated with earnings differentials. The difference between working more than two kilometres from home and less than two kilometres is a wage differential of 21%, with little or no difference based on full and part-time employment status.

⁸⁵ In a U.S. firm, Burt (1998) finds that managers determine bonuses based on the likelihood of a worker leaving the firm if the bonus is not adequate. The likelihood of leaving is calculated from measuring each employee's social network and social capital. Lazear and Rosen (1990) also find in a U.S. study that the probability of quitting is linked to earnings differentials and promotions.

1989; Solinger 1999⁸⁶). Moreover, the absence of developed financial markets and state banks' reluctance to lend to private firms means that initial investments to start businesses must usually come from family savings or at high interest rates from informal credit societies (McMillan 1995; Young 1995; Chen 1999).⁸⁷ Else, individuals pool resources, borrow from relatives (Lee 1998a; Knight and Song 1999b; Oi 1989, 1999) or otherwise raise funds through social networks, particularly from kin from outside of China (see Oi 1999 for examples in Fujian and Wenzhou).

For self-employment to serve as a viable alternative to wage employment thus depends in large part on social capital. This underscores the impact that differential amounts of *guanxi* possessed by women may have on their ability to enter into self-employment. Although a full analysis is not pursued, the role of self-employment as an alternative in the face of adverse wage changes can be an important factor affecting the elasticity of labour supplied to a firm. To the extent that women are less able than men to enter into self-employment, this increases their dependence on wage employment and causes them to have relatively less elastic labour supplied with respect to a firm.⁸⁸

⁸⁶ Solinger (1999) finds that contacts were necessary to obtain enterprise permits in order to start self-employment.

⁸⁷ Narayan and Pritchett (2000) make similar findings in Tanzania in which social capital is thought to facilitate the development of an informal credit market. In Burkina Faso, Swamy, Grootaert and Oh (1999: 30, table 23) find that more than 50% of credit is provided through friends and relatives. Fisman (2000) in a study of African firms in five countries estimates that firms are twice as likely to obtain credit from suppliers from within their own ethnic community.

⁸⁸ Using a 1991 data set for Britain, Hakim (1998) finds that although women comprise 44% of the workforce (39% of the full-time workforce), they are only 22% of the self-employed. She argues that this is an important factor in women's less successful labour market outcomes.

3.6 Some Economic Aspects of Gender Inequality

Since women are typically not the primary income-earners in the Chinese household, they will tend to stay with a current employer rather than move to take a better job. Familial responsibilities may also take up her time. Women will have fewer resources and time to cultivate *guanxi* as compared with men, which will in turn affect her economic opportunities. Employers find it profitable to act upon labour supply differences rather than pay wages according to marginal productivity.⁸⁹

In these ways, gender differences in mobility and *guanxi* can result in similarly productive individuals having different labour supply elasticities and experiencing unequal economic outcomes. In turn, perceived labour market differentials can cause pre-labour market inequality. For instance, parental assessment of the smaller returns to the education of women may lead to less investment in the human capital of daughters than sons, thereby causing gender differences in productive characteristics prior to entering the labour market.

Some aspects of these gender inequalities in post-1978 urban China will be explored in the empirical chapters of this thesis. Chapter 4 will model the parental decision to invest in children's education and Chapter 5 will investigate the relationship between *guanxi* and the employment outcomes explored in this chapter.

⁸⁹ Recall this is efficient firm behaviour under imperfect market conditions [in Chapter 2].

Chapter 4

Pre-Labour Market Inequality – Parental Investment in Children's Human Capital

This chapter investigates possible gender differences in household expenditure on the education of children. We aim to discern evidence of pre-labour market gender inequality that could cause human capital differences between men and women prior to entering the labour market. Our analysis is confined to urban China. Research has been conducted on similar questions for rural China (Song 1999; Knight and Song 2000).

First, we will review the educational system of China, focusing on gender differences in school enrolment. This is followed by a model of human capital for school-aged children in which parental decision-making is critical (see Becker 1981, 1993 [1964], 1993). We test our approach using intrahousehold resource allocation models (Deaton 1989, 1997; Lundberg and Pollak 1993; Haddad, Hoddinott and Alderman 1997) to investigate whether gender is a significant factor in the allocation of household resources toward the education of children in urban China. If there are gender inequalities, we will then test two hypotheses concerning the motivation of parents that are related to perceived returns to education. We conclude with a summary of our findings of pre-labour market gender differences in human capital and explore the implications with respect to the future labour supplies of men and women.

Pre-labour market gender inequality implies policy conclusions that are different from those based on post-entry inequalities in the labour market. This provides a useful analytical separation in examining the factors concerning gender discrimination, *i.e.*, differentiating between productivity-related differences generated by pre-labour market inequality, such as education obtained as a child, and those that pertain once men and women enter the labour market.⁹⁰ Any evidence would also point to the circular nature of gender inequality. In other words, what happens in the labour market can affect decisions made prior to entry to the labour market.

4.1 Education in Modern China

The modern Chinese educational system is generally comprised of primary (six years), secondary (six years, three years of lower and three years of upper middle school), and tertiary or higher education (varying between two and five years) (Knight and Li 1993). Education is officially compulsory for nine years to the completion of lower middle school, though not always in practice (NBS 1997a). However, overall school enrolment in China is high in 1995, the year corresponding to the data set used in this chapter. The gross enrolment ratio of all school-aged children was 94%, while it was 91% for girls and 96% for boys (UNESCO 1999).⁹¹

⁹⁰ The factors that affect productivity within the labour market include training, experience and many others. For a long line of work examining these issues, see Ben Porath (1967), Mincer (1974), Heckman, Lochner and Taber (1998), Keep and Mayhew (1999) and Stevens (1999).

⁹¹ UNESCO (1999) uses the definition of school-aged children as given by the country (see NBS 1997c).

Table 4.1
Gross Enrolment Ratios of Girls in Selected Years
(gender ratio of girls to boys)

	1980	1985	1990	1995
All School-Aged Children	71 (0.81)	70 (0.82)	79 (0.87)	91 (0.95)
Primary	104 (0.86)	114 (0.86)	120 (0.93)	117 (0.99)
Secondary	37 (0.69)	33 (0.70)	42 (0.75)	62 (0.89)
Tertiary	0.8 (0.32)	1.7 (0.44)	2.0 (0.51)	3.9 (0.53)

Sources: NBS (1997c), UNESCO (1999) and World Bank (2000a, 2000b).

- Notes: (1) The data on net enrolment ratios (NER), which would compute the ratio of the number of children of official school age enrolled in school to the number of children school age in the population, is not available for secondary and tertiary education nor is it complete for primary school in China (UNESCO 1999). We report gross enrolment ratios (GER), defined as the total enrolment in a specific level of education, regardless of age, expressed as a percentage of the official school-age population corresponding to the same level of education in a given school year (UNESCO 1999). As noted earlier, the GER is widely used as an alternative indicator to the NER when data on enrolment by single years of age are not available. NER for primary education is reported in Note (2) to this table.
- (2) For primary education, NER for girls was 89 and the gender ratio was 0.92 in 1986, as figures for 1985 were not available. In 1990, NER for girls was 95 and the gender ratio was 0.96. In 1995, NER for girls was 98 and the gender ratio was 1.00.
- (3) For tertiary education, the figures are for 1996, as 1995 figures were not available.

Table 4.1 shows that the ratio of enrolled girls to boys has stayed the same or improved from 1980 to 1995 for every level of education, although girls still lag behind at the secondary level and substantially behind at the tertiary level.⁹² Using a 1995 rural household survey, Knight and Song (2000) find that boys are significantly more likely to be enrolled in school than girls, with the greater difference for upper middle school-aged children. One explanation posited by Broaded and Liu (1996) is that educational aspirations are different for boys and girls. In their study of Wuhan, boys are more likely to enter into advanced schooling while girls are more likely to enter into professional courses. They posit that this is primarily the result of two

⁹² Figures for rural and urban China separately are not available.

factors – tradition and parents' perception of future discrimination against women.

They also find that women are reluctant to be better educated than any likely future spouse for fear that they might risk limiting their marriage prospects.

This customary reliance on sons and the argument concerning the role of tradition in fostering gender inequalities in education may hold for rural China. In rural China, Gao (1994) argues that patrilocal marriage and patrilineal inheritance are important aspects of the structure of patriarchal society that did not change in the course of economic transformation.⁹³ Even though marriage and inheritance in China are legislated to give daughters and sons equal privileges as heirs, patrilineal inheritance continues to be practised in rural areas with the result that sons are preferred to daughters (Lee 1998b).⁹⁴ Sons inherit property, live near their parents and support them in old age. In a household survey conducted in the early 1990s, the

⁹³ Rural residences, for example, have traditionally been passed to sons and not daughters. The introduction of cooperatives abolished private ownership of land, but it did not significantly affect patrilocal residence patterns, argues Gao (1994). The government advocated men moving to their wives' home at marriage, but there are very few instances of this occurrence in rural areas. China's rural villages are usually made up of several large single-surname lineages (Kipnis 1997). Because land is limited, villages restrict outsiders from moving in. Rural residents see women who move in to marry as effectively of their lineage and their descendants are welcomed as part of the lineage. Men who move in to marry are seen as outside the lineage and are excluded because all their descendants will belong to a differently surnamed lineage. The great majority of rural Chinese women must marry or they will not have a home of their own (Gao 1994). Most do not have the privilege of choosing to remain at their natal home because their village is unwilling to distribute land or residence to their husbands and children. In this respect, daughters are unable to benefit their natal families, while a son, aside from having his own land, gains another portion when he takes a wife. The periodic redistribution of land contracted for household production under the household responsibility system is based on the number of people in the household. Finally, by remaining near his parents, a son will be able to care for them in their old age (Croll 1994). Consequently, parents in rural China likely value sons more than daughters.

⁹⁴ Lee (1998b), in her sociological study of rural-urban migrant factory workers in special economic zones in southern China, finds that parents discriminate against girls in favour of boys because of the perception that girls will eventually marry and move away so parents must rely on their sons in old age in rural China. In many villages there are only primary schools and upper middle school often involves extra fees for room and board when attending in towns. Thus, she finds that parents educate their sons more than their daughters with the result that more boys are enrolled in school in some rural areas.

Institute of Population Studies of the Chinese Academy of Social Sciences finds that rural, but not urban, households show a preference for sons in the distribution of family property. We discuss this survey in detail later in the chapter. Finally, in examining educational enrolment patterns in 1988, Knight and Li (1993) find that traditional values favouring the education of boys rather than girls appear to have been eroded in urban areas though not in rural areas.

Our focus is on urban China. We will explore whether a preference for boys is as important as it appears to be in rural China, or if there are other factors motivating the parental decision to educate their children. To a large extent, due to the rural roots and migration patterns of the current cohort of adults in urban areas, we expect that rural customs will have an impact on parental attitudes in urban China. This is likely to be compounded by the additional linkages of urban with rural China through grandparents and the extended family. However, we hypothesise that parents are rational investors in their children in both rural and urban China, but face different constraints. In other words, there are differences in the economic needs of urban and rural households that affect their decisions regarding investment in children. The household production function of rural China may have caused parents to value sons more than daughters, giving rise to a tradition of bias toward boys. As the view of China is often driven by the view of rural areas where the bulk of the population live, there is a perception of pro-boy bias. We posit that tradition is often the historical product of practical necessity, and that rational acts under one set of circumstances, such as in rural China, will change when the context is altered, as in urban China with a different set of household needs and constraints. Our findings may run counter to the perceived traditions of rural China, but could better reflect the practices of an urban

population with different concerns. These and other hypotheses are the focus of this chapter.

4.2 A Model of Human Capital

The starting point of this approach is to separate conceptually the case in which an individual decides to invest in human capital and the case in which the investment decision rests with his parents. Becker (1981) in his book, *A Treatise on the Family*, identified the parental role in developing the human capital of children. This account was subsequently added as a chapter to the third edition of his *Human Capital*, published in 1993.⁹⁵ The investment in children's human capital, under credit constraints, necessarily entails forgone current consumption for the household. There is a strand of literature – intrahousehold resource allocation models – that can test the extent to which parents will forgo consumption to spend on children's education (see Deaton 1997: chapter 4 and Haddad, Hoddinott and Alderman 1997 for excellent overviews) and whether there are gender differences (DeTray 1988; Deaton 1989; Hoddinott and Haddad 1995; Alderman and Gertler 1997; Behrman and Knowles 1999; Song 1999; Knight and Song 2000).

Our proposed model draws heavily from Becker (1981, 1993 [1964], 1993) and theories of educational enrolment in China (Knight and Li 1993, 1996).⁹⁶ There are two innovations in our approach, pertaining to the theory and to the

⁹⁵ See Becker (1993 [1964]): 260-279.

⁹⁶ Knight and Li (1993, 1996) formulate supply and demand constrained approaches to education in China. Some of their findings and hypotheses were discussed earlier.

empirical testing. The first innovation is that the parental decision to invest in children's human capital is motivated by the returns that will accrue not only to the children, but also the portion of the returns that will generate transfers to parents in the future. Our results are largely identical to Becker (1993), but we differ in positing that the investment decision can be motivated by considerations other than parents' altruism and children's guilt.⁹⁷ The second is to use the intrahousehold resource allocation approach (Deaton 1989; Haddad, Hoddinott and Alderman 1997) to investigate the present costs (forgone consumption) and future benefits of investments in children. This provides a direct empirical test of the investment calculus under borrowing constraints.⁹⁸

In a three-period model, parental utility is due not solely to the future income of children generated by human capital investments, but also depends on the portion of that income that accrues to parents in retirement as transfers. Parental expectations are thus based on an assessment of the expected future household income of the children, including potential multiplier effects of spouse's income, if transfers are likely to be made by the children's future household rather than by the children individually (Becker 1993 [1964]).⁹⁹

⁹⁷ Becker (1993: Appendix A) develops a three-period model as the next formulation of the parental investment decision in children's human capital. The primary difficulty in this approach is the reconciliation of making efficient investments in children and own assets in the second period with the third period expectation that relies on consumption generated from these forms of capital. Investment in children's human capital, unlike investment in pensions for instance, will not necessarily generate transfers for consumption. In this way, an efficient decision in the second period is inefficient in the third period. Becker resolves this by fashioning the utility function of parents and children to be influenced by altruism and guilt, respectively. We take an alternative approach.

⁹⁸ We assume there are severe constraints on borrowing, which is empirically accurate for China.

⁹⁹ Becker (1993 [1964]: 281) does not incorporate considerations of marriage and fertility in his model of parental investment in children's human capital, but believes it would be useful to do so.

Formally, we present a three-period model with two rates of return – the rate of return to each yuan invested in the children’s human capital that will accrue to the children (“personal rate of return”) and the rate of return to each yuan invested in the children’s human capital that will accrue to parents in retirement in the form of transfers or old-age support (“familial rate of return”). Both of these are expected returns based on current market conditions. Accordingly, they suggest two potential pre-labour market explanations for parental discrimination among offspring that are not motivated by taste or a traditional preference for sons or altruism but by an efficient use of resources.

First, we posit that parents will invest more resources in the child with greater returns. Future discrimination in the labour market will differentiate the rates of return to children’s human capital and parents acting efficiently will invest less in the child with lower expected returns (Becker 1981¹⁰⁰). Therefore, perceived gender earnings differentials will decrease the returns to education for daughters, *ceteris paribus*, and parents will invest less in the human capital of girls. In testing this hypothesis, the critical variable is what we term the *personal* rate of return to children’s human capital.

Second, parents are also concerned with transfers when they retire.

This *familial* rate of return is based on the rate of return from expected transfers to

¹⁰⁰ Becker (1981) argues that parental investments will reinforce differences in innate ability among children because parental utility is maximised when marginal returns across investments are equal. Thus, children with more ability will have higher rates of return to investments in their human capital and parents will invest more to drive down the marginal returns to equal that of less able children.

parents in retirement that is a proportion of the future household income of their children. Household income of the children comprises their earned income, which is related to parental investment in their human capital, their spouse's income, and any other sources of nonlabour income. In making the trade-off decision this period, parents will consider which child is likely to support them or provide larger transfers in their retirement.¹⁰¹ For instance, in rural China, parents have traditionally relied on sons for provision of care in old age because daughters marry into other families and even other villages, making support less likely (Croll 1994). This also leads to the proposition that because girls marry into another family, the investment in their human capital accrues not to the natal family but to the in-laws upon marriage so that the investment is not recouped sufficiently.¹⁰² This notion of unrecouped investment may be the cause of current conditions from which parents form expectations of transfers.

In urban China, the existence of pensions provided by state-owned enterprises may have lessened the expectation of old-age support, which had seemingly been the basis of a preference for sons, particularly in rural China. Moreover, a household survey of urban and rural China conducted by the Institute of Population Studies of the Chinese Academy of Social Sciences (IPS) in 1994, asked a series of attitudinal questions to assess the position of women with respect to quality of life

¹⁰¹ L. Chang (2000) reports that parents have sued their children to obtain the governmentally mandated monthly support of 100 yuan. This occurs not only in rural but also in urban China. In the Changning district of Shanghai, approximately 10% of all civil cases involved the elderly, many in disputes with their children. There is also a criminal penalty for failure to meet the obligation.

¹⁰² Parish and Willis (1993) find in Taiwan that bride price (the gifts and cash payments from the groom's to the bride's family) exceeded dowries (the gifts given by the bride's to the groom's family) for the 1940-1949 and 1950-1959 cohorts, but not for later cohorts (1960-1969 and 1970-1975). There are not similar figures for China because the practice of bride price is outlawed, but it suggests that there may have been an element of unrecouped investment in daughters in the past.

issues.¹⁰³ A number of questions dealt with the importance of old-age support in affecting household expenditure decisions. Parents in urban China have similar expectations of old-age support – financially and psychologically – from their sons and daughters. There is also evidence that parents are concerned about children's support in their old age (IPS 1994: 493, table 7.22.2). In urban and rural households, both spouses would choose to bequeath their property to the child who will take care of them in their old age, more than to sons and daughters equally, or primarily to sons or primarily to daughters. More parents in urban than rural China said that they would leave more property to the child who would support them in old age than the other three options. This is consistent with the large number of single-child households in urban China. Also, it may be that women tend to provide gifts to maintain familial networks.¹⁰⁴ Thus, daughters and not sons could be the likely source of personal support of parents in old age. The evidence generally suggests that transfers are a concern of parents, and may be a greater concern than a traditional pro-boy bias.

There is another factor that may influence the investment decision if transfers are provided by the future household of the child rather than by the child alone. Owing to favourable assortative mating (Becker 1981), there are larger potential returns from investment in daughters than sons in terms of the children's

¹⁰³ There were six survey areas (Shanghai, Shanxi, Shandong, Guangdong, Ningxia and Jilin) with 5,991,946 couples sampled in urban China and 24,186,940 couples in rural China (IPS 1994: 19).

¹⁰⁴ We do not have data regarding sources of gifts and transfers, but see Chapters 3 and 5 of this thesis for theoretical and empirical analyses of gift giving as an aspect of social capital, where we find gender differences. In a sample that persons who experienced unemployment in the five-year period from 1994 to 1999 [from our 1999 urban household survey], we have data regarding gifts but not transfers. We find that men gave less to their parents than women, both on average and in terms of maximum amounts. Men gave their parents annual gifts with an average value of 184 RMB and a maximum value of 2,300 RMB, while women gave their parents 236 RMB in annual gifts on average with the largest annual gift at 15,000 RMB. The difference in means was not statistically significant.

future household income.¹⁰⁵ Becker hypothesises that individuals with more educational attainment will tend to marry others with similar or better educational backgrounds. The same gender earnings differential that decreases the personal rate of return to the human capital of girls would simultaneously suggest that if favourable assortative mating occurs, girls who attain a certain level of education will be more likely to marry a primary income provider with comparable or better education, higher returns to his human capital and greater expected earnings. This will generate the same or larger expected future household income for daughters than sons based on the assumption that parents do not invest in their potential children-in-law. Any augmentation of their children's expected future household income through marriage enters into the parental investment calculus through anticipating larger amounts of transfers. Parents will invest more in the child with a greater likelihood of marrying a comparably educated spouse, *i.e.*, daughters in urban China, even if the likelihood of making future transfers to parents is the same for all offspring.

Therefore, considerations of both the personal and familial rates of return exist in the parental decision to invest in the human capital of their children and may generate differences between sons and daughters that are efficient and unrelated to taste. These effects will overlap in the parental investment calculus and one return may dominate the other depending on the magnitude of the differences in the respective returns. The formal model is as follows.

¹⁰⁵ Becker (1981: 164) recognises the effect of assortative mating on parental investment in children's human capital when he stated: "The optimal investment in children depends on the propensity to invest in children, an important parameter of the analysis. This propensity is positively related to the fraction of family income spent on children, rates of return on investments in children, and the degree of assortative mating...." He does not explore the implications.

An individual lives for three periods – he is a child in the first period, an adult with two children in the second period, and a retiree in the third period.¹⁰⁶ As a child in the first period, his utility is comprised of consumption that includes his parents' investment in his human capital. In the second period, he is a parent who produces income, consumes, makes transfers to his parents, and invests in his children. In the third and final period, he is a retiree who does not earn income and whose utility is comprised of consumption only, which is a function of transfers from his children and returns from assets, such as pension schemes.

The utility of parents in the second period will depend on their consumption (comprised of their expenditures minus transfers to their parents, savings to invest in assets for retirement and spending on children's education) and the present discounted value of the future income of their children and their next period's utility. The variables of interest are the children's future income associated with their earnings generated through returns to their human capital and the expected future household income of the children that will be the source of transfers to parents in the third period.¹⁰⁷ Expected household income of the children is based on the children's own earned income, the income of their likely future spouses and any other sources.

¹⁰⁶ As our focus is on differentiating between sons and daughters, we present a model with two children of different genders. The model can be formulated with respect to any number of offspring.

¹⁰⁷ The optimising investment decision is made under uncertainty and is based on expected returns assessed from current market conditions, *i.e.*, perceived earnings differentials and expected transfers. In other words, the first and third periods are purely consumption, in which retired parents consume in the latter and children consume in the first. To illustrate the implications of acting on perceived returns, if a child decides not to accept the investment of his parents, then he will not generate future income from investments in his human capital. Or, a child when he becomes an adult could decide not to make transfers to his parents. In which case, parents were wrong again to rely on current conditions in which there are transfers with the amount dependent on the children's future household income. These perceptions can be wrong, but parents take uncertainty into account when maximising utility in these models. There is a well-understood circularity in that perceived future earnings

The utility function of parents with two children, a son and a daughter, in the t^{th} period is given by

$$U_t = u_t + \delta(W^m_{t+1} + W^f_{t+1} + U_{t+1}), \quad (4.1)$$

where u_t is their utility this period from consumption, W^m_{t+1} is the future income of their son, W^f_{t+1} is the future income of their daughter, U_{t+1} is next period's utility, and δ is the discount rate or subjective rate of time preference. The utility derived from their children is assumed to be separable from the utility produced by their own consumption. Utility next period, U_{t+1} , is comprised of consumption in the form of returns from savings invested in assets, A_{t+1} , and transfers from their son's future household, B^m_{t+1} , and from their daughter's future household, B^f_{t+1} .

Expected transfers from children is a function of parental investment in their human capital that generates earnings for the children in the third period, which is augmented by marrying spouses who earn income from their human capital. Parents do not invest in their likely children-in-law, but the future earnings of children's spouses will constitute a proportion of the children's future household

differentials will affect the current decision to invest in human capital. The same can be true for the decision to invest in children's human capital in the hopes of generating future transfers. There is empirical evidence in China discussed in this chapter and in many societies where transfers are made to parents, and which may be implicit (*e.g.*, parents living with children in old age). This could be a result of parents acting to recoup some of their investment if they were wrong in judging expected returns and they cannot otherwise consume in retirement. The decision to invest based on current conditions will take these transfers into account.

income that is expected to generate transfers to parents in the third period.¹⁰⁸ Thus, each yuan invested in the children's human capital will also generate transfers, yielding a return from this investment. This yield is more uncertain than that from assets and will carry a larger risk premium.

The marginal yield on assets, A_{t+1} , is R_a , while the marginal yields on investments in the human capital of the son and daughter with respect to the returns to their future income (R_h^m, R_h^f) and the portion of that which will generate transfers to parents in the next period (R_b^m, R_b^f) are respectively given by

$$R_h^m = \partial W_{t+1}^m / \partial \gamma_t^m, \quad (4.2a)$$

$$R_h^f = \partial W_{t+1}^f / \partial \gamma_t^f, \quad (4.2b)$$

$$R_b^m = \partial B_{t+1}^m / \partial \gamma_t^m, \quad (4.2c)$$

$$R_b^f = \partial B_{t+1}^f / \partial \gamma_t^f, \quad (4.2d)$$

where γ_t^m and γ_t^f denote the proportion of parental household resources, Q_t , expended on the human capital of their son and daughter, respectively. Thus, the investment in the human capital of the children yields two forms of returns. One is that which accrues solely to the children, so that parents derive utility from their children's future income that is a result of having invested in their human capital. The second is

¹⁰⁸ The model could have been formulated differently whereby parents consider the full effects of assortative mating in making their investment decision. This is strengthened if there were perfect assortative mating, as parents may be expected to act on the certainty that their children will marry spouses with comparable education and income. However, this would differ greatly from existing models. We follow Becker (1993) and enter the children's future income separately in the parents' utility function. Then, we include a consideration of the effects of children's future household income on parents' consumption in the third period. This consideration, however, is a separate and indirect effect and does not supersede a standard analysis of returns to education in human capital models.

indirect. There is utility associated with the human capital investment that will produce income for the children's future household, a portion of which will accrue to parents as transfers. In other words, the portion of the earnings generated from the children's human capital, augmented by their future household income, will comprise one source of financial support for parents' consumption in the third period. Thus, the parental decision is both motivated by the direct utility associated with their children's future income and also indirectly through expected transfers.¹⁰⁹

The intertemporal budget constraint is given by

$$Z_t + \gamma_t^m + \gamma_t^f + A_{t+1}/R_a + B_{t+1}^m/R_b^m + B_{t+1}^f/R_b^f = PV(Q_t), \quad (4.3)$$

where Z_t is expenditures in the current period and $PV(Q_t)$ is the present value of parental household income, comprised of Q_t and expected Q_{t+1} . In other words, parental household income this period consists of expenditures (Z_t) that include consumption, transfers to their parents, savings invested in assets, and forgone consumption invested in children's education (γ_t^m and γ_t^f). Parental household resources next period (Q_{t+1}) is equal to the discounted value of all expected sources of consumption ($A_{t+1}/R_a + B_{t+1}^m/R_b^m + B_{t+1}^f/R_b^f$), *i.e.*, assets and transfers, which are the result of savings and investment in children's human capital.

¹⁰⁹ We assume transfers are expected given current conditions, but need not be. It may be that bequests to children are given instead. If transfers are not expected from children, parents may leave bequests that will increase the children's future income if the yield from assets is higher than that from children's human capital. Some parents may be secure in having more than adequate assets to support their consumption in retirement, so they will gain more utility from leaving bequests to ensure that their children have additional future income with little or no expectation of transfers.

The allocation between investing in assets or children when contemplating consumption next period is determined by a first order condition equating the marginal yields on the three sources of income in the third period:

$$\delta A'_{t+1} + \delta B^{m'}_{t+1} + \delta B^f_{t+1} = \lambda_u / R_k = \delta U'_{t+1}. \quad (4.4a)$$

The yields on human capital are expected to decline as more resources are invested, $\partial R^m_h / \partial \gamma^m_t \leq 0$, $\partial R^f_h / \partial \gamma^f_t \leq 0$, $\partial R^m_b / \partial \gamma^m_t \leq 0$, and $\partial R^f_b / \partial \gamma^f_t \leq 0$, and will eventually equal returns to nonhuman capital, assets in this model, R_a assumed to be constant. Since $\partial R^m_h / \partial R_a < 0$, $\partial R^f_h / \partial R_a < 0$, $R^m_h > R_a$ and $R^f_h > R_a$, the returns from investing in the human capital of the children and assets toward retirement support will be equal. Thus, the marginal rate of return on all three forms of capital is denoted R_k .

The next first order condition maximises parental utility and determines their optimal consumption in periods two and three:

$$U'_t = \delta R_k U'_{t+1} = \lambda_u, \quad (4.4b)$$

where λ_u is the marginal utility of income.

The last first order condition determines investment in children's human capital in terms of the utility derived from the future income of the children:

$$\delta R^m_h W^{m'}_{t+1} = \lambda_u, \quad (4.4c)$$

$$\delta R_h^f W_{t+1}^f = \lambda_u. \quad (4.4d)$$

Combining the first order conditions gives

$$\lambda_u/R_a = \lambda_u/R_b^m = \lambda_u/R_b^f = \lambda_u/R_h^m = \lambda_u/R_h^f, \quad (4.5)$$

which shows that the marginal rates of return on human capital in terms of both the children's future income and the expected transfers equal the return on assets when parents maximise their utility in both periods.

Parents will expend both financial and nonfinancial resources to invest in their children's human capital, including both direct investments, such as spending on education, and indirect investments, such as producing *guanxi* that benefits the child (increasing family contacts) or spending time doing homework together (increasing positive environmental factors).¹¹⁰ Under credit constraints, all of these will involve expenditures of time and resources as well as forgone earnings.

It is straightforward to see how investments in the human capital of multiple children may differ given different returns to those expenditures. To maximise utility, parents will invest more in the child with higher returns to his human capital and also more in the child with larger expected transfers. Equation (4.5) shows that the

¹¹⁰ Becker (1981: 117) believes that children benefit from the reputation and connections of their families. This is in line with the idea of social capital as offering opportunities to particular families and cultures (see Borjas 1992 for findings that the "ethnic" capital of the parents affects the accumulation of human capital of children). The model can thus link the notions of social capital and opportunity with returns to human capital (see also Becker 1993 [1964] for a discussion of the underlying distribution of human capital to be comprised of opportunity and ability).

marginal yields on these investments are equal in equilibrium. If returns to the human capital of the son are higher than for the daughter, but expected transfers are larger from the daughter (on account of her marrying a spouse with higher returns to his human capital that parents did not invest in), then parents acting efficiently will consider both sets of returns and invest until the marginal yields are equal.

If daughters who attain a certain level of education benefit from more favourable assortative mating, then parents will invest more in daughters than sons. On the other hand, sons are expected to have higher returns to their human capital under current market conditions and should receive more investment. Both outcomes are consistent with efficiency insofar as there are two components of the yield from investment in children's human capital. We test these propositions empirically.

4.3 Hypotheses and Framework for Empirical Testing

The hypotheses are as follows:

- *The Personal Rates of Return Hypothesis: Given unequal rates of return to education for sons and daughters, parents will invest more in the human capital of the child with the greater expected future personal income (H_4^a).*
- *The Familial Rates of Return Hypothesis: Given an equal likelihood of providing transfers, parents will invest more in the human capital of the child with the greater expected future household income (H_4^b).*

The empirical analysis will proceed in three parts. We first investigate whether there are gender differences in the proportion of household resources allocated to children's education in urban China in 1995. We begin with using a unitary household decision-making model and then contemplate the possibility of joint decision-making by including a proxy for female bargaining power to discern any effects on household expenditure patterns. If we find boy-girl differences in educational expenditures, then we proceed to test our two hypotheses derived from our model of parental investment in children's human capital.

The second part tests the first hypothesis H_4^a . We estimate returns to education for working-aged individuals, which generates the expectations for the cohort of school-aged children. If educational expenditures are greater for the children with higher expected returns, then there is support for the "personal rate of return" hypothesis.

The final part of the empirical testing investigates the second, "familial rate of return," hypothesis (H_4^b). Owing to data limitations (we do not have information on intergenerational transfers), we instead assess the descriptive evidence on assortative mating for the cohort of adults, which is the population from which parents form expectations concerning the future household income of their children. Daughters, rather than sons, may have a greater likelihood of providing gifts and transfers through their maintenance of social ties in urban China, although we cannot test this using this data set. Instead, we assume that even if daughters and sons have similar probabilities of providing transfers, the same gender earnings differentials that cause unequal returns to education can prompt parents to invest more in daughters if

they are more likely to marry a primary income provider through more favourable assortative mating. Parents anticipate a larger return from spending on their daughter's education than their son's because they do not invest in their likely future children-in-law. A final source of evidence is from the models of unitary versus joint household decision-making. If households make expenditure decisions as one entity, then there is an expectation that transfers will be from the future household of the children regardless of who earns the income.¹¹¹

4.3.1 Gender Differences in Household Expenditure Patterns on Children's Education

Intrahousehold resource allocation models sought to disaggregate the expenditure decision of a household (see Doss 1996 for an overview). Studies of developing countries suggest the importance of the age-gender composition of the household in resource allocation decisions. They tend to find that expenditure patterns favour males (see Deaton 1997). Medical care for girls is a luxury good in that it is more income and price elastic than for boys in Pakistan (Alderman and Gertler 1997). Regarding children's education, DeTray (1988) finds in Malaysia that the demand for girls' schooling is more income elastic than for boys. Similarly, the education of girls is a luxury good in Vietnam (Behrman and Knowles 1999).

Household expenditures are also thought to differ with the degree of influence of women, suggesting a joint decision-making model (see Haddad, Hoddinott

¹¹¹ This is consistent with women providing more personal gifts if expenditure decisions are a household unit, but the maintenance of social networks is a personal investment decision (see our model of social capital in Chapter 5).

and Alderman 1997). For instance, Hoddinott and Haddad (1995) find in the Côte d'Ivoire in the 1980s that doubling the cash income of women increases the household budget share of food and reduces the shares of alcohol and cigarettes. Haddad and Hoddinott (1994) also find in the Côte d'Ivoire that increasing women's share of cash income betters the health status of boys relative to girls. For Brazil, Thomas (1997) finds that increased female earnings are associated with a larger share of the household budget being devoted in human capital – such as health and education – as well as leisure goods, including recreation. Song (1999), in a study of rural China in 1995, finds that greater female bargaining power changes expenditure patterns in favour of health care and education, but does not reduce the pro-boy discrimination in these expenditures (see also Knight and Song 2000 for similar findings that increasing female bargaining power does not increase expenditure on the education of daughters but rather benefits sons in rural China).

We use this approach to model the decision of parents to forgo consumption to spend on education as a measure of direct investment in children's human capital. In line with this literature, both a unitary household decision-making model and a joint decision-making model are estimated (see Deaton 1997).

Unitary Household Decision-making Model

The proportion of household expenditure on the e^{th} item is given by

$$\gamma_t^e = \beta_0 + \beta_1 \ln(Z_t/n) + \beta_2 \ln(n) + \sum_{g=1}^{G-1} \beta_3(n_g/n) + \beta_4 X_t + \varepsilon_t, \quad (4.6)$$

where γ_t^e denotes the share of household expenditures spent on the education of children, Z_t is total household monetary expenditure, n denotes household size, n_g is the number of individuals of age-gender demographic group g , $\sum n_g/n$ represents the proportion of individuals of demographic group g in the household, X_t is a vector of control variables, and ε_t is the error term.

Joint Household Decision-making Model

This alternative formulation takes into account potential bargaining as between parents concerning the education of their children. A proxy for relative bargaining power is included. The proportion of household expenditure on the e^{th} item is now given by

$$\gamma_t^e = \beta_0 + \beta_1 \ln(Z_t/n) + \beta_2 \ln(n) + \sum_{g=1}^{G-1} \beta_3(n_g/n) + \beta_4 X_t + \beta_5 E_t^m + \varepsilon_t, \quad (4.7)$$

where E_t^m denotes the years of education of the mother as a ratio of the total years of education of both spouses, which is a proxy for female bargaining power (see Song 1999¹¹²). We tried alternative proxies, such as women's share of earned income to that of both spouses (see Hoddinott and Haddad 1995).

¹¹² Song (1999) finds for rural China that the proxy of the ratio of the wife's years of education relative to both spouses is more robust than the wife's working time relative to their combined working time or the proportion of the wife's cash income to that earned by both spouses.

Interpreting Patterns of Intrahousehold Resource Allocation

As explained by Deaton (1989, 1997), because we do not have data regarding actual expenditure on the education of boys and girls but only on all the children in the household, the analysis is based on a correlation between the number of boys and girls in the household and the amount of forgone consumption. This is evidenced through the variable, $\sum n_g/n$. From both the unitary and the joint decision-making formulations of the model, the coefficient β_3 indicates the relationship between educational expenditure and the age-composition of the household. If β_3 are significant and different for boys and girls, then we will attempt to explain these findings through our two hypotheses.

4.3.2 Returns to Education

To investigate the first hypothesis, we estimate returns to education using a Mincerian type formulation of the logarithm of earnings as the dependent variable and a set of personal and other characteristics as the independent variables (Mincer 1974). Following Knight and Li (1996), we alternatively estimate earnings functions in which the independent variables include the levels of completed education. The coefficients of each level of education term will indicate the marginal returns to each additional level of education attained.

4.3.3 Assortative Mating

In this data set, it is not possible to directly test for a multiplier or augmenting effect from investments in the human capital of children in terms of children's future household income that will generate transfers, our second hypothesis. Instead, we investigate any discrepancies not explained by the standard analysis of returns to education through two types of descriptive evidence. The first derives from the implications of favourable assortative mating, *that is*, individuals of comparable educational attainment are more likely to marry each other (Becker 1981). If this holds for urban China, then there is some support for the expectation that investing in daughters will generate more transfers than in sons. Gender earnings differentials in favour of men under favourable assortative mating will cause daughters to marry spouses with higher returns to their human capital and generate the same or higher future household income than sons. This is strengthened if household expenditure decisions are made not through bargaining, but as a unit. Then, who earns the income is not as important in household spending decisions, such as on transfers.

4.4 Results for Urban China

We tested our hypotheses using an urban household survey conducted in China and related to 1995. The survey was designed by the Institute of Economics, Chinese Academy of Social Sciences, in consultation with international scholars. The households are drawn from a sub-sample of the NBS annual household income and

expenditure survey. Eleven of the 30 provinces of China are included. For details, see Riskin, Zhao and Li (forthcoming).

The pertinent descriptives are as follows. There are 6,594 households and 21,697 individuals, of whom 70.3% are aged 19 and over, and primary and secondary school-aged children [7-18 years of age] are approximately 17.12%. Of such children, boys are slightly more numerous than girls (8.61% and 8.51%, respectively), and the gender ratio of girls to boys is 98.84. In terms of age-gender demographics, boys aged 7-12 are 3.82% of household members, boys aged 13-15 are 2.70%, boys aged 16-18 are 2.09%, while girls aged 7-12 are 4.02%, girls aged 13-15 are 2.37% and girls aged 16-18 are 2.12%.

The mean proportion of annual household resources expended on children's education is 4.69% (with a standard deviation of 0.09). In absolute figures, it is 573 yuan (with a standard deviation of 1,219). Total mean household expenditure is 12,222 yuan (with a standard deviation of 10,365), while mean household income is 14,290 yuan (with a standard deviation of 8,591). As expected under the one-child policy, the mean number of household members is 3.13 (with a standard deviation of 0.83). More than three-quarters of the households are two-generations (78.16%), while one-generation households comprise 15.52%, three-generation households are 5.55%, and the remaining 7.65% are other types of household, defined as those with relatives other than the nuclear family or includes non-relatives. The head of household is male in a majority of the sample (65.93%), and just under half of all households (45.64%) include a Communist Party member.

Finally, there are not large gender differences in educational enrolment in urban China in the current period (see Knight and Li 1993 for similar findings in 1988).¹¹³ Figure 4.1 presents the possible paths in the Chinese school system and partitions enrolment by academic and professional schools into gender proportions, as computed from our data set.

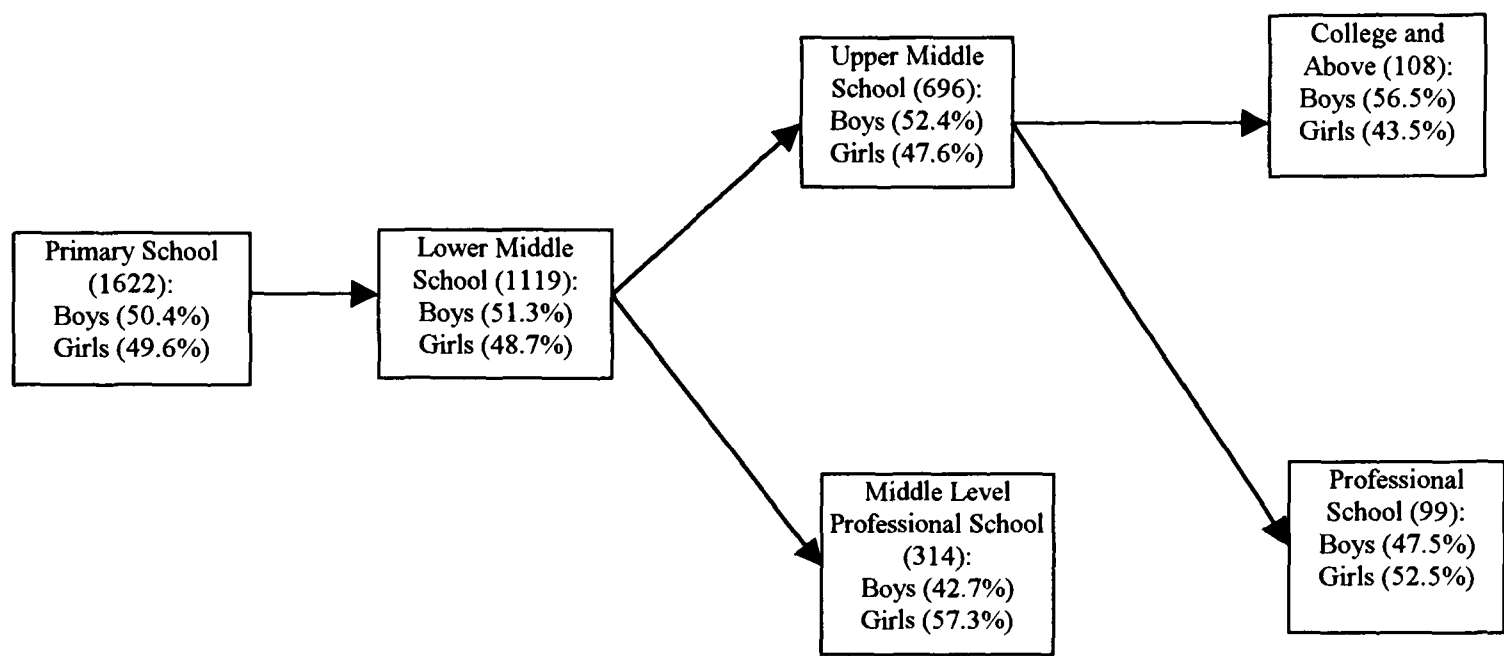


Figure 4.1

In the Chinese school system, students attend lower middle school after completing primary school. They then test into upper middle school or middle level professional school. Middle level professional school generally takes one more year to complete than upper middle school and is typically the last level attained. Those who complete upper middle school are likely to apply and test into college. Professional school is an alternative to college. Table 4.2 gives school enrolment rates for children aged 7-18 in our sample.

¹¹³ The mean years of education for all full-time students is 8.77 with a standard deviation of 3.83. For boys, it is 8.86 years of education (with a standard deviation of 3.82), while it is 8.66 years of education for girls (with a standard deviation of 3.84).

Table 4.2
 School Enrolment Rates (%) for Children Aged 7-18
 (total number of boys and girls)

Age	Boys	Girls
7	87.5 (144)	89.4 (142)
8	97.2 (145)	95.3 (150)
9	99.1 (111)	99.3 (140)
10	96.1 (153)	96.2 (133)
11	98.5 (137)	96.3 (136)
12	97.0 (168)	96.8 (189)
13	99.5 (199)	99.0 (193)
14	98.1 (206)	95.8 (166)
15	98.0 (198)	97.8 (181)
16	93.8 (160)	94.4 (196)
17	91.5 (176)	90.1 (152)
18	84.0 (163)	75.0 (164)
Total Enrolment Rate	94.6 (1960)	93.9 (1942)

Source: Urban Household Survey, 1995.

4.4.1 Are there Gender Differences in Household Resources Allocated to Children’s Education?

The results of the two-stage least squares estimation of a unitary household decision-making model of resource allocation toward children’s education are presented in Table 4.3. The independent variables include household level variables as well as the characteristics of the household head in addition to city dummy variables. The education variable is a rank variable indicating the level of education completed, while the occupation variable is also a rank variable indicating professional

to unskilled workers. The definitions of these variables for the 1995 urban household survey are identical to the questions for the 1999 urban household survey, the relevant portions are provided in Appendix 5.3. We tested the robustness of the specification by using one-generation households as the omitted variable, for instance. Different characteristics of the household head were also tried. Our results concerning the significance of the age-gender household composition variables do not change.

Table 4.3 Two Stage Least Squares Unitary Intrahousehold Resource Allocation Model Regarding the Proportion of Household Expenditure on Children's Education		
Dependent Variable: Proportion of Household Resources Expended on Children's Education	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	-0.0776 (-0.374)	0.0469 ¹¹⁴ (0.0898)
Household Characteristics:		
Log of household expenditure per capita (predicted)	-0.0088 (-1.119)	8.1370 ¹¹⁵ (0.3157)
Log of number of household members (predicted) ¹¹⁶	0.1366 (1.119)	1.1062 ¹¹⁷ (0.2016)
Communist Party membership of any member of the household	0.0051 (1.135)	0.4564 (0.4981)
One-generation household	0.1186 (1.291)	0.1552 (0.0871)
Two-generation household	0.0498 (1.706)*	0.7816 (0.3622)
Three-generation household	0.0052 (0.377)	0.0555 (0.2291)
Characteristics of Household Head:		
Male	-0.0072 (-1.548)	0.6593 (0.4740)
Educational level	-0.0033 (-3.373)***	3.8015 (1.5173)
Occupation	-0.0012 (-1.631)	5.5657 (1.9401)

¹¹⁴ Mean value and standard deviation of the dependent variable are reported, and similarly in each table in the chapter.

¹¹⁵ The mean of the natural logarithm of household expenditure per capita (actual) is 8.1366 with a standard deviation of 0.7323.

¹¹⁶ We use the logarithm of number of household members to better correspond with the proportion of household expenditure and age-gender composition variables (see also Song 1999).

¹¹⁷ The mean of log of number of household members (actual) is 1.1063 with a standard deviation of 0.2682.

<u>Age-Gender Composition of Household:</u>		
Male aged 0-6	-0.0096 (-0.233)	0.0256 (0.0862)
Male aged 7-12	0.0583 (1.349)	0.0382 (0.1046)
Male aged 13-15	0.1465 (3.719)***	0.0270 (0.0894)
Male aged 16-18	0.1434 (6.180)***	0.0209 (0.0785)
Male aged 19-55	-0.0027 (-0.147)	0.2893 (0.1711)
Male aged 56-65	-0.0440 (-2.061)**	0.0653 (0.1503)
Male aged 66 and over	-0.0404 (-1.398)	0.0299 (0.1101)
Female aged 0-6	-0.0191 (-0.466)	0.0235 (0.0831)
Female aged 7-12	0.0636 (1.418)	0.0402 (0.1071)
Female aged 13-15	0.1317 (3.852)***	0.0237 (0.0844)
Female aged 16-18	0.1998 (9.348)***	0.0212 (0.0780)
Female aged 19-55	0.0136 (0.589)	0.3094 (0.1634)
Female aged 56-65	0.0052 (0.168)	0.0593 (0.1492)
<u>Provinces:</u>		
Beijing	-0.00004 (-0.007)	0.0721 (0.2587)
Shanxi	-0.0106 (-1.324)	0.0937 (0.2915)
Liaoning	-0.0207 (-4.242)***	0.1010 (0.3013)
Anhui	-0.0095 (-1.695)*	0.0721 (0.2587)
Henan	-0.0265 (-3.465)***	0.0865 (0.2812)
Hubei	0.0018 (0.391)	0.1070 (0.3091)
Guangdong	-0.0070 (-0.875)	0.0787 (0.2694)
Sichuan	-0.0049 (-1.261)	0.1223 (0.3277)
Yunnan	-0.0100 (-2.021)**	0.0935 (0.2911)
Gansu	-0.0040 (-0.616)	0.0577 (0.2331)
R ²	0.0905	
Adjusted R ²	0.0861	
F(32, 6555)	26.17***	
Number of observations	6588	

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party members, females aged 66 and over, Jiangsu province and other types of households.

- (2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.
- (3) Instruments are ownership of telephone and type of house; see Appendix 4.1 for first stage regression results.

Not surprising, there is a 4.98 percentage point increase in the proportion of household resources allocated to children's education associated with two-generation households. Turning to the age-gender household composition variables,¹¹⁸ we find that the proportions of boys and girls aged 13-15 and 16-18 affect the proportion of household resources expended on children's education, but not children aged 7-12. As education is heavily subsidised, this is not surprising for the younger age groups (see Knight and Li 1993). The proportion of boys aged 13-15 increases household expenditure on children's education by 14.65 percentage points, while girls aged 13-15 increase expenditure by a smaller amount (13.17 percentage points).¹¹⁹ The situation is reversed for boys and girls aged 16-18, in which the effects on household educational expenditure are respectively 14.34 percentage points and 19.98 percentage points. The results of this model suggest that there are differential

¹¹⁸ Other significant variables include the education of the household head and the proportion of men aged 56-65 in the household, along with a number of province dummy variables. The education of the household head and the proportion of men aged 56-65 both have negative effects on children's educational expenditures. There are numerous possible explanations. Regarding the education of the household head, it is possible that we have only captured direct expenditure on children's education and not indirect spending. In other words, parents will invest a set amount of time and resources in their children. More educated household heads may spend more time investing in their children by helping them with homework or perhaps spend time and resources on cultivating *guanxi* to further the children's future opportunities. Less educated household heads may not be able to invest in these other respects and thus their spending is direct, while indirect expenditures and time spent are not captured in this estimation. The proportion of men aged 56-65 in the household probably include retirees who are not now earning income but may require additional expenditure on their consumption that will take away from spending on children's education. This corresponds to other studies in which adult men in the household is associated with an increase in spending on alcohol and cigarettes and a decrease in spending on education and health (for example, see Hoddinott and Haddad 1995). Finally, as compared with the omitted province of Jiangsu, poorer provinces such as Liaoning, Anhui, Henan and Yunnan have significantly negative coefficients (see also Knight and Song 2000).

¹¹⁹ Joint F-tests on all of these sets of coefficients reject the null hypothesis that they are equal for boys and girls of the same age groups.

patterns of household expenditure on the education of boys and girls that are significant for middle school children (ages 13-15 best correspond to lower secondary school while ages 16-18 best correspond to upper secondary school). Household expenditure patterns appear to favour boys aged 13-15, but girls aged 16-18.

We next include proxies for bargaining power as between spouses to determine whether the unitary household decision-making model is the proper specification. None of the proxies for spousal bargaining power is found to be significant (see also IPS 1994¹²⁰). One set of estimations is reported in Table 4.4

Table 4.4
Two Stage Least Squares Joint Household Decision-making Model
Regarding the Proportion of Household Expenditure on Children’s Education

Dependent Variable: Proportion of Household Resources Expended on Children’s Education	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	-0.0794 (-0.407)	0.0551 (0.0899)
<u>Household Characteristics:</u>		
Log of household expenditure per capita (predicted)	-0.0088 (-1.118)	8.1370 (0.3157)
Log of number of household members (predicted)	0.1369 (1.145)	1.1062 (0.2016)
Communist Party membership of any member of the household	0.0051 (0.0045)	0.4564 (0.4981)
One-generation household	0.1187 (1.313)	0.1552 (0.0871)
Two-generation household	0.0499 (1.718)*	0.7816 (0.3622)
Three-generation household	0.0052 (0.378)	0.0555 (0.2291)
<u>Characteristics of Household Head:</u>		
Male	-0.0065 (-0.611)	0.6593 (0.4740)
Educational level	-0.0033 (-3.366)***	3.8015 (1.5173)
Occupation	-0.0012 (-1.641)	5.5657 (1.9401)
<u>Age-Gender Composition of Household:</u>		

¹²⁰ The survey conducted by IPS (1994) finds little difference in responses regarding household expenditure when spousal bargaining power is taken into account. The several measures of bargaining power include spouses’ age difference, educational levels and proportion of earned income.

Male aged 0-6	-0.0096 (-0.232)	0.0256 (0.0862)
Male aged 7-12	0.0583 (1.340)	0.0382 (0.1046)
Male aged 13-15	0.1465 (3.714)***	0.0270 (0.0894)
Male aged 16-18	0.1433 (6.120)***	0.0209 (0.0785)
Male aged 19-55	-0.0026 (-0.145)	0.2893 (0.1711)
Male aged 56-65	-0.0437 (-2.146)**	0.0653 (0.1503)
Male aged 66 and over	-0.0400 (-1.466)	0.0299 (0.1101)
Female aged 0-6	-0.0191 (-0.464)	0.0235 (0.0831)
Female aged 7-12	0.0636 (1.407)	0.0402 (0.1071)
Female aged 13-15	0.1314 (3.847)***	0.0237 (0.0844)
Female aged 16-18	0.1998 (9.305)***	0.0212 (0.0780)
Female aged 19-55	0.0135 (0.565)	0.3094 (0.1634)
Female aged 56-65	0.0051 (0.162)	0.0593 (0.1492)
<u>Provinces:</u>		
Beijing	-0.0001 (-0.009)	0.0721 (0.2587)
Shanxi	-0.0106 (-1.338)	0.0937 (0.2915)
Liaoning	-0.0207 (-4.269)***	0.1010 (0.3013)
Anhui	-0.0096 (-1.691)*	0.0721 (0.2587)
Henan	-0.0265 (-3.489)***	0.0865 (0.2812)
Hubei	0.0018 (0.389)	0.1070 (0.3091)
Guangdong	-0.0070 (-0.877)	0.0787 (0.2694)
Sichuan	-0.0062 (-1.256)	0.1223 (0.3277)
Yunnan	-0.0100 (-2.023)**	0.0935 (0.2911)
Gansu	-0.0040 (-0.615)	0.0577 (0.2331)
<u>Proxy for Bargaining Power:</u>		
Wife's years of education as a proportion of the husband's and wife's combined years of education	0.0014 (0.106)	0.6259 (0.2997)
R ²	0.0903	
Adjusted R ²	0.0857	
F(33, 6554)	25.45***	
Number of observations	6588	

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party

- members, females aged 66 and over, Jiangsu province and other types of households.
- (2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.
- (3) Instruments are ownership of telephone and type of house; see Appendix 4.1 for first stage regression results.

The results in Table 4.4 correspond to the unitary household decision-making model (Table 4.3) in that girls aged 13-15 are associated with a smaller proportion of household educational expenditure than boys of the same age cohort, while girls aged 16-18 receive more expenditure on their education than boys of the same ages. Specifically, the proportion of girls aged 13-15 in the household increases expenditure by 13.14 percentage points, while boys of the same ages increase expenditure by 14.65 percentage points. The proportion of boys aged 16-18 increases household expenditure on education by 14.33 percentage points, while girls aged 16-18 increases household expenditure by 19.98 percentage points. Joint F-tests on these sets of coefficients reject the null hypothesis that they are equal for boys and girls of the same age groups. These findings provide further support that the household spends more on daughters in upper secondary school and sons in lower middle school.

We attempted to sort out the effects of school quality by disaggregating educational expenditures to the extent permitted by our data. Expenditures on children's education comprise two items – expenditures on tuition and fees, and other expenditures. Tuition and fees serve as our best proxy for school quality, as we do not have data on actual schools in the survey. By separating the two categories, we may find that the differences are a function of school quality insofar as better schools are more costly. The mean value of tuition and fees is 398.80 RMB (with a standard deviation of 1027.85) while it is 153.87 RMB (with a standard deviation of 683.89) for

other educational expenditures. We cannot identify these other expenditures, but posit that they include school uniforms, transportation expenses and out-of-school tuition fees. None of the coefficients on the age-gender household composition terms were significant and the link with school quality is not clear cut.

We also explore the implications of the one-child policy implemented in the late 1970s and early 1980s on household expenditure on children’s education, *i.e.*, families with one child will spend on their child regardless of his or her gender. The cohort of school-aged children in 1995 is affected by this policy. Table 4.5 gives the mean values for household expenditure on children’s education for single-child, single-boy and single-girl households, as compared with all households with children that include single-child households.

Table 4.5
Mean Household Expenditure on Children’s Education for All and Single-Child Households
(in yuan with standard deviation and maximums, respectively, in parentheses)

Children’s Educational Expenditure	All Households with Children	Single-Child Households	Single-Boy Households	Single-Girl Households
Number of Households	5802	4181	2158	2023
Total Educational Expenditure	602.11 (1278.74; 33,033)	617.85 (1177.98; 33,033)	610.46 (1244.29; 33,033)	625.75 (1103.12; 12,683)
Sub-category: Tuition and School Fees	411.28 (1063.94; 40,000)	409.61 (1092.57; 40,000)	404.25 (1168.71; 40,000)	415.32 (1005.28; 17,010)
Sub-category: Other Expenditures	161.77 (709.31; 25,000)	158.86 (636.62; 17,400)	151.03 (517.05; 6,500)	167.21 (743.32; 17,400)

Source: Urban Household Survey, 1995.

Single-child households represent 60.3% of all households with children in the sample. Of these households, 51.6% are single-boy households and the remainder are single-girl households. Single-child households spend 2.55% more on children’s education than all households with children. Single-girl households spend

more, on average, on children’s education in both sub-categories than single-boy households. These figures suggest that parents are willing to spend more on education where there is one child, and also that there may be more associated expenses for girls than boys in single-child households, such as clothing, that are captured in the other expenditure category. One possible explanation as to why tuition and school fees are also higher for single-girl households may have to do with girls testing into better schools with higher fees. However, our discussion above indicates that our data set does not permit us to explore school quality. Given these patterns, nevertheless, we may find that the larger educational expenditure associated with the proportion of girls aged 16-18 is explained by single-girl households. Table 4.6 gives the results of the intrahousehold resource allocation model of expenditure on children’s education estimated for the sub-sample of single-child households, and further disaggregated by single-boy and single-girl households.

Table 4.6 Two Stage Least Squares Unitary Intrahousehold Resource Allocation Model Regarding the Proportion of Expenditure on Children’s Education in Single-Child Households						
Dependent Variable:	Coefficient (t-statistic)			Mean Value or Percentage (standard deviation)		
Proportion of Household Resources Spent on Children’s Education	Single-Child (1)	Single-Boy (2)	Single-Girl (3)	Single-Child	Single-Boy	Single-Girl
Intercept	-0.0865 (-0.148)	0.1830 (0.249)	-0.5014 (-0.467)	0.0551 (0.0889)	0.0550 (0.0909)	0.0551 (0.0868)
Household Characteristics:						
Log of household expenditure per capita (predicted)	-0.0162 (-1.603)	-0.0196 (-1.374)	-0.0106 (-0.699)	8.0814 (0.6959)	8.0730 (0.6742)	8.0902 (0.7182)
Log of number of household members (predicted)	0.1370 (0.543)	0.0200 (0.065)	0.3236 (0.671)	1.1637 (0.1759)	1.1669 (0.1759)	1.1602 (0.1758)
Communist Party membership of any	0.0059	0.0101	0.0012	0.4138	0.4194	0.4078

member of the household	(1.371)	(1.654)*	(0.180)	(0.4926)	(0.4936)	(0.4915)
Two-generation household	0.0482 (1.242)	0.0267 (0.423)	0.0627 (1.393)	0.9132 (0.2816)	0.9133 (0.2814)	0.9130 (0.2819)
Three-generation household	0.0237 (1.011)	0.0118 (0.271)	0.0185 (0.599)	0.0813 (0.2734)	0.0816 (0.2738)	0.0811 (0.2730)
<u>Characteristics of Household Head:</u>						
Male	-0.0068 (-1.887)*	-0.0058 (-1.205)	-0.0087 (-1.370)	0.639 (0.4803)	0.6362 (0.4812)	0.6423 (0.4795)
Educational level	-0.0026 (-2.039)**	-0.0036 (-2.130)**	-0.0024 (-0.946)	3.7016 (1.4291)	3.6724 (1.4440)	3.7328 (1.4128)
Occupation	-0.0010 (-1.165)	-0.0003 (-0.247)	-0.0018 (-1.475)	5.6737 (1.9232)	5.6312 (1.9236)	5.7186 (1.9223)
<u>Age-Gender Composition of Household:</u>						
Male aged 0-6	0.2094 (0.335)	-0.0559 (-0.072)	---	0.0390 (0.1052)	0.0756 (0.1367)	0.00 (0.00)
Male aged 7-12	0.2721 (0.434)	0.0072 (0.009)	---	0.0566 (0.1253)	0.1097 (0.1568)	0.00 (0.00)
Male aged 13-15	0.3673 (0.586)	0.1077 (0.138)	---	0.0395 (0.1078)	0.0766 (0.1402)	0.00 (0.00)
Male aged 16-18	0.3639 (0.617)	0.1201 (0.163)	---	0.0301 (0.0944)	0.0582 (0.1250)	0.00 (0.00)
Male aged 19-55	0.0130 (0.218)	0.0079 (0.090)	0.0234 (0.245)	0.3026 (0.0983)	0.3021 (0.0986)	0.3032 (0.0981)
Male aged 56-65	-0.0484 (-0.917)	-0.0275 (-0.386)	-0.0563 (-0.603)	0.0158 (0.0634)	0.0163 (0.0642)	0.0152 (0.626)
Male aged 66 and over	-0.0724 (-1.095)	-0.0676 (-0.686)	-0.0647 (-0.608)	0.0101 (0.0506)	0.0099 (0.0496)	0.0102 (0.0517)
Female aged 0-6	0.1971 (0.315)	---	0.6192 (0.531)	0.0346 (0.1006)	0.00 (0.00)	0.0716 (0.1352)
Female aged 7-12	0.2771 (0.439)	---	0.7007 (0.594)	0.0598 (0.1284)	0.00 (0.00)	0.1236 (0.1618)
Female aged 13-15	0.3512 (0.572)	---	0.7593 (0.661)	0.0332 (0.1008)	0.00 (0.00)	0.0685 (0.1362)
Female aged 16-18	0.4056 (0.678)	---	0.8011 (0.718)	0.0284 (0.0873)	0.00 (0.00)	0.0587 (0.1249)
Female aged 19-55	-0.0010 (-0.016)	-0.0288 (-0.310)	0.0394 (0.362)	0.3195 (0.0653)	0.3216 (0.0850)	0.3173 (0.0897)
Female aged 56-65	-0.0085 (-0.143)	-0.0241 (-0.361)	0.0433 (0.316)	0.0164 (0.0603)	0.0166 (0.0648)	0.0162 (0.0659)
<u>Provinces:</u>						
Beijing	0.0027 (0.379)	-0.0038 (-0.379)	0.0123 (1.000)	0.0684 (0.2525)	0.0649 (0.2464)	0.0722 (0.2588)
Shanxi	-0.0167 (-1.703)*	-0.0054 (-0.338)	-0.0252 (-1.990)**	0.0902 (0.2865)	0.0922 (0.2894)	0.0880 (0.2833)
Liaoning	-0.0276 (-4.411)***	-0.0233 (-2.444)**	-0.0308 (-3.562)***	0.1093 (0.3121)	0.1006 (0.3008)	0.1186 (0.3234)
Anhui	-0.0179 (-2.523)**	-0.0053 (-0.501)	-0.0252 (-1.955)*	0.0734 (0.2609)	0.0746 (0.2628)	0.0722 (0.2588)
Henan	-0.0299 (-3.870)***	-0.0252 (-2.326)**	-0.0346 (-2.840)***	0.0773 (0.2670)	0.0834 (0.2766)	0.0707 (0.2564)
Hubei	-0.0007 (-0.117)	-0.0025 (-0.290)	0.0037 (0.400)	0.1165 (0.3208)	0.1149 (0.3190)	0.1181 (0.3229)
Guangdong	-0.0034	0.0007	-0.0061	0.0782	0.0853	0.0707

	(-0.402)	(0.057)	(-0.496)	(0.2685)	(0.2793)	(0.2564)
Sichuan	-0.0096	-0.0007	-0.0167	0.1186	0.1251	0.1117
	(-1.574)	(-0.075)	(-1.815)*	(0.3234)	(0.3309)	(0.3151)
Yunnan	-0.0179	-0.0012	-0.0331	0.1000	0.0955	0.1048
	(-2.855)***	(-0.130)	(-3.808)***	(0.3000)	(0.2939)	(0.3064)
Gansu	-0.0108	-0.0119	-0.0061	0.0574	0.0635	0.0509
	(-1.331)	(-1.016)	(-0.500)	(0.2326)	(0.2439)	(0.2199)
R ²	0.1003	0.1039	0.0429			
Adjusted R ²	0.0933	0.0919	0.0295			
F(31, 3976)	13.47***	---	---			
F(27, 2029)	---	7.07***	---			
F(27, 1923)	---	---	8.87***			
Number of observations	4008	2057	1951			

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party members, females aged 66 and over, Jiangsu province and other types of households.

(2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.

(3) Instruments are ownership of telephone and type of house; see Appendix 4.1 for first stage regression results.

The results of Table 4.6 do not shed further light on the degree to which the age-gender composition of the household affects expenditure on children’s education. Although single-child households are a majority of the sample of households with children, the age-gender composition variables are not significant in these estimations. Therefore, the patterns of household expenditure on children’s education are not well explained by single-child households. In sum, we find that the proportion of household expenditure on the education of children significantly differs for children aged 13-15 and 16-18, corresponding to the two levels of secondary school. The attempt to explain these patterns leads us to our hypotheses.

4.4.2 Testing the Hypothesis of “Personal Rates of Return” to Education

Returns to education are estimated for the working-aged population, which moulds the expectations of parents who examine these rates of return in

deciding to invest in their children’s education. Table 4.7 and Figure 4.2 depict the educational attainment of the adult population, divided into working-aged men and women (19-55) and those aged 56 and over.

Table 4.7
Educational Attainment for Adult Men and Women
(number of observations)

	Men		Women	
	19-55 (6438)	56 and over (1774)	19-55 (6814)	56 and over (1635)
College and Above	9.68%	13.7%	5.00%	3.55%
Professional School	(623)	(243)	(341)	(58)
Middle Level Professional School	17.92%	9.13%	11.48%	2.63%
	(1154)	(162)	(782)	(43)
Upper Middle School	15.77%	10.71%	16.20%	8.44%
	(1015)	(190)	(1104)	(138)
Lower Middle School	23.72%	14.43%	24.95%	7.03%
	(1527)	(256)	(1700)	(115)
Primary School	28.56%	28.86%	32.70%	20.85%
	(1839)	(512)	(2228)	(341)
Less than Primary School	4.01%	18.49%	8.29%	26.54%
	(258)	(328)	(565)	(434)
	0.34%	4.68%	1.38%	30.89%
	(22)	(83)	(94)	(505)

Source: Urban Household Survey, 1995.

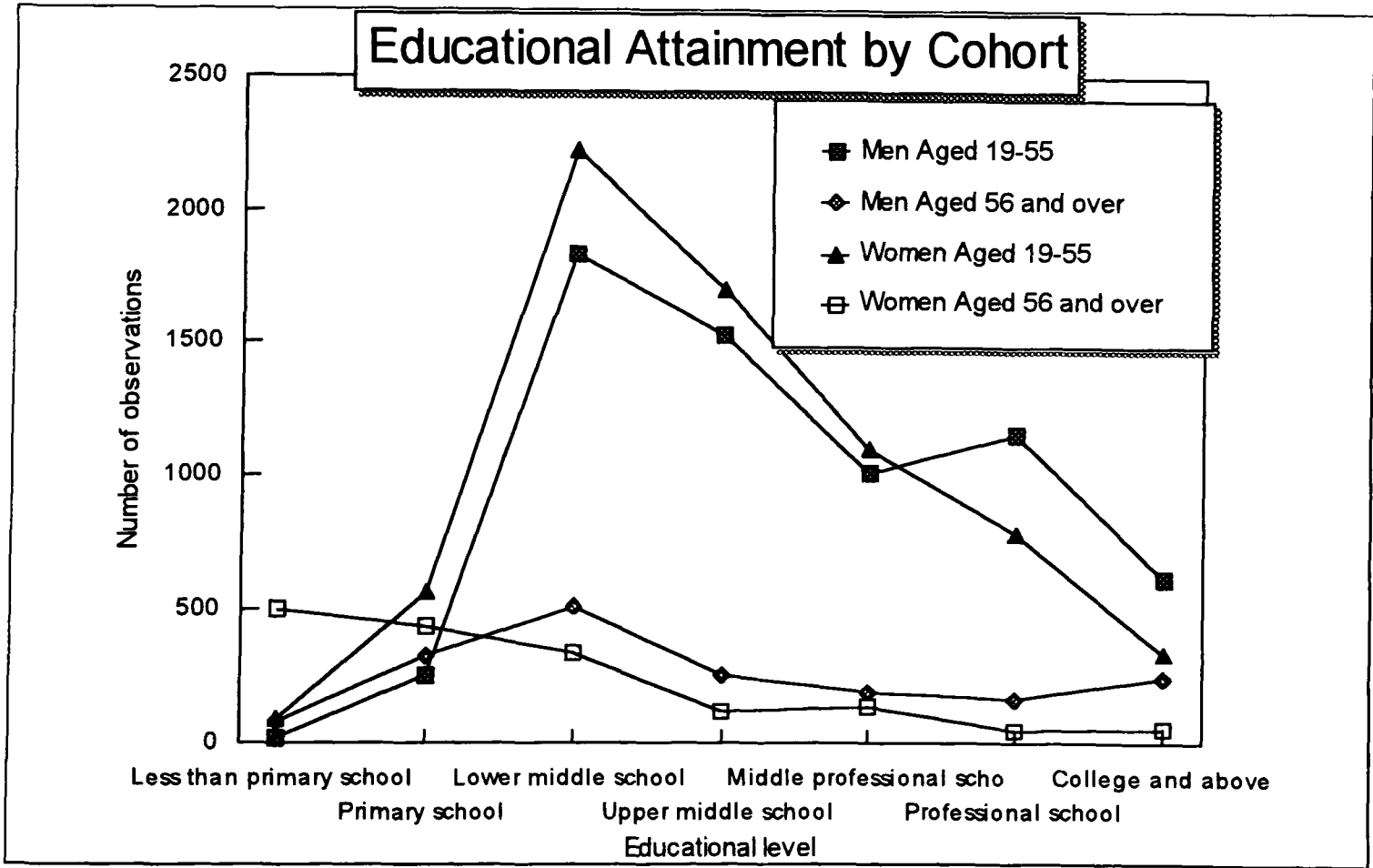


Figure 4.2

We estimate selection-corrected earnings functions for working-aged men and women.¹²¹ The following earnings functions use the Huber correction for clustering at the household level that can cause the variance of the error terms not to be constant (White 1980; Newey and West 1987; Levine 1992). Due to the use of household-level data, heteroskedasticity is tested for to address the possibility that the error terms are not independent because of a common unmeasured household effect. Failure to account for these biases tends to result in an understatement of the standard errors and a loss of efficiency of the OLS coefficients. In these equations, we test for heteroskedasticity following White (1980) and find that the F-test rejects the null hypothesis of homoskedasticity.¹²² Therefore, robust standard errors are computed in all estimations (Newey and West 1987). One final methodological note is that we control for sample selection, which is not frequently addressed in estimates of returns to human capital. We are puzzled over this lack of selectivity correction and find that a few others are beginning to analyse the resulting biases. One of the papers we found was by Dearden (1999), which examines biases in returns to education in Britain.¹²³

We follow Heckman (1979) and include a correction term in the earnings function to adjust for those who select into wage employment. If this

¹²¹ The dependent variable is the logarithm of annual income instead of hourly wages because there is not information on hours worked in this data set. Other scholars who have used this data set in this manner include Riskin, Zhao and Li (forthcoming).

¹²² White (1980: 824) proposes a test for heteroskedasticity by regressing the left-hand side variable on the squared residuals of the right-hand side variables and any interaction terms (see also Deaton 1997). The null hypothesis of homoskedasticity is then subject to a F-test (see Greene 1997 [1993]).

¹²³ Dearden (1999) reviews the literature and finds that sample selection has been largely overlooked in estimates of the returns to education.

selection term (the inverse Mills ratio or λ_i ¹²⁴) is significant in the earnings function, then there is selection bias. We use maximum likelihood estimation (see Johnston and DiNardo 1997 [1963]: 450 for a discussion of preferring maximum likelihood estimation to the Heckman two-step model because MLE is more efficient). The t-values are based on heteroskedasticity-consistent standard errors. Finally, we choose the presence of children in the household as the exclusion restriction because we expect *a priori* that having children will affect selection into employment, but not earnings (Gronau 1974). Thus, in the probit estimation, the dependent variable is equal to one if the person is observed in wage employment and is equal to zero otherwise.

Table 4.8A
The Determinants of Income for All Working-Aged Individuals

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)			Mean Value or Percentage (standard deviation)
	Probit	Corrected MLE	Uncorrected OLS	
Intercept	1.0259 (1.185)	5.9030 (42.611)***	6.3440 (45.457)***	8.3313 (0.5074)
<u>Personal Characteristics:</u>				
Years of education	0.0302 (1.343)	0.0437 (15.579)***	0.0424 (15.184)***	11.1290 (2.6608)
Male	0.0998 (1.024)	0.1331 (13.350)***	0.1304 (13.088)***	0.4858 (0.4998)
Age	0.0488 (1.156)	0.1050 (16.052)***	0.0818 (12.911)***	37.7866 (9.6625)
Age squared	-0.0008 (-1.536)	-0.0014 (-17.549)***	-0.0011 (-14.556)***	1521.184 (720.6569)
Experience	0.0287 (2.825)***	0.0200 (10.910)***	0.0219 (11.825)***	19.0589 (9.3082)
Occupation	0.0463 (2.044)**	-0.0280 (-6.308)***	-0.0293 (-6.615)***	5.8788 (2.0064)

¹²⁴ The inverse Mills ratio is given by $\lambda_i = f(\phi_i)/F(\phi_i)$, where $f(\phi_i)$ represents the standard normal density function and $F(\phi_i)$ denotes the cumulative normal distribution function. The denominator of λ_i is the probability that the i^{th} person chooses wage employment. The coefficient on the inverse Mills ratio measures the bias due to non-random sample selection into wage employment. If it is statistically different from zero, then the null hypothesis of no selection bias is rejected (Heckman 1979).

Communist Party membership	4.6682 (---)	0.1004 (8.223)***	0.1037 (8.472)***	0.2123 (0.4090)
Have children	-0.6602 (-4.231)***	---	---	0.1953 (0.3964)
<u>Provinces:</u>				
Beijing	0.2520 (0.633)	0.2614 (7.645)***	0.2553 (7.503)***	0.0233 (0.1509)
Shanxi	4.5034 (---)	0.2621 (9.782)***	0.2626 (9.778)***	0.0279 (0.1648)
Liaoning	0.0706 (0.245)	0.1962 (5.393)***	0.1970 (5.411)***	0.0311 (0.1736)
Anhui	-0.2429 (-1.029)	-0.1414 (-3.747)***	-0.1420 (-3.782)***	0.0244 (0.1544)
Henan	-0.1305 (-0.460)	-0.3649 (-9.939)***	-0.3665 (-9.949)***	0.0271 (0.1624)
Hubei	-0.2445 (-1.186)	-0.0544 (-2.289)**	-0.0522 (-2.193)**	0.0392 (0.1942)
Guangdong	4.4828 (---)	0.0531 (1.697)*	0.0586 (1.877)*	0.0226 (0.1485)
Sichuan	-0.2337 (-1.208)	-0.2060 (-6.004)***	-0.2071 (-6.033)***	0.0384 (0.1922)
Yunnan	4.4686 (---)	0.1381 (4.910)***	0.1389 (4.919)***	0.0285 (0.1665)
Gansu	4.4744 (---)	0.1925 (5.880)***	0.1946 (5.974)***	0.0161 (0.1261)
Inverse Mills Ratio	---	-0.0269 (-2.676)***	---	0.0151 (0.0253)
R ²	---	---	0.2355	
Pseudo R ²	0.1840	---	---	
X ² (18)		---	---	
Wald X ² (17) ¹²⁵	163.89***	---	---	
F(17, 5976)	---	2933.07***	---	
Log likelihood	---	---	171.43***	
Number of observations	-363.3931 12016	-10791.37 11943	---	
			11943	

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female, non-Communist Party members, and Jiangsu province.

(2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.

(3) Heteroskedasticity-consistent robust standard errors adjusted for clustering at the household level are computed.

Table 4.8B
The Determinants of Income for All Working-Aged Individuals (by Educational Levels)

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Probit	Corrected	Uncorrected

¹²⁵ Wald chi-squared values are computed because of the lack of the assumption of homoskedasticity in the error terms (see Greene 1997 [1993]).

		MLE	OLS	
Intercept	0.7545 (0.809)	6.2869 (39.771)***	6.3668 (40.446)***	8.3313 (0.5074)
<u>Education Level Completed:</u>				
College and above	0.5044 (1.058)	0.6108 (7.478)***	0.5936 (7.250)***	0.0727 (0.2597)
Professional school	0.7351 (1.575)	0.5273 (6.547)***	0.5112 (6.331)***	0.1461 (0.3532)
Middle level professional school	0.4963 (1.115)	0.4731 (5.898)***	0.4554 (5.663)***	0.1599 (0.3665)
Upper middle school	0.3741 (0.860)	0.3897 (4.901)***	0.3737 (4.686)***	0.2435 (0.4292)
Lower middle school	0.2521 (0.587)	0.2812 (3.569)***	0.2654 (3.360)***	0.3069 (0.4612)
Primary school	0.7305 (1.404)	0.1668 (2.063)**	0.1511 (1.862)*	0.0621 (0.2414)
<u>Personal Characteristics:</u>				
Male	0.0984 (1.004)	0.1309 (13.112)***	0.1305 (13.061)***	0.4858 (0.4998)
Age	0.0588 (1.364)	0.0878 (13.695)***	0.0843 (13.205)***	37.7866 (9.6625)
Age squared	-0.0010 (-1.825)*	-0.0012 (-15.173)***	-0.0011 (-14.701)***	1521.184 (720.6569)
Experience	0.0318 (2.987)***	0.0214 (11.372)***	0.0217 (11.504)***	19.0589 (9.3082)
Occupation	0.0543 (2.349)**	-0.0237 (-5.045)***	-0.0240 (-5.105)***	5.8788 (2.0064)
Communist Party member	4.9060 (---)	0.0940 (7.642)***	0.0950 (7.702)***	0.2123 (0.4090)
Have children	-0.6476 (-4.102)***	---	---	0.1953 (0.3964)
<u>Provinces:</u>				
Beijing	0.2001 (0.518)	0.2505 (7.335)***	0.2497 (7.316)***	0.0233 (0.1509)
Shanxi	4.4596 (---)	0.2556 (9.579)***	0.2563 (9.589)***	0.0279 (0.1648)
Liaoning	0.0602 (0.207)	0.1941 (5.372)***	0.1943 (5.372)***	0.0311 (0.1736)
Anhui	-0.2301 (-0.962)	-0.1426 (-3.808)***	-0.1430 (-3.818)***	0.0244 (0.1544)
Henan	-0.1525 (-0.534)	-0.3725 (-10.188)***	-0.3727 (-10.183)***	0.0271 (0.1624)
Hubei	-0.2866 (-1.394)	-0.0627 (-2.646)***	-0.0628 (-2.645)***	0.0392 (0.1942)
Guangdong	4.6498 (---)	0.0576 (1.824)*	0.0591 (1.869)*	0.0226 (0.1485)
Sichuan	-0.2041 (-1.041)	-0.2043 (-5.983)***	-0.2049 (-5.990)***	0.0384 (0.1922)
Yunnan	4.4468 (---)	0.1360 (4.833)***	0.1366 (4.847)***	0.0285 (0.1665)
Gansu	4.4705 (---)	0.1949 (5.963)***	0.1958 (5.983)***	0.0161 (0.1261)
Inverse Mills Ratio	---	-0.0463 (-3.668)***	---	0.0151 (0.0263)
R ²	---	---	0.2381	

Pseudo R ²	0.1928	---	---
X ² (23)	171.74***	---	---
Wald X ² (22)	---	3362.31***	---
F(22, 5976)	---	---	133.37***
Log likelihood	-359.46448	-10754.93	---
Number of observations	12016	11943	11943

Source: Urban Household Survey, 1995.

- Notes: (1) Omitted dummy variables are: female, less than primary school education, non-Communist Party members, and Jiangsu province.
 (2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.
 (3) Heteroskedasticity-consistent robust standard errors adjusted for clustering at the household level are computed.

Table 4.8C
 The Determinants of Income for All Working-Aged Men and Women (by Educational Levels)

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)						Mean Value or Percentage (standard deviation)	
	Men			Women			Men	Women
	Probit	Corrected MLE	Uncorrected OLS	Probit	Corrected MLE	Uncorrected OLS		
Intercept	4.5525 (---)	6.3397 (26.366)***	6.3827 (26.574)***	1.0595 (0.867)	6.3395 (30.116)***	6.2928 (29.818)***	8.7290 (0.6015)	8.5094 (0.6671)
<u>Education Level</u>								
<u>Completed:</u>								
College and above	-3.5194 (-2.799)***	0.6015 (3.910)***	0.5968 (3.873)***	0.4258 (0.806)	0.5803 (5.734)***	0.5901 (5.829)***	0.0968 (0.2957)	0.0500 (0.2181)
Professional school	-3.4707 (-2.736)***	0.5079 (3.324)***	0.5042 (3.294)***	0.8892 (1.638)	0.5287 (5.440)***	0.5384 (5.537)***	0.1792 (0.3836)	0.1148 (0.3188)
Middle level professional school	-3.6339 (-2.978)***	0.4400 (2.883)***	0.4352 (2.847)***	0.5049 (1.059)	0.4587 (4.761)***	0.4681 (4.857)***	0.1577 (0.3644)	0.1620 (0.3685)
Upper middle school	-3.6631 (-2.928)***	0.4199 (2.766)***	0.4161 (2.736)***	0.3382 (0.737)	0.3147 (3.306)***	0.3226 (3.387)***	0.2372 (0.4254)	0.2495 (0.4327)
Lower middle school	-3.9632 (-3.139)***	0.3309 (2.197)**	0.3272 (2.169)**	0.3480 (0.772)	0.1987 (2.100)**	0.2062 (2.179)**	0.2856 (0.4518)	0.3270 (0.4691)
Primary school	-4.0891 (-3.159)***	0.2403 (1.559)	0.2359 (1.528)	5.3015 (---)	0.1050 (1.080)	0.1135 (1.168)	0.0401 (0.1961)	0.0829 (0.2758)
<u>Personal Characteristics:</u>								
Age	0.0892 (1.331)	0.0865 (9.817)***	0.0844 (9.602)***	0.0397 (0.681)	0.0912 (10.477)***	0.0930 (10.659)***	37.8879 (9.7425)	37.6909 (9.5860)
Age squared	-0.0015 (-1.635)	-0.0010 (-9.730)***	-0.0010 (-9.502)***	-0.0008 (-1.092)	-0.0013 (-12.134)***	-0.0013 (-12.317)***	1530.3910 (726.3334)	1512.4850 (715.1966)
Experience	0.0370 (1.833)*	0.0118 (4.424)***	0.0120 (4.457)***	0.0343 (2.562)***	0.0248 (10.333)***	0.0249 (10.349)***	19.6987 (9.5261)	18.4391 (9.04993)
Occupation	0.0502 (1.355)	-0.0171 (-2.795)***	-0.0174 (-2.841)***	0.0559 (1.827)*	-0.0265 (-3.911)***	-0.0260 (-3.827)***	5.7091 (1.9060)	6.0445 (2.0866)
Communist Party member	4.8251 (---)	0.0941 (6.254)***	0.0948 (6.288)***	4.8998 (---)	0.1135 (5.852)***	0.1136 (5.848)***	0.2967 (0.4568)	0.1327 (0.3392)
Have children	-0.7163 (-2.675)***	---	---	-0.6401 (-3.120)***	---	---	0.2165 (0.4119)	0.1752 (0.3802)
<u>Provinces:</u>								
Beijing	4.5410 (---)	0.2956 (7.277)***	0.2954 (7.264)***	-0.1185 (-0.284)	0.2035 (4.376)***	0.2032 (4.367)***	0.0249 (0.1556)	0.0219 (0.1463)
Shanxi	4.4274 (---)	0.2506 (6.412)***	0.2515 (6.423)***	4.4978 (---)	0.2505 (8.092)***	0.2511 (8.103)***	0.0281 (0.1653)	0.0277 (0.1642)
Liaoning	0.0019	0.1953	0.1951	0.0932	0.1877	0.1877	0.0317	0.0305

Anhui	(0.004)	(3.721)***	(3.712)***	(0.231)	(5.144)***	(5.138)***	(0.1752)	(0.1720)
	0.0150	-0.0942	-0.0943	-0.3659	-0.2046	-0.2053	0.0248	0.0241
Henan	(0.034)	(-2.250)**	(-2.249)**	(-1.246)	(-3.532)***	(-3.538)***	(0.1557)	(0.1533)
	-0.3038	-0.3192	-0.3197	-0.0483	-0.4266	-0.4261	0.0278	0.0264
Hubei	(-0.764)	(-7.748)***	(-7.741)***	(-0.114)	(-8.471)***	(-8.449)***	(0.1644)	(0.1604)
	-0.5016	-0.0921	-0.0929	-0.0416	-0.0358	-0.0363	0.0407	0.0379
Guangdong	(-1.855)*	(-3.033)***	(-3.054)***	(-0.118)	(-1.225)	(-1.239)	(0.1976)	(0.1909)
	4.7400	0.1027	0.1040	4.5054	0.0009	0.0009	0.0235	0.0217
Sichuan	(---)	(2.959)***	(2.992)***	(---)	(0.018)	(0.019)	(0.1514)	(0.1458)
	0.1293	-0.0946	-0.0946	-0.3896	-0.3216	-0.3226	0.0395	0.0374
Yunnan	(0.317)	(-2.074)**	(-2.071)**	(-1.659)*	(-6.914)***	(-6.928)***	(0.1947)	(0.1898)
	4.3650	0.1445	0.1451	4.5103	0.1288	0.1290	0.0287	0.0283
Gansu	(---)	(4.142)***	(4.150)***	(---)	(3.580)***	(3.578)***	(0.1671)	(0.1659)
	4.5275	0.1716	0.1725	4.4911	0.2262	0.2265	0.0163	0.0160
	(---)	(4.386)***	(4.398)***	(---)	(5.986)***	(5.978)***	(0.1267)	(0.1254)
Inverse Mills Ratio	---	-0.0566	---	---	-0.0448	---	0.0128	0.0171
		(-2.822)***			(-2.552)**		(0.0274)	(0.0286)
R ²	---	---	0.2127	---	---	0.2382		
Pseudo R ²	0.2375	---	---	0.1814	---	---		
χ ² (22)	92.07***	---	---	90.98***	---	---		
Wald χ ² (21)	---	1410.91***	---	---	1728.86***	---		
F(21, 5389)	---	---	67.11***	---	---	---		
F(21, 6014)	---	---	---	---	---	82.28***		
Log likelihood	-147.7940	-5018.282	---	-205.3058	-5648.514	---		
Number of observations	5938	5907	5907	6078	6036	6036		

Source: Urban Household Survey, 1995.

- Notes: (1) Omitted dummy variables are: less than primary school education, non-Communist Party members, and Jiangsu province.
- (2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.
- (3) Heteroskedasticity-consistent robust standard errors adjusted for clustering at the household level are computed.

We discuss the sample selection issue as it affects returns to education.

The selection terms are significant in all estimations, indicating that non-random sample selection exists in choosing to enter into wage employment (Tables 4.8A-C).

The uncorrected OLS regressions slightly overestimate the returns to education for women but slightly underestimate the returns for men (Table 4.8C).

One interpretation is that employed women have higher ability that is not measured, and the adjusted estimates correct for the correlation between ability and education. For men, the uncorrected estimate understates their returns to education, which might suggest that some unmeasured trait, such as determination or economic necessity, is negatively correlated with education. It is always difficult to

interpret the effects of unobserved characteristics, but our findings indicate that estimations of returns to education that do not correct for sample selection are biased, and biased differently for men and women.

Concerning rates of returns to education, years of education have a positive and highly significant (at the 1% level) effect, increasing earnings by 4.4% (Table 4.8A). Rather unusually, each level of education attained is associated with higher returns, indicating increasing returns to education in China (Table 4.8B). With respect to the sub-samples of men and women (Table 4.8C), we find that, relative to less than primary school, men earn more returns to education than women for all levels of education other than professional school and professional middle school.¹²⁶ For professional school and professional middle school, women have slightly larger coefficients than for men. However, the returns for each level of education are not statistically different for men and women.¹²⁷ Finally, returns to primary school are not significant for either group.

In summary, relative to having less than primary education, the return to lower middle school is larger for men than for women (39.2% versus 22.0%), as with upper middle school (52.2% versus 37.0%).¹²⁸ For college and above, the

¹²⁶ We do not compute rates of return to years of education separately for men and women because we constructed the years of education variable, as there is only data on the level of education completed. This is not as reliable as actual data, so we opt to use levels of education when estimating earnings functions for men and women.

¹²⁷ In order to determine whether the estimated returns are statistically different for men and women for each level of education, a full set of interaction terms for gender and all independent variables were included in a selection-corrected estimation using the combined sample (unreported equation).

¹²⁸ See Halvorsen and Palmquist (1980) for use of antilogs to interpret the coefficients on dummy variables in earnings functions in semilogarithmic form. The formula they derive is that the percentage change caused by a coefficient of g on a dummy variable is given by $(\exp(g)-1)$.

difference is much smaller (82.5% versus 78.7%). Returns to both professional schools are slightly higher for women than for men. For professional school, it is 66.2% and 69.7% for men and women, respectively, while the return to middle level professional school is 55.3% for men and 58.2% for women. Although the differences in returns to education are not statistically significant for men and women, there are different perceived rates of return such that gender differences in returns to upper and lower middle schools are larger, while the differences to professional school and for completing college and above, are largely similar.

These findings provide some evidence in support of the personal rates of return hypothesis. Parents spend more on the education of boys than of girls aged 13-15, the age group best corresponding to lower middle school. On the other hand, parents spend more on the education of girls aged 16-18 despite the fact that boys are expected to receive higher or comparable returns at upper secondary school. We further investigate this cohort of children aged 16-18, for whom the pattern of household expenditures on education does not correspond to the perceived rates of return to education.

Table 4.9
Enrolment of Children Aged 16-18 in Upper Secondary Schools
(number of observations)

	Male (499)	Female (512)
Upper Middle School	51.3% (256)	43.16% (221)
Middle Level Professional School	17.03% (85)	23.05% (118)
Not Enrolled in School	12.22% (61)	13.09% (67)
Total Enrolment	68.34% (341)	66.21% (339)

Source: Urban Household Survey, 1995.

Table 4.9 shows there are more girls enrolled in middle level professional school than boys, both in absolute numbers and as a percentage of the total aged 16-18.¹²⁹ The reverse is true for upper middle school in which there are fewer girls than boys – again both absolutely and as a percentage of total enrolment. On account of the slightly higher returns to middle level professional school, it is possible that girls self-select into professional rather than academic upper secondary school. The testing process into upper middle school is another possibility. However, it is difficult to distinguish ability from the influence of examination preparation at lower middle school that may result from more household expenditure on the education of boys aged 13-15.

Our original estimation of the intrahousehold resource allocation model did not separate children according to whether they attended academic or professional schools. To test for possible differences stemming from the type of school, we re-estimate the household expenditure model.¹³⁰ The results are given in Table 4.10.

Table 4.10		
Two Stage Least Squares Unitary Intrahousehold Resource Allocation Model		
Regarding the Proportion of Expenditure on Children's Education (by Type of School)		
<u>Dependent Variable: Proportion of Household Resources Expended on Education</u>	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	-0.0367 (-0.176)	0.0551 (0.0889)
<u>Household Characteristics:</u>		
Log of household expenditure per capita (predicted)	-0.0109	8.1370

¹²⁹ There are 499 boys aged 16-18, making the gender ratio 1.03 for this cohort.

¹³⁰ The estimated model is of the unitary household decision-making form since we did not find evidence to support a bargaining model (see Table 4.4).

	(-1.386)	(0.3157)
Log of number of household members (predicted)	0.1338	1.1062
	(1.086)	(0.2016)
Communist Party membership of any member of the household	0.0044	0.4564
	(0.969)	(0.4981)
One-generation household	0.1151	0.1552
	(1.246)	(0.0871)
Two-generation household	0.0487	0.7816
	(1.678)*	(0.3622)
Three-generation household	0.0033	0.0555
	(0.236)	(0.2291)
<u>Characteristics of Household Head:</u>		
Male	-0.0068	0.6593
	(-1.474)	(0.4740)
Educational level	-0.0031	3.8015
	(-3.237)***	(1.5173)
Occupation	-0.0011	5.5657
	(-1.482)	(1.9401)
<u>Age-Gender Composition of Household:</u>		
Male aged 0-6	-0.0349	0.0256
	(-0.839)	(0.0862)
Male aged 7-12	0.0342	0.0382
	(0.778)	(0.1046)
Male aged 13-15	0.1218	0.0270
	(3.048)***	(0.0894)
Male aged 16-18 enrolled in upper middle school	0.1510	0.0108
	(5.352)***	(0.0566)
Male aged 16-18 enrolled in middle level professional school	0.1584	0.0034
	(4.466)***	(0.0325)
Male aged 16-18 enrolled in college and above	0.2349	0.0004
	(2.402)**	(0.0114)
Male aged 16-18 enrolled in professional school	0.0193	0.0005
	(0.195)	(0.0140)
Male aged 16-18 not enrolled in school	-0.0051	0.0026
	(-0.117)	(0.0283)
Male aged 19-55	-0.0245	0.2893
	(-1.367)	(0.1711)
Male aged 56-65	-0.0674	0.0653
	(-3.243)***	(0.1503)
Male aged 66 and over	-0.0699	0.0299
	(-2.459)**	(0.1101)
Female aged 0-6	-0.0436	0.0235
	(-1.053)	(0.0831)
Female aged 7-12	0.0389	0.0402
	(0.851)	(0.1071)
Female aged 13-15	0.1080	0.0237
	(3.126)***	(0.0844)
Female aged 16-18 enrolled in upper middle school	0.1885	0.0093
	(6.954)***	(0.0530)
Female aged 16-18 enrolled in middle level professional school	0.2595	0.0049
	(7.598)***	(0.0385)
Female aged 16-18 enrolled in college and above	0.4370	0.0005
	(4.846)***	(0.0133)
Female aged 16-18 enrolled in professional school	0.2446	0.0009
	(3.121)***	(0.0164)
Female aged 16-18 not enrolled in school	-0.0243	0.0025
	(-0.529)	(0.0264)

Female aged 19-55	-0.0036 (-0.153)	0.3094 (0.1634)
Female aged 56-65	-0.0107 (-0.340)	0.0593 (0.1492)
<u>Provinces:</u>		
Beijing	0.0002 (0.036)	0.0721 (0.2587)
Shanxi	-0.0109 (-1.359)	0.0937 (0.2915)
Liaoning	-0.0204 (-4.193)***	0.1010 (0.3013)
Anhui	-0.0094 (-1.676)*	0.0721 (0.2587)
Henan	-0.0266 (-3.434)***	0.0865 (0.2812)
Hubei	0.0017 (0.353)	0.1070 (0.3091)
Guangdong	-0.0052 (-0.650)	0.0787 (0.2694)
Sichuan	-0.0067 (-1.392)	0.1223 (0.3277)
Yunnan	-0.0101 (-2.036)**	0.0935 (0.2911)
Gansu	-0.0034 (-0.527)	0.0577 (0.2331)
R ²	0.1008	
Adjusted R ²	0.0953	
F(40, 6547)	22.29***	
Number of observations	6588	

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party members, females aged 66 and over, Jiangsu province and other types of households.

(2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.

(3) Instruments are ownership of telephone and type of house; see Appendix 4.1 for first stage regression results.

As expected, children who are not enrolled in school do not affect the pattern of household expenditure on education (Table 4.10). A larger proportion of household resources is spent on girls aged 16-18 regardless of the type of school (middle level professional school or upper middle school) than on boys of the same age-group and enrolled in the same schools (all coefficients are significant at the 1% level).¹³¹ Joint F-tests on these sets of coefficients reject the null hypothesis that they

¹³¹ In order not to omit observations, we include those children aged 16-18 enrolled in college and in professional school. There are 11 men enrolled in college and above and another 11 in professional school. There are 12 women enrolled in college and above and 19 in professional school. Despite

are equal for boys and girls of the same age groups. We find that the coefficients for each set of boys and girls of the same age groups are statistically different. These results confirm the results of our original estimation in which academic and professional schools are considered together.

We conclude that parents spend more on the education of sons than daughters who are aged 13-15 on account of men receiving higher rates of return to education. However, parents spend more on daughters than sons aged 16-18 in both types of upper secondary school. The evidence suggests that higher rates of return to education cannot be the motivation in the latter case because men earn higher returns than women in upper middle school. Of the possible explanations, it is also plausible that there are different kinds of families in the sample. The parents who spend more on daughters aged 16-18 may have also spent more on daughters at the time when they were aged 13-15 than on sons of the same age groups. However, we are unable to test this outcome without panel data for the same families from previous years.

Therefore, the first hypothesis that parents will invest in children who have higher returns to education is supported partially – for children aged 13-15, but not for those aged 16-18. Finally, there may be a second set of returns that we have not considered.

their small numbers, the coefficients on educational expenditure on sons and daughters who are enrolled in college are positive and significant (at the 5% and 1% levels, respectively). The coefficient for girls in college is almost twice as large than that of boys. For those attending professional school, we find that the coefficient on girls is positive and significant (at the 1% level), but not significant for boys. This lends additional evidence that more is spent on girls than boys aged 16-18 regardless of the type of school.

4.4.3 Testing the Hypothesis of “Familial Rates of Return” Through Assortative Mating

Table 4.11 gives the educational background of married couples. Men and women are more likely to marry someone with the same educational attainment than someone of any one other level of education. There are three exceptions. More men of middle level professional school attainment marry women with a lower middle school education than women with comparable educational attainment, suggesting that they tend to marry below their level of education. The other two exceptions indicate that women are more likely to marry above their own level of educational attainment. More women who completed primary school tend to marry men with a lower middle school education than men who complete only primary school, while women who completed less than primary school tend to marry men who a primary school education rather than men of comparable educational attainment. The result is not surprising when we consider that there is a lower supply of better-educated women.

Table 4.11
Educational Attainment of Spouses in Urban China, 1995
(number of observations of married couples)

Men \ Women	College and Above	Professional School	Middle Level Professional School	Upper Middle School	Lower Middle School	Primary School	Less than Primary School
College and Above	60.47/24.76 (182)	15.28/4.22 (46)	7.31/2.30 (22)	7.64/1.79 (23)	3.65/0.55 (11)	0.66/0.39 (2)	0.00/0.00 (0)
Professional School	18.51/16.87 (124)	41.04/25.25 (275)	15.07/10.55 (101)	12.23/6.37 (82)	8.51/2.83 (57)	1.19/1.54 (8)	0.30/3.33 (2)
Middle Level Professional School	18.51/16.87 (148)	23.69/21.21 (231)	22.97/23.41 (224)	15.08/11.41 (147)	16.92/8.18 (165)	1.74/3.28 (17)	0.21/3.33 (2)
Upper Middle School	8.04/15.51 (114)	16.57/21.58 (235)	13.61/20.17 (193)	34.70/38.20 (492)	21.72/15.27 (308)	1.48/4.07 (21)	0.00/0.00 (0)
Lower Middle School	4.92/15.10 (111)	10.34/21.40 (233)	12.69/29.89 (286)	16.90/29.58 (381)	45.70/51.07 (1030)	5.90/25.63 (133)	0.49/18.33 (11)

Primary School	4.20/5.03 (37)	5.44/4.41 (48)	11.45/10.55 (101)	12.47/8.54 (110)	35.60/15.57 (314)	25.17/ 42.77 (222)	1.13/16.67 (10)
Less than Primary School	2.67/1.09 (8)	3.67/1.01 (11)	6.00/1.88 (18)	9.67/2.25 (29)	27.33/4.07 (82)	32.67/18.88 (98)	10.00/ 50.00 (30)

Source: Urban Household Survey, 1995.

Note: The largest percentage within each educational level is in bold type, where the percentage of women of each level of educational attainment in rows that marry men of the educational level corresponding to each column is denoted first. The percentage of men by educational attainment in columns that marry women of each educational level corresponding to each row is denoted second. The notation is the percentage of women of each educational level that marry men of each educational level/percentage of men of each educational level that marry women of each educational level.

Table 4.11 shows that 82.3% of women of each level of educational attainment marry at or above their own educational level, while it is less (55.5%) for men. In the absence of perfect assortative mating, parents have only a probabilistic expectation that a child will marry a spouse with comparable education based on the distribution of the educational attainment of spouses in the current cohort of married couples. We explore the implications for children’s expected future household income.

Using the earnings functions estimated in Table 4.8C, we first predict mean annual income for men and women with each level of educational attainment standardising for the characteristics of their respective samples. This is given in Table 4.12. The predicted annual mean income of the children’s likely future spouse is the predicted annual mean income of men and women weighted by the probabilities of marrying a spouse who has attained each educational level based on Table 4.11. In other words, a woman with educational attainment at or above the college level has a 60.47% chance of marrying a man who has attained the same level of education, a 15.28% chance of marrying a man with a professional school education, a 7.31% chance of marrying a man of middle level professional school educational attainment, a

7.64% chance of marrying a man who has completed upper middle school, a 3.65% chance of marrying a man who has completed lower middle school, a 0.66% chance of marrying a man with a primary school education and probability of naught of marrying a man with less than primary school education. These weights are multiplied by the respective predicted annual mean income of men who have completed each level of education. If there were perfect assortative mating, then column (1) would equal column (4) and columns (2) and (3) would be equal in Table 4.12.

Table 4.12 Predicted Mean Annual Income of Children and of their Likely Future Spouses in Yuan					
Children's Level of Educational Attainment	Sons (1)	Daughters (2)	Male-Female Earnings Differential	Sons' Future Spouse (3)	Daughters' Future Spouse (4)
College and Above	7,528.38	7,028.11	7.12%	5,732.31	6,664.72
Professional School	6,622.82	6,302.31	5.09%	5,701.34	6,242.95
Middle Level					
Professional School	5,994.66	5,812.54	3.13%	5,492.40	6,220.49
Upper Middle School	5,528.95	5,423.29	1.95%	5,368.68	5,729.30
Lower Middle School	5,575.43	5,359.46	4.03%	5,206.68	5,641.78
Primary School	5,487.37	5,091.43	7.78%	4,811.91	5,463.87

Source: Urban Household Survey, 1995.
 Note: Author's calculations based on Tables 4.8C and 4.11.

Predicted mean annual income is higher for sons than daughters with the average characteristics of the sample for all educational levels (Table 4.12). This has the effect of causing the likely future spouses of daughters to have higher expected mean annual income than those of sons. The combined income of the child and that of their likely future spouse's generates an expectation of the child's future household income from which parents may obtain transfers, shown in Table 4.13.

Table 4.13
Predicted Mean Annual Household Income of Children in Yuan

Children's Level of Educational Attainment	Sons' Future Household (1)	Daughters' Future Household (2)	Daughters'-Sons' Household Income Difference (2)-(1)
College and Above	13,260.69	13,692.83	432.14
Professional School	12,324.15	12,545.25	221.10
Middle Level Professional School	11,487.05	12,033.03	545.98
Upper Middle School	10,897.64	11,152.58	254.95
Lower Middle School	10,782.10	11,001.24	219.14
Primary School	10,299.27	10,555.30	256.03

Source: Urban Household Survey, 1995.

Note: Author's calculations based on Tables 4.8C, 4.11 and 4.12.

Table 4.13 gives the predicted mean annual income for the future households of daughters and sons based on their respective expected mean income and that of their likely spouse [column (1) in Table 4.13 is the sum of columns (1) and (4) in Table 4.12, while column (2) in Table 4.13 is the sum of columns (2) and (3) in Table 4.12].¹³² Expected mean annual household income is higher for daughters than sons for each level of educational attainment. These are static expectations and may not accurately reflect the rapid economic changes taking place in China in 1995. However, to the extent that parents act on available information, this exercise is useful in attempting to gain an understanding of parental expectations of future transfers.

We find that the smallest difference between the expected future household income of sons and daughters is for those who have completed lower middle school, while the largest difference is for those who have completed middle

¹³² In a British study, Harper (2000) takes a similar approach in predicting household income in the context of estimating the effect of beauty on earnings and on the probability of marriage. He finds that attractiveness generates not only earnings differentials for individuals but also affects their expected future household income when compared with less attractive individuals.

level professional school. This coincides with our finding that parents invest more in sons than daughters aged 13-15 (corresponding to lower middle school) but more in daughters than sons aged 16-18 (corresponding to upper secondary school).

Thus, at the level of lower middle school, sons have higher personal rates of return to education than daughters coupled with the smallest difference as between their future expected household income. For upper secondary school, daughters have lower or nearly comparable returns to education as sons, but the largest expected differential in terms of their future household income. This provides some evidence that both the personal and familial rates of return are present in the parental investment decision, and that one effect may dominate the other depending on the magnitude of the differences in the effects.

The evidence of imperfect assortative mating and the unitary household decision-making model of resource allocation together suggest that investing in daughters at the upper middle school level increases parental utility through a familial rate of return. By law, the spouses of children have an obligation to support their parents-in-law.¹³³ In addition, approximately 80% of all persons are employed in the state sector in urban China that provides pensions.¹³⁴ This may reduce some of the tendency to favour sons over daughters that arises in rural China, which lacks pension schemes and has a greater adherence to traditional preferences for boys discussed earlier. When also considered in light of the large number of families with one child,

¹³³ See The Protection of the Rights and Interests of Old People Law (October 1, 1996), particularly Article 11: "Children and their spouses are both to support their parents both financially, spiritually and of their particular needs." There is a counterpart in the criminal law providing for sanctions.

¹³⁴ Of the 15,233 employed individuals, the workplace is SOEs for 12,157 persons.

there may also be a diminished expectation of relying on sons in old age. This is further bolstered by the study of *guanxi* in China in which there is some evidence that women are more likely than men to engage in *renqing*, which includes the giving of cash and other gifts to their parents.

4.5 Conclusion

The proportion of household resources allocated to children's education in urban China in 1995 is not well explained by examining only returns to education or a preference for boys. If a bias for sons were the governing motivation, then we would not expect to find more expenditure on the education of daughters aged 16-18. Rather, the evidence suggests that parents are efficient investors in accordance with our hypotheses.

First, there are different rates of return to education for men and women. Consistent with the first hypothesis and with the predictions of human capital models (see Becker 1993 [1964]), parents are expected to invest accordingly. However, this did not hold for children aged 16-18 (the age-groups best corresponding to upper secondary school), although it was true for children aged 13-15 (best corresponding to lower middle school). Our first hypothesis is supported by finding parental expenditure on education to be higher for boys than girls aged 13-15, in line with the higher rates of return to education for men than women. By spending more on sons than daughters of those ages, parents are investing efficiently. However, this interpretation leaves the puzzle of girls aged 16-18.

There are several possible explanations, one of which is that returns to middle level professional school are slightly higher for women than for men. Parents act on rates of return to their investment, so it is efficient to spend more on daughters enrolled in middle level professional school. However, household expenditure on education is higher for girls than boys aged 16-18 regardless of the type of school – for both middle level professional school and upper middle school. Yet, men have higher rates of return to upper middle school than women.

We explored whether if there is a second set of returns parents consider when investing – that is, transfers from the children's future household. There may be an effect from marriage under favourable assortative mating that has not been taken into account. Future household income of the children generates transfers and comprises one component of the utility function of parents in retirement when they are concerned about their consumption. Thus, conventional estimates of returns to education may not adequately capture parental utility in this context.

In support of the second hypothesis, we find more household expenditure on the education of girls than of boys aged 16-18. Girls who successfully enter upper secondary school have a likelihood of marrying primary income providers of comparable education, and parents expect an augmenting effect in terms of their daughters' future household income on account of the same perceived gender earnings differential. Women also tend to maintain a family's social network; thus making it more likely that daughters rather than sons will provide transfers, while favourable assortative mating increases the expected amount. Finally, because we do not find

evidence of a bargaining model of intrahousehold resource allocation, household income may be shared at least concerning expenditures, such as transfers to parents.

Therefore, it is plausible that the personal and the familial rates of return are present in every investment decision. The larger expected future household income of daughters may temper the higher returns to education for sons if parents gain utility both from knowing that their children will earn income generated by human capital investment and also that there are future transfers from that income.

In conclusion, there are some – but not large – gender differences in the educational enrolment of school-aged children in urban China. We find, rather, that there are significant differences in household expenditure patterns on the education of sons and daughters. Parents appear to consider two rates of return – personal and familial – when choosing to forgo consumption and spend on education. For boys aged 13-15, their higher rates of return to education are likely to explain the larger amounts spent on their education than on girls. For girls aged 16-18, their prospects of favourable assortative mating and greater future transfers may explain the larger expenditure on their education relative to boys. For both age groups, our interpretation implies that parents are acting efficiently.

Finally, despite more expenditure on the education of girls than boys aged 16-18, there is evidence that girls have higher attrition rates beyond lower middle school, are more likely to be enrolled in professional than academic schools, and expect lower returns to this education than boys. Therefore, we find pre-labour market gender differences in urban China are the likely result of perceived future

earnings inequality that may in turn cause these children to receive unequal investment in their human capital prior to entering the labour market.

Appendix 4.1 First-Stage Results for the Two-Stage Least Squares Intrahousehold Resource Allocation Models¹³⁵

Table 4.1.1

Instrumenting for Household Expenditure Per Capita		
Dependent Variable: Log of Household Expenditure Per Capita	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	7.7613 (81.160)***	8.1366 (0.7323)
<u>Household Characteristics:</u>		
Ownership of telephone ¹³⁶	0.1330 (14.762)***	1.7277 (0.9265)
One-generation household	0.6610 (7.094)***	0.1552 (0.3622)
Two-generation household	0.1917 (2.099)**	0.7816 (0.4132)
Three-generation household	0.0262 (0.270)	0.0556 (0.2291)
<u>Provinces:</u>		
Beijing	0.2075 (5.437)***	0.0721 (0.2587)
Shanxi	-0.4150 (-11.743)***	0.0937 (0.2915)
Liaoning	-0.1107 (-3.211)***	0.1010 (0.3013)
Anhui	-0.2582 (-6.830)***	0.0721 (0.2587)
Henan	-0.3637 (-10.081)***	0.0865 (0.2812)
Hubei	-0.0910 (-2.671)***	0.1070 (0.3091)
Guangdong	0.3609 (9.367)***	0.0787 (0.2694)
Sichuan	-0.0865 (-2.616)***	0.1223 (0.3277)
Yunnan	-0.1260 (-3.587)***	0.0935 (0.2911)
Gansu	-0.3327 (-8.113)***	0.0577 (0.2331)
R ²	0.1860	
Adjusted R ²	0.1843	
F(33, 6854)	112.15***	
Number of observations	6888	

Source: Urban Household Survey, 1995.

Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party members, females aged 66 and over, Jiangsu province and other types of households. Not all variables are reported for brevity.

(2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.

(3) Heteroskedasticity-consistent robust standard errors are computed.

¹³⁵ Household expenditure per capita and the number of household members are endogenous based on the results of the Durbin-Wu-Hausman test. We instrument for these variables (see Deaton 1997).

¹³⁶ There are four outcomes for ownership of telephone, ranked as follows: no telephone, telephone publicly paid for, private telephone and public telephone.

Table 4.1.2
Instrumenting for the Number of Household Members

Dependent Variable: Log of Number of Household Members	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	1.3758 (53.586)***	1.1063 (0.2683)
<u>Household Characteristics:</u>		
Type of house ¹³⁷	0.0053 (4.228)***	4.3238 (1.7279)
One-generation household	-0.7434 (-29.789)***	0.1552 (0.3622)
Two-generation household	-0.2357 (-9.631)***	0.7816 (0.4132)
Three-generation household	0.0071 (0.272)	0.0556 (0.2291)
<u>Provinces:</u>		
Beijing	-0.0246 (-2.431)**	0.0721 (0.2587)
Shanxi	0.0384 (4.093)***	0.0937 (0.2915)
Liaoning	0.0072 (0.776)	0.1010 (0.3013)
Anhui	-0.0113 (-1.122)	0.0721 (0.2587)
Henan	0.399 (4.163)***	0.0865 (0.2812)
Hubei	-0.0004 (-0.039)	0.1070 (0.3091)
Guangdong	0.0414 (4.195)***	0.0787 (0.2694)
Sichuan	-0.0186 (-2.119)**	0.1223 (0.3277)
Yunnan	-0.0049 (-0.519)	0.0935 (0.2911)
Gansu	0.0190 (-1.743)*	0.0577 (0.2331)
R ²	0.1340	
Adjusted R ²	0.1297	
F(33, 6897)	30.74***	
Number of observations	6931	

Source: Urban Household Survey, 1995.

- Notes: (1) Omitted dummy variables are: female household head, households without any Communist Party members, females aged 66 and over, Jiangsu province and other types of households. Not all variables are reported for brevity.
(2) *** denotes statistical significance at 1% level, ** at 5% level, and * at 10% level.
(3) Heteroskedasticity-consistent robust standard errors are computed.

¹³⁷ There are seven outcomes for the type of house, ranked as follows: single family unit with auxiliary rooms, one bedroom apartment, two bedroom apartment, three bedroom apartment, four bedroom apartment, ordinary apartment unit without or with shared kitchen and toilet, and single storey house or rooms without auxiliary rooms.

Chapter 5

Labour Market Inequality – *Guanxi* and Employment Outcomes

In an attempt to understand gender inequality within the urban labour market, in this chapter we explore the relationship among *guanxi*, opportunities and employment outcomes for men and women using an original data set designed for this purpose.

The first section surveys the impact of recent reform of the state-owned sector on employment in urban China, the context of our survey. The next section presents an investment model of social capital, together with a game-theoretic formulation of cooperative relationships and an analysis of the effect of social capital on labour supply. This is followed by the results of testing the remaining social capital and labour market hypotheses of the thesis. The final section concludes. In an appendix we provide for reference the pertinent questions on social networks and social capital from the survey of urban households in China conducted in February/March 2000 and pertaining to 1999.

5.1 Employment in Urban China

One of the pressing economic issues in China is the current large-scale reform of state-owned enterprises and the associated layoffs of workers. These

workers are the focus of our study because they have had to undertake job search and explore the confines of the urban labour market. We discovered during fieldwork that they are categorised under different guises of not being formally employed (“not in post”). This section discusses some of these forms of “not in post.”

There are multiple categories of nonemployment – only a part of which is being officially unemployed. They include: (1) those who are officially registered as unemployed; (2) *xiagang* workers; (3) those who are on “long vacation” – *ligang* workers; (4) youths waiting for work; and (5) those who take early retirement. As of September 2000 (the latest figures available), there were an estimated 22 million individuals who fall within these categories, including approximately seven million *xiagang* workers (MOL 2000c; NBS 2000a). This dwarfs the official urban unemployment rate of 5.85 million (3.1%). However, the nonemployment figure seems to better reflect the labour market situation in urban China.

Xiagang is a relatively recent phenomenon, the category and the term having been introduced in 1997. *Xiagang* workers are still officially registered with their work units, but no longer work (see Mo 1999). In theory, every SOE with *xiagang* workers is obliged to establish a re-employment centre to provide training and assist with job search for a period of three years (Yang and Xin 1999; MOL 2000c¹³⁸). The re-employment centres often do not provide access to suitable jobs. Those who are officially registered as *xiagang* are also entitled to a basic monthly stipend, estimated at RMB100-300 (Yang and Xin 1999). This is to be paid for by a “3-3

¹³⁸ As of September 2000, approximately 91.8% of *xiagang* workers were reported to have participated in re-employment centres (MOL 2000c).

System,” in which the central government, the enterprise and the local government are each responsible for one-third of the sum (MOL 2000c). In actuality, the enterprise is responsible for 40-50% of the basic living stipend (Yang and Xin 1999). However, because most SOEs are unprofitable or bankrupt, many could not and did not fulfil their obligations.¹³⁹

Whereas *xiagang* is well known, we uncovered a new form of nonemployment – *ligang* – during fieldwork. *Ligang* was recently introduced in some areas because some enterprises could not meet their financial obligations to *xiagang* workers. Officially, the difference between *xiagang* and *ligang* is that *xiagang* workers are registered and entitled to a basic living stipend, whereas *ligang* workers are not registered by their work unit as *xiagang* and do not receive any stipend. Both groups of workers are entitled to receive medical, housing and old age benefits since they are formally still part of their *danwei* although they do not go to work. The distinction between *xiagang* and *ligang*, moreover, appears not to be clear to the workers themselves. Many of the respondents we encountered during fieldwork labelled themselves as *xiagang* in status, even though they are not registered as such

¹³⁹ The official statistic reported by the Ministry of Labour is that 97.3% of all *xiagang* workers received their basic living stipend as of September 2000 (MOL 2000c). However, the official figure seems high from our anecdotal observations during fieldwork. We estimated that more than 2-3% of the households we visited had not received any stipend. Further evidence to this effect is that the central government had allocated a sum of money that was distributed to *xiagang* workers about the time of the Fiftieth Anniversary of the Founding of the People’s Republic of China (1 October 1999) to ease the situation of *xiagang* workers who did not receive support. Also, during our fieldwork in early 2000, we heard that there had been some unrest in Liaoning by *xiagang* workers. To “extinguish fires,” the central government had set aside a sum of money specifically to be distributed to them.

and have not collected any stipend.¹⁴⁰ In reality, regardless of the status of *xiagang* or *ligang*, the work unit is often in a state of financial difficulty with the result that even the social securities to which they are entitled are not provided (Yang and Xin 1999).

The category of youths waiting for work is another interesting facet of the former system of allocated jobs. After a certain period of time, they may plausibly be considered nonemployed.¹⁴¹ Those who have taken early retirement may have done so involuntarily. Early retirement can occur as early as when a worker is in her 30s (see Solinger 2000), suggesting that it may also constitute a form of nonemployment.

These aspects of nonemployment may play a role in the growing inequality in income as between men and women. To the extent that *guanxi* generates opportunities within imperfect labour markets, we investigate whether there are gender differences in the accumulation of and returns to social capital. In the following section, we present a model of individual investment in social capital, sketch a game-theoretic formulation of repeated cooperation, and develop a theory of differential employment opportunities associated with social capital that can affect the elasticity of labour supplied to a firm.

¹⁴⁰ During our fieldwork, a local official in Liaoning estimated that of the total number of workers who are *xiagang* or *ligang*, about one-third are *xiagang* and the majority are *ligang*. These proportions may be particular to Liaoning.

¹⁴¹ The majority of models of transition from school to work involve job search (for example, see Wolpin 1987). This remains an interesting course of further study because youth in China did not search for work but wait for it on account of the former system of allocated jobs. Their behaviour, therefore, is unlike existing models of youth unemployment.

5.2 A Model of *Guanxi*

Although the current approach to social network and social capital tends to model these concepts at a community level (for example, see Narayan and Cassidy 1999 and Dasgupta 2000), we argue that a model of individual decision-making can better explain the choices that people make with respect to accumulating this form of capital.¹⁴² We view social capital as individual investments in relationships, which can provide positive returns in the labour market as well as noneconomic benefits from cultivating good relationships. The model is premised on the basic tenets of human capital models (Schultz 1961, Becker 1993 [1964]), and advances the notion that social capital is an individual-level decision with implications at the community level when returns from others are sought in either or both economic and noneconomic contexts. In other words, the degree of cooperation in reciprocating investments in social capital can be thought of as indicative of the amount of social capital in a community. The advantage of this measure over norms-based questions regarding trust, for instance, is that it is more measurable in both stock and returns.¹⁴³

¹⁴² Following the completion of this model and presentation at the Labour Economics Seminar, University of Oxford, in Michaelmas Term 1999, we read an independently formulated and similar approach by Glaeser, Laibson and Sacerdote (2000). Both models change direction from the predominant view of social capital by focusing on the individual decision to invest and are based on human capital models. There are numerous differences – a notable one is the definition of social capital. Glaeser, Laibson and Sacerdote (2000: 4) define social capital as “a person’s social characteristics – including social skills, charisma, and the size of his Rolodex – which enable him to reap market and non-market returns from social interactions with others.” Our definition, as noted in Chapter 2, is simpler and more measurable. Social capital is defined as the relationships that an individual has (stock) and maintains (flows) in a social network. A social network is the number of persons an individual knows and interacts with from time to time. Other differences include our modelling of social capital as a repeated cooperative game that has potential to characterise a group, a community or a society.

¹⁴³ One argument for the better explanatory power of an individual approach to social capital is that when surveys ask respondents about general levels of trust, the answers reflect individual perceptions (for example, see the World Values Survey explored in Knack and Keefer 1997; Zak and Knack

The connection between social capital and income can be traced to Becker (1993 [1964]). He sought to investigate the distribution of opportunity and ability that underlie the returns to human capital. Our formulation makes an attempt to investigate opportunities by viewing a person's options as at least partly determined by his social capital. Specifically, social capital is a conduit for information, connections and other types of access that can generate opportunities to realise economic returns on productive abilities. Opportunities are thought to increase the options that a person has in the labour market and so to increase the elasticity of his labour supply, which affects earnings in imperfect labour markets characterised by frictions. Differential reduction in frictions can be associated with social capital and may cause differential employment outcomes for otherwise equally productive individuals.

5.2.1 Optimal Lifetime Investment in Social Capital

An individual investing in social capital can view it as a cost-benefit decision, weighing present expenditures in terms of time and physical (*e.g.*, monetary and in-kind gifts) as well as non-physical resources (*e.g.*, emotions, attachments), against the present value of future expected benefits in the form of economic and noneconomic returns. There are certainly many noneconomic – cultural, emotional, social, etc. – benefits derived from relationships. However, there may also be economic aspects to social capital that have been largely unanalysed. For instance,

2001). Norms-based notions of social capital likely reflect the perceived degree of reciprocated relationships in a community based on an individual's own amount of social capital and his assessment of the social capital of others.

Arrow (2000: 3-4) states that the “essence of social networks is that they are built up for reasons other than their economic value to the participants (... that much of the reward for social interactions is intrinsic)... this is not to deny that networks and other social links may also form for economic reasons. One line of reasoning is that the social networks guard against market failure....” He goes on to point out that modern economic theory emphasises that “the market needs supplementation (for efficiency) by nonmarket relations. This is true for the firm, and also true in markets in which personal relations are important...” (Arrow 2000: 5; see also Dasgupta 2000¹⁴⁴).

Akin to human capital models, the investment cost of social capital consists of the direct and opportunity costs, as well as risk and liquidity premiums (Becker 1993 [1964]). The actual cost of the investment can be either or both monetary and nonmonetary. The risk premium will tend to be more variable than that of human capital since the uncertainty of returns is compounded by the reliance on others for returns. We address this issue in the next section in which social capital is analysed as a cooperative game. Finally, social capital, again like human capital, tends to be illiquid because typically it cannot be used as collateral for a loan or other such security and if so used would warrant a high liquidity premium.¹⁴⁵

¹⁴⁴ Dasgupta (2000: 381) points out that the returns can be economic and unanticipated: “One can imagine that many of the benefits and costs of joining a network and continuing one’s membership are unanticipated. The immediate motivation could be direct pleasure (for example, enjoyment in relating to someone or being a member of a congenial group); its economic benefits an unanticipated side effect. But the direction could go the other way (for example, joining a firm and subsequently making friends among colleagues).”

¹⁴⁵ One example is that a contact may act as a guarantor for a loan or other property.

We assume that a person will live n periods. Her utility, U_g , depends on her consumption over time of commodities, as in

$$U_g = U_g(C_1, \dots, C_n), \quad (5.1)$$

where C_g is the amount of the commodity consumed in period g . The commodity, C_g , is produced at home with inputs consisting of her market goods and time. Let the composite market goods used in period g be x_g , and the composite amount of time combined with x_g be t_{c_g} . Then,

$$C_g = f(x_g, t_{c_g}), \quad g = 1, \dots, n, \quad (5.2)$$

where f is the production function in period g .

A person's time can be allocated among labour market activity (*e.g.*, wage employment [work]), nonmarket consumption activity (*e.g.*, reading [leisure] or cooking a meal [home work]) or social activity (*e.g.*, chatting with friends or giving gifts [investing in social capital]). She produces social capital by investing some of her time and goods to cultivate relationships. The rate of change in her capital equals the difference between her rate of production and the rate of depreciation on her stock.¹⁴⁶

This is represented by

¹⁴⁶ There is some debate as to the appropriate depreciation rate. One issue has to do with location-specific social capital. We maintain that in the same way firm-specific human capital depreciates at a faster rate than general human capital with job change, the same can occur with social capital if an individual moves. These are shocks in a sense but our general solution holds, just as in models of human capital.

$$o_g = f(t_{s_g}, x_{s_g}), \quad (5.3)$$

where o_g is the output of social capital in the g^{th} period, and t_{s_g} and x_{s_g} are the time and goods inputs, respectively. As a simplification, let the composite amount of time combined with x_{s_g} be t_{s_g} .¹⁴⁷ Then,

$$S_{g+1} = S_g + o_g - \phi S_g, \quad (5.4)$$

where S_{g+1} is the stock of social capital at the beginning of the $g+1$ period, S_g denotes the stock of social capital at the beginning of the g^{th} period, and ϕ is the rate of depreciation. Each person maximises the utility function (5.1), subject to the production constraints in (5.2), (5.3) and (5.4), and to the following time and goods (budget) constraints

$$t_{c_g} + t_{w_g} + t_{s_g} = t, \quad g = 1, \dots, n, \quad (5.5)$$

$$\sum_{g=1}^n [(x_g + x_{s_g})/(1+d)^g] = \sum_{g=1}^n [w_g t_{w_g} + v_g]/(1+d)^g, \quad (5.6)$$

where x_{s_g} is expenditure on social capital investment, x_g is expenditure on market goods, $x_{s_g} + x_g$ is the expenditure on goods that must equal income in present value terms, d is the interest rate, w_g denotes the wage in period g , v_g is the amount of

¹⁴⁷ This follows Becker's simplification in human capital models (Becker 1993 [1964]). Empirically, our input is an index of time, closeness and gifts, which mirrors the theoretical formulation.

nonlabour income in period g , s_g is the payment per unit of social capital in period g , t_{c_g} and t_{w_g} respectively represent the amount of time spent in consumption and work while t_{s_g} denotes the time spent investing in social capital in g , and t is the total time available. For simplicity, f is assumed to be the same in all periods and o_g is assumed to depend only on t_{s_g} .¹⁴⁸ Also assuming nonzero values, the first order optimality conditions are

$$(\partial U_g / \partial C_g)(\partial f / \partial x_g) = \lambda [1 / (1+d)^g], \quad g = 1, \dots, n, \quad (5.7)$$

$$(\partial U_g / \partial C_g)(\partial f / \partial t_{c_g}) = \lambda [w_g / (1+d)^g], \quad g = 1, \dots, n, \quad (5.8)$$

$$0 = \lambda \{ [w_g / (1+d)^g] - \sum_{N=g+1}^n \{ [s_N t_{w_g} / (1+d)^N] [\partial S_N / \partial t_{s_g}] \}, \quad (5.9)$$

where λ is a Lagrangian multiplier equal to the marginal utility of wealth.

In equilibrium, equation (5.7) shows that the marginal utility of consumption of market goods depends on the interest rate, time preference and substitution between goods and time. The marginal utility of an additional hour of consumption, as seen in equation (5.8), is additionally affected by the wage. The path of these marginal utilities depends on the elasticities of substitution between goods and time in consumption and production.¹⁴⁹ Regarding investment in social capital,

¹⁴⁸ Following Becker (1993 [1964]), this is because we simplify the output of social capital to depend only on time (formulated as a composite of time and market goods).

¹⁴⁹ In the context of investment in human capital, Becker (1993 [1964]) shows the marginal utility of an additional hour of consumption falls with age until the age of the peak wage rate and then will increase, with its path dependent on the elasticities of substitution in consumption and production.

equation (5.9) expresses the equilibrium condition that the present value of the marginal cost of investing in social capital equals the present value of future returns. Following Becker's solution, recall that we simplified the input into the production of social capital as a composite of time and market goods. Thus, the theoretical cost is forgone earnings which is equal to the shadow price of time. In actuality, the shadow price of time consists also of the cost of market goods, so that the investment cost is forgone earnings plus expenditures. The return is equal to the shadow price of an hour of work or wages ($w_g = s_g S_g$). Therefore, the investment in social capital tends to decline with age for two reasons, one on the returns side and one on the cost side. The number of remaining periods will decrease with age so there will be fewer periods to enjoy the returns. Moreover, the cost of investing will tend to increase with age, *i.e.*, as S_g rises, forgone earnings will rise assuming an increasing age-earnings profile up to the age of the peak wage rate. There may also be an income effect in that as income rises, individuals are willing to forgo earnings to invest in social capital.

If women have more home work obligations, then they have less time (more constrained by equation 5.5) and as secondary earners have fewer monetary resources (more constrained by equation 5.6). In equilibrium, as seen in equations (5.7) and (5.8), they can afford fewer market goods and also have less time with which to invest in social capital. As a result, women invest less than men when they equate the marginal cost and returns per equation (5.9) and will have less social capital.

5.2.2 *Guanxi* as a Repeated, Cooperative Game

We recognise that this form of capital most likely entails reciprocity to generate both economic and noneconomic returns. Some returns may not require reciprocity because an individual can gain utility from investing in a relationship on account of altruism, for instance. For the most part, even noneconomic returns, such as friendship, will necessitate reciprocity at some future point. This suggests an additional uncertainty to the payoffs, and also that there are risks to consider in investing in another person who may not wish to reciprocate. A formulation of *guanxi* as a repeated, cooperative game may capture the dependence on the reciprocity of others for returns to social capital. We sketch an outline of a proposed game and leave its formal development as one potential extension of this thesis.

Our approach would differ from existing games of gift-giving in that the gift-giving aspect of *guanxi* is neither inefficient (Camerer 1988) nor inefficient and irrational (Carmichael and MacLeod 1997). Camerer (1988) argues that gifts are economic signals that a person intends to enter into a relationship, and are inefficient in that they serve not only as the commitment, but also as a signal to distinguish his type from the non-committed. Therefore, he argues, gifts are inefficient but are a way to reduce risk. Carmichael and MacLeod (1997) argue gifts are inefficient because individuals are conditioned to follow what has been done in the past. Thus, individuals inherit certain traditions and patterns of behaviour that compromise their rationality and cause them to make gifts, though inefficient. They use this framework to explain why gifts are given instead of cash (the more efficient approach) and why gifts are

wrapped. This does not serve an efficiency function, in their view, and is thus irrational.

Our model posits that gift-giving is one form of investment in social capital and is efficient because the payoffs are the von Neumann-Morgenstern formulation of linear utilities rather than the monetary value of the gift itself. If the payoffs are in the form of utilities, then the process of gift wrapping need not be irrational. Insofar as nice packaging represents the care and time that was put into the gift, the individual who makes the gift is able to convey her intention to invest both monetary and nonmonetary resources. Thus, wrapped gifts can increase utility and be efficient if individuals desire to enter into repeated, cooperative relationships. As immediate reciprocity is not sought, the investment is general in nature because the player seeks to develop a relationship over time. Each nonmonetary expenditure or gesture can potentially add to the utility of the other players. Instead, if cash were given – the form both Camerer (1988) and Carmichael and MacLeod (1997) argue is more efficient – then the intention may be too clear and in certain settings may constitute a bribe or cause disutility by seemingly to make a specific investment in contemplation of a particular return.

We agree that the challenge is coping with the risk that the recipient of the gift or time spent will not consider the act as an investment but as a one-shot gain. For instance, Camerer (1988) suggests that in mating, an individual will desire to give gifts to others who are interested in entering into a relationship rather than just taking the gift and not committing. In *guanxi* relationships, an individual likewise would generally prefer to invest time and monetary as well as nonmonetary resources in

another person who will consider cooperating at some point in the future. Considering the costly nature of the investment, an individual will want to learn about the potential recipient. Under incomplete information regarding another person's payoffs, the individual will wish to learn about a potential recipient's intentions.

In game theory parlance, *guanxi* can be modelled as a dynamic cooperative game of incomplete information – specifically, a finitely repeated Prisoners' Dilemma. It is dynamic because it can be a game of sequential as well as simultaneous moves. We are dealing with cooperative games because communication among players is permitted (von Neumann and Morgenstern 1947). The game is one of incomplete information in which at least one player is uncertain about another player's payoff function, as this is consistent with an inability to assess another person's utility function (Gibbons 1992). It is finitely repeated because individuals have terminable lifetimes (see Fudenberg, Kreps and Masin 1990 for a model in which the time horizons of the players differ¹⁵⁰), and a Prisoners' Dilemma because there are gains from cooperation so that it is a nonzero sum game. Finally, it is two-person game¹⁵¹ in which each player engages in simultaneous play with multiple opponents

¹⁵⁰ Fudenberg, Kreps and Masin (1990) conclude when there are both short-run and long-run players, *i.e.*, some players are playing an one-shot game, one solution of the cooperative game is the equilibrium that the long-run player prefers when there is one long-run and many short-run players. Their work demonstrates the complexity when players with different time horizons are introduced into the repeated Prisoners' Dilemma game. Our formulation assumes that every player is a long-run player since each maximises her lifetime social capital.

¹⁵¹ We assume only two types of players – those who invest in *guanxi* and those who do not. The reason for this is the difficulty in determining a general existence theorem for *n*-person cooperative games (see Lucas 1971). For our purposes, each *guanxi* transaction can be viewed as a two-person cooperative game because each investment in *guanxi* is undertaken by one individual with respect to another individual, with each person playing with any number of individuals. The equilibrium points for these games have been proven (Nash 1953).

(Fudenberg and Kreps 1987).¹⁵² Although a social network can encompass any number of persons, each unit of social capital consists of investing in one other player with a probabilistic expectation of cooperation in the future. These acts of engaging another person can be repeated n times over a lifetime. We further assume that the players' utility functions are linear, their strategy spaces are compact and convex (Nash 1950, 1953) and there exists a perfect Bayesian equilibrium¹⁵³ (Kreps and Wilson 1982). *Guanxi* may provide a stronger explanation of the equilibrium outcome of cooperation than that offered by reputation, as derived by Kreps, Milgrom, Roberts and Wilson (1982). The advantage of social capital is in specifically rather than generally indicating an intent to cooperate, which produces stronger Bayesian updating – the process that drives the equilibrium solution of cooperation found for finitely repeated Prisoners' Dilemma games.

Some further aspects of this game include a consideration of the difficulty of making interpersonal comparisons of utility in the structure of payoffs (*i.e.*, we do not assume a similar slope in the utility functions of the players). We would instead posit that the players have private information about all feasible strategies but not payoffs, which is consistent with the requirement of incomplete information. Thus, at each stage, each player recalls his previous actions and is informed of his opponent's actions. The players can move simultaneously or sequentially at each stage and the payoffs in the overall game are the undiscounted sums of the stage payoffs. This reflects the empirical conception of *guanxi* as an occasion in which a person will spend time or resources on another person and the other person will initiate or receive the

¹⁵² Fudenberg and Kreps (1987) showed that reputation effects dominate the play of the game when multiple opponents are faced simultaneously as well as sequentially.

gesture and reciprocate or even wait until the next stage to act. If the gesture is rejected, then no relationship is formed or a previously existing relationship is now less strong. The failure of a player to continue to engage in a relationship decreases the possibility of reciprocity and both sides would cease to invest in social capital with each other in the immediate aftermath. However, the relationship may be re-initiated at a future time. This expectation coincides with the Tit-for-Tat strategy proved to be the dominant strategy in Prisoners' Dilemma games (see Axelrod 1981).

Finally, by backwards induction, a finitely repeated Prisoners' Dilemma results in no cooperation and is subgame perfect. Axelrod (1981) showed that, in contrast to this theoretical prediction, empirical evidence suggests that cooperation occurs not infrequently in Prisoners' Dilemmas even over finite periods. Kreps, Milgrom, Roberts and Wilson (1982) proved that a model of reputation is consistent with an equilibrium outcome of cooperation for periods not too close to the end. In a repeated game of incomplete information, reputation serves the function of conveying information between two persons regarding the intention to cooperate and thereby increasing the probability of the cooperative equilibrium.

The advantage of *guanxi* over reputation in generating expectations of future cooperation lies in the conveying of specific rather than general information, as well as its cumulative nature – further suggesting more reliable indications of the intent to enter into a repeated, cooperative relationship. This is particularly important with respect to the requirements of a perfect Bayesian equilibrium. The equilibrium concept

¹⁵³ This means that each subgame is characterised by a Bayesian Nash equilibrium (Gibbons 1992).

of sequential equilibria (Kreps and Wilson 1982) requires that the action taken by any player at any point of the game must be part of an optimal strategy from that point forward – given his beliefs about the evolution of the game to this point which must be consistent with Bayesian updating. This is on the hypothesis that the equilibrium strategies have been used to date and that future play will be governed by the equilibrium strategies. In one sense, *guanxi* serves the same function as reputation and may be a better signal. Both are built over time and involve costs, but whereas reputation is based on general information, *guanxi* can be seen through an individual's investments – time, monetary and nonmonetary – that convey more reliable information regarding the *specific* intention to cooperate of the investing persons with regard to the intended recipients. A person who has the reputation of a general willingness to cooperate may not be interested in specifically cooperating in this instance, whereas the recipient of *guanxi* receives a direct signal that the investing person intends to cooperate with him. Finally, social capital is invested in over a lifetime so that the intent to cooperate increases with each interaction, producing stronger Bayesian updating each time.

5.2.3 Returns to Social Capital as Job Opportunities

We examine one form of economic returns in labour markets – social capital as generating job opportunities. This section formulates an empirical approach to some of the effects of social capital that are modelled theoretically in Chapter 2.

The supply of labour to a firm is affected by job opportunities.

Opportunities are viewed as options beyond the current job, such as alternative wage

employment, nonemployment or self-employment. Even under perfect information, there exist transaction costs such as the costs of job search that cause the supply of labour to be upward sloping with respect to a firm. Social capital reduces frictions, lowers search costs, and thus generates returns in the form of favourable job opportunities.

We use a simple labour supply function to show how social capital affects the labour supplied to a firm. Recall from Chapter 2 that the wage offered by a firm is a function of the average wage of the industry in which all firms are rent-seeking, the firm-specific production function and the labour supplies of heterogeneous groups. Labour supplied to a firm is a function of the firm-specific production function and the average wage in the industry faced by each group of labour, which is in turn affected by transaction costs and thus social capital.

A labour supply function takes the following form:

$$E(h_{i,k}|w_{i,k}) = E(h_{i,k}|w_{i,k}, h_i > 0) \times \Pr[h_{i,k} > 0|w_{i,k}, E(w_{i,b})], \quad (5.10)$$

where the i^{th} individual will supply hours, $h_{i,k}$, to the k^{th} firm conditional on the wage offered, $w_{i,k}$, and the probability that he will supply positive number of hours to this firm, which is conditional on both the offered wage and $E(w_{i,b})$, his expected average wage offers in the b^{th} industry¹⁵⁴ that are not specific to the k^{th} firm.¹⁵⁵

¹⁵⁴ Following our theoretical model in Chapter 2, the expected average wage offers are based on the industry. This is a stylistic simplification in keeping with our interpretation of rent-seeking firms within certain imperfectly competitive industries that coincide with supply-side frictions.

The first expression in equation (5.10) captures an individual's decision at the intensive margin in choosing between work and leisure, and the second term regards participation and employment choices at the extensive margin (see Heckman 1993). We modify the equation to model the hours of labour supplied to a firm, which affects the interpretation of the second term. If equation (5.10) is the decision of an individual to supply labour *to a firm*, then the second term is also influenced by job search and social capital.

Lower search costs will generate larger search parameters and a higher expected mean distribution of wage offers (see Chapter 2). Assuming similar preferences regarding work and leisure for men and women in the first term, we expect the group with lower search costs (larger value of the second term) will have more elastic labour supply functions (larger left-hand side value, indicating more change in hours per unit change in the wage). The conditional expectation reflects the importance of the expected wage distribution facing an individual when she decides at the extensive margin to continue to supply hours to a firm or to undertake job search. Therefore, the extensive margin decision is whether a worker stays with the current firm or leaves for another firm, nonemployment or self-employment. It becomes a matter of opportunities available to a worker and his degree of mobility that determines his search costs.

¹⁵⁵ In our dynamic model of discrimination, we model the labour supplied to a firm rather than to the market as a whole. Thus, nonlabour income, which is considered in labour supply functions with respect to the market as it affects the reservation wage, is implicit in the labour supply function with respect to a firm. The reason is when a worker leaves the firm – he may opt out of the market or take other employment – if the offered wage is less than the reservation wage or if the offered wage is less than expected wage minus search costs. In either event, the worker leaves the firm.

We argue that the greater share of home work causes women to have more familial obligations and additional mobility constraints, higher reservation wages and less investment in social capital. When the labour supplied is to the market as a whole, women are typically found to have more elastic labour supply curves because they choose more frequently not to participate in the labour market because of the greater share of home work (an additional use of time) than men and are secondary earners (more nonlabour income), and thus have higher reservation wages (see Killingsworth 1983). Women also have a higher likelihood of working at home and are likely to have more labour market interruptions than men (see Hakim 1998; Lee 1998a). Thus, employers may choose not to invest in training women as they have a higher likelihood of quits (see Black 1995; Bowles 1997; see also Chapter 2 where we discuss how differences in quit rates and differential investment in firm-specific capital can generate earnings differentials).

Opting out of the labour market generates zero hours supplied and thus greater responsiveness of hours to wage changes; therefore, a relatively more elastic labour supply. Our formulation models hours of labour supplied to a firm, so that the reservation wage argument is part of the decision to supply labour to a firm. Even with a greater likelihood of opting out of the labour market, this can be offset by a less favourable set of alternative wage offers outside a given firm. Women with fewer choices will change the labour they supply to a firm to a lesser extent than men. The relatively less elastic labour supply of women will cause them to experience less favourable employment outcomes than men. Social capital can exacerbate the

outcomes if the differential opportunities generated by this form of capital reduce frictions more for men than women.

In Chapter 3, we outlined the various ways in which social capital or *guanxi* can affect employment outcomes, such as labour mobility and earnings. We now investigate empirically these aspects of labour market gender inequality.

5.3 Hypotheses for Empirical Testing

The social capital and labour market hypotheses from Chapter 2 are restated here:

- *Women, on account of not being the primary income earners in the household and bearing more household responsibilities, will have less time and resources to invest in social capital than men (H_1).*
- *Women, with less social capital, will have fewer opportunities in an imperfect labour market and are less able to reduce the frictions causing the labour they supply to a firm to be upward sloping (H_2).*
- *The group with the relatively less elastic labour supply curve to a firm – women – will experience labour market discrimination (H_3).*

Two forms of labour market inequality –

- *Earned Income: Women will earn less income than men with equal productive characteristics (H_5^a).*
- *Re-employment: Women will be less likely than men to find re-employment after experiencing unemployment (H_5^b).*

The hypotheses pertaining to pre-labour market inequality, H_4^a and H_4^b , were tested in Chapter 4. Parental investment in children's human capital is affected

by perceived future income differentials, adding further implications to our analysis of within-labour market gender inequality. As discussed before, hypotheses H_2 and H_3 cannot be tested using this data set due to lack of information on hours worked. The evidence from our empirical testing will provide indirect support for the possible effects of social capital on labour supply and gender discrimination.

Our testing of the remaining hypotheses is in three parts. We first establish measures of social networks and social capital for men and women. Then, we estimate economic returns to these variables for two forms of labour market outcomes: earned income, and the probability of re-employment after experiencing unemployment. With this evidence, we investigate whether the group with the smaller social network and less social capital experiences less favourable labour market outcomes.

5.4 Labour Market Outcomes: Earned Income and Re-Employment

The following estimations of earned income and the probability of successful re-employment after experiencing unemployment will investigate gender differences by taking into account social capital and social network variables.

5.4.1 The Determinants of Earned Income

We estimate income functions for the combined sample and the subsamples of men and women that include social networks and social capital. We

investigate whether there are different returns to these variables for men and women.

The logarithm form of annual income gives the following expression for the i^{th} individual,

$$\ln w_i = \alpha_0 + \alpha_1 Z_i + \alpha_2 S_i + \alpha_3 D_i + u_i, \quad (5.11)$$

where Z_i is a vector of personal characteristics, S_i is social capital, D_i are city dummy variables designed to capture city-specific effects within urban China,¹⁵⁶ and u_i is the error term. Earned income is only observed for those individuals who worked for pay. Thus, given the possibility of heteroskedasticity induced by selection bias into wage employment and the clustering effect of using a household data set to estimate individual income functions, we compute robust standard errors that are also adjusted for clustering at the household level. The details are given in Chapter 4.

The prediction is that women will earn less income than men holding productive characteristics constant (hypothesis H_5^a). If the group with smaller social networks and less social capital experience disadvantage in earned income in the labour market, then there is indirect support for hypotheses H_2 and H_3 .

5.4.2 Probability of Re-Employment

As one test of the importance of social networks and social capital in the job search process, we investigate whether *guanxi* affects the probability of re-

¹⁵⁶ The inclusion of these variables to capture regional differences is particularly important in China (see Knight and Song 1999b; Gustafsson and Li 2000).

employment after experiencing unemployment. We specify a logit equation in which the dependent variable, R , is successful re-employment. For person i , this is given by

$$\Pr(R_i=1) = \beta_0 + \beta_1 Z_i + \beta_2 S_i + \beta_3 D_i + u_i, \quad (5.12)$$

where Z_i denotes the vector of personal characteristics, S_i denotes social capital, D_i are the city dummy variables, and u_i is the error term. If women are less likely than men to become successfully re-employed, then this will provide support for hypothesis H_5^b . If we find that the group with smaller social networks and less social capital have a smaller probability of re-employment, then there is additional indirect support for hypothesis H_2 and H_3 .

5.5 Data

The data set we use to test our hypotheses is an urban household survey designed by the Institute of Economics, Chinese Academy of Social Sciences in collaboration with foreign scholars and conducted by the NBS in February/March 2000 pertaining to 1999. The total sample size is 4,500 urban households, 2,500 of which are NBS sample households and 1,500 are from a representative sampling frame begun in 1999 that includes urban residing households without urban *hukou*. In addition, an independent sample was drawn of 500 households in which a member had experienced being laid-off during the five-year period from the end of 1994 to the end of 1999.

The survey covers six provinces and 13 cities. The provinces are Beijing (chosen to represent the four cities that are independently administered municipal districts), Liaoning (to represent the northeast), Henan (to represent the interior), Gansu (to represent the northwest), Jiangsu (to represent the coast), and Sichuan (to represent the southwest). The capital of each province is chosen as a city within the sampling frame – a total of three cities are chosen in Sichuan and Henan and two in each of the others except Beijing.¹⁵⁷

To establish the basic hypothesis that the group with less social capital will experience labour market disadvantage, survey data are needed that generate measures of social capital and employment outcomes. The author had the opportunity to design the relevant part of the questionnaires concerning social networks and social capital.¹⁵⁸ These were geared toward providing original measures of *guanxi* and linking these variables with labour market outcomes for men and women in urban China. Our questions asked respondents to provide information regarding the time, and the monetary and nonmonetary resources they invested in relationships. Together with the data on income and employment, it is possible to estimate returns to investments in social capital and social networks. The author's part of the survey provides the first original data set designed to measure an investment-based approach to social capital (see Glaeser, Laibson and Sacerdote 2000 who independently propose

¹⁵⁷ The cities are Beijing, Shenyang and Jinzhou in Liaoning, Nanjing and Xuzhou in Jiangsu, Zhengzhou, Kaifeng and Pingdingshan in Henan, Chengdu, Zigong and Nanchong in Sichuan, and Lanzhou and Pinliang in Gansu.

¹⁵⁸ Fieldwork was undertaken by the author during the survey administration in February/March 2000 and follow-up interviews were conducted in August/September 2000.

a similar approach to social capital but do not have data designed to test the model).

Appendix 5.3 reports the relevant questions on *guanxi*.¹⁵⁹ First, we provide a descriptive overview of the data concerning employment and income for men and women in urban China.

Demographic and Employment Characteristics

In the representative urban sample, there are 4,557 persons and an average of 3.24 persons per household.¹⁶⁰ There are 2,252 men (49.42%) and 2,304 women (50.58%). Approximately 60.63% (2,763 individuals) are working-aged (19-55), of whom 1,347 are men (48.75%) and 1,415 women (51.25%).¹⁶¹ We find 483 individuals (17.48%) experienced some form of unemployment in the five-year period from the end of 1994 to the end of 1999. In all, 209 men (43.27%) and 274 women (56.73%) had been unemployed at some point over this five-year period. There are also 58 rural-urban migrants (2.10%), of which 16 were men and 42 women.

Participation rates for both men and women are high in urban China. In the representative urban sample of 1,347 working-aged men and 1,415 working-aged women, the participation rate (counting the nonemployed as non-participants) is 77.7% for men and 58.8% for women, implying a female-male ratio of 0.76. Recall that the nonemployed are those individuals who are not working under one of the various

¹⁵⁹ In the interest of brevity, the entire survey questionnaires are not attached.

¹⁶⁰ This is from the sampling frame begun in 1999 that includes urban residing households without urban *hukou* and is thus representative of urban China.

¹⁶¹ Throughout this thesis as discussed in detail before, we define working-aged individuals as those aged 19-55 in consideration of the different retirement ages for men and women and the proportion of individuals who are enrolled in full-time education.

forms of being “not in post,” such as *xiagang* or *ligang*. The survey provides that non-participants include full-time homemakers, full-time students, and those who are disabled, injured, chronically ill or otherwise unable to work. Because they are not considered as being officially unemployed, those who are “not in post” are counted as non-participants in the labour force. However, we submit that they may be usefully considered as unemployed.

When only the officially registered unemployed are considered, the rates of unemployment are low: 2.3% and 2.2% for women and men, respectively. In contrast, when other forms of “not in post” are considered, the figures rise to 24.5% for women and 13.3% for men. Moreover, there are striking gender differences among those who are laid-off. Women comprise 60.9% of all laid-off workers and men 39.1%. This may be due in part to the practice of enterprises to not layoff two spouses who work in the same work unit. A substantial number of couples are employed in the same work unit and the decision to layoff women is often the product of informal consultation between the work unit and the married couple as to which one will be laid-off. We found during fieldwork that it was often decided that the woman would be laid-off because the man earned a higher wage and the woman could devote more time to children.

We turn to our second sample, the men and women who experienced some form of unemployment in the five years from 1994 to 1999. The 1,691 persons who experienced unemployment come from 695 households. Recall this is a separately drawn sample. We refer to this as the laid-off sample as shorthand. These households also have 3.24 persons on average, which is similar to the representative urban sample.

In the laid-off sample, there are 734 men (43.41%) and 957 women (56.59%), showing that women are disproportionately unemployed. Considering the working-aged among them (97.99% of the sample), there are 1,657 in total: 710 men (42.84%) and 947 women (57.16%).¹⁶² The proportion of women who took early retirement is 79.5% as compared with 20.5% for men, suggesting that women may be disproportionately required to retire early. Together with the laid-off figures from the representative urban sample, women appear to bear more of the brunt of the changes in employment associated with the reform of the state-owned sector.

Income and Wages

Mean income for the representative urban sample is 5,982 RMB. Men have higher mean income (7,139 RMB) than women (4,854 RMB). For working-aged men, mean income is 8,574 RMB, while it is 6,026 RMB for working-aged women. Mean income is lower for working-aged men and women who experienced unemployment than in the representative urban sample (4,599 RMB). However, men in the laid-off sample still have higher mean income than women in the same sample (5,673 RMB versus 3,800 RMB).

The overview of the data indicates that official unemployment figures for urban China do not capture the number of people who are nonemployed in some fashion. When we include those who took early retirement with the various forms of nonemployment in the representative urban sample, we find that the number of

¹⁶² There were 29 migrants included in the laid-off sample, of which 10 were men (34.5%) and 19 were women (65.5%).

officially unemployed (2.2%) understates those who are not working (19.0%).

Moreover, women constitute a larger proportion of the nonemployed than men. We further find that men, on average, have higher annual mean income than women in both the representative urban sample and in the laid-off sample.

Before we turn to our hypothesis testing, there is a data issue concerning earned income that warrants discussion. In our earned income functions we use the logarithm of annual income as the dependent variable, excluding those observations for which there was only nonwage income, which allows us to correct for sample selection in the usual manner.¹⁶³ The rationale for using annual income instead of wages is two-fold. First, the returns that we estimate will represent the welfare implications associated with total income. The advantage for our purposes is that we capture returns to the total income of an individual who invests in social capital, *i.e.*, in terms of transfers and other support. Second, because we do not have data on hours worked, we cannot standardise for hours. Thus, the use of wages as the dependent variable may not accurately reflect rates of return. The same problem exists when we use annual income. It is mitigated by the fact that nearly 90% of the sample worked in SOEs or urban collectives, where hours are standardised at 40 hours per week. Our approach corresponds to those of other researchers using these sets of data from 1988, 1995 and the current 1999 survey (for example, see Riskin, Zhao and Li, forthcoming; Appleton, Knight, Song and Xia 2000).

¹⁶³ There is also some measurement error in that 167 working-aged individuals in the laid-off sample answered they were currently working and yet report no earnings. They may have interpreted the question regarding current status as their employment situation as of February/March 2000 rather than as of the end of 1999. We treat these observations in the same manner as those who report income but no earnings. All individuals are included in the descriptives.

Table 5.1
Mean Annual Income and Components in RMB for the Representative Urban and Laid-off Samples
(% of total income¹⁶⁴)

	Men in the Representative Urban Sample (N=1347)	Women in the Representative Urban Sample (N=1415)	Total for the Representative Urban Sample (N=2763)	Men in the Laid-off Sample (N=710)	Women in the Laid-off Sample (N=947)	Total in the Laid-off Sample (N=1657)
Income	8,574.09 (100%)	6,025.90 (100%)	7,266.91 (100%)	5,673.31 (100%)	3,793.81 (100%)	4,599.23 (100%)
Wages	6,374.90 (74.35%)	4,118.96 (68.35%)	5,218.19 (71.81%)	2,622.41 (46.22%)	1,849.30 (48.75%)	2,180.56 (47.41%)
<i>Bonus within Wages</i>	521.52 (6.08%)	292.37 (4.85%)	403.97 (5.56%)	93.73 (1.65%)	37.81 (0.01%)	61.77 (1.34%)
Subsidy	316.54 (3.69%)	186.87 (3.10%)	250.02 (3.44%)	78.95 (1.39%)	23.66 (0.62%)	47.35 (1.03%)
<i>Laid-off Subsidy</i>	75.85 (0.88%)	89.09 (1.48%)	82.60 (1.14%)	403.52 (7.11%)	492.13 (12.97%)	454.16 (9.87%)
Nonwage Income	110.05 (1.28%)	103.41 (1.72%)	106.61 (1.47%)	45.82 (0.81%)	45.10 (1.19%)	45.41 (0.99%)
Self-Employed Income	668.39 (7.8%)	176.35 (2.93%)	416.16 (5.73%)	680.90 (12.00%)	227.84 (6.01%)	421.97 (9.17%)
Other Employment Income	57.94 (0.68%)	39.81 (0.66%)	48.63 (0.67%)	155.83 (2.75%)	93.24 (2.46%)	120.06 (2.61%)
Other Income from Work	275.51 (3.21%)	209.92 (3.48%)	241.82 (3.33%)	1,087.67 (19.17%)	665.93 (17.55%)	846.64 (18.41%)
<i>Second Job Income</i>	43.65 (0.51%)	18.75 (0.31%)	30.88 (0.42%)	103.33 (1.82%)	62.30 (1.64%)	79.88 (1.74%)
Property Income	120.92 (1.41%)	92.93 (1.54%)	106.54 (1.47%)	176.09 (3.10%)	106.66 (2.81%)	136.41 (2.97%)
Transfer Income ¹⁶⁵	284.31 (3.32%)	865.43 (14.36%)	581.82 (8.00%)	312.54 (5.51%)	406.15 (10.71%)	366.04 (7.96%)
<i>Pensions</i> ¹⁶⁶	175.74 (2.05%)	690.48 (11.46%)	439.29 (6.05%)	22.63 (0.40%)	167.12 (4.41%)	105.20 (2.29%)
<i>Gifts Received</i>	72.33 (0.84%)	76.65 (1.27%)	74.52 (1.03%)	137.79 (2.43%)	76.35 (2.01%)	102.67 (2.23%)
<i>Asset Sales</i>	1.78 (0.02%)	0.16 (0.00%)	0.95 (0.01%)	10.60 (0.19%)	1.74 (0.05%)	5.54 (0.12%)
<i>Unemployment Benefits</i>	2.29 (0.03%)	13.81 (0.23%)	8.19 (0.11%)	24.71 (0.44%)	34.14 (0.90%)	30.10 (0.65%)
Income in Kind	16.99 (0.20%)	10.54 (0.17%)	13.68 (0.19%)	9.82 (0.17%)	8.98 (0.24%)	8.70 (0.19%)

Source: Urban Household Survey, 1999.

¹⁶⁴ The selected components do not sum to 100%, as not all are included and some are sub-components (delineated in italics). The selected components render a picture of the contributions to annual income.

¹⁶⁵ Transfer income includes pensions, price subsidy, alimony for the elderly, child support, income from gifts, survey income, asset sales, unemployment benefits, minimum living benefits, and other hardship subsidies. We show the largest categories in the table.

Table 5.1 shows that wages constitute the major share of annual income (over 70%) for the representative urban sample, and a smaller proportion for the laid-off sample (approximately 47%) due to social securities and other forms of support received by those who have experienced unemployment. When we include all employment income, we find that work-related income (*e.g.*, self-employed income and other employment income) comprises over 80% of total income for the representative urban sample and approximately 78% for the laid-off sample. Thus, we find that approximately 80% of annual income is comprised of earned income for both samples, suggesting that the individuals in the laid-off sample often have secondary employment perhaps in the informal sector. Although we are unable to resolve the problem, we attempt to address it.

5.6 Results of Hypothesis Testing

In this section, we present the results of our hypothesis testing concerning the stock of social capital and size of social networks (hypothesis H_1) as well as the returns to these variables with respect to two sets of employment outcomes for men and women – earned income (hypothesis H_5^a), and re-employment (hypothesis H_5^b). Together with the two parts of hypothesis H_4 [tested in Chapter 4], we explore whether women suffer from economic discrimination on account of labour supply differences associated with social capital (hypotheses H_2 and H_3).

¹⁶⁶ There is a notable gender difference in pensions as we include women who are retired at the official age of 54, in an attempt to maintain comparability with men who have an official retirement age of 59.

5.6.1 Social Networks and Stocks of Social Capital

Table 5.2 presents the social network and social capital variables for the working-aged population in the representative urban and laid-off samples.

Table 5.2			
Social Network and Social Capital Variables for the Working-Aged Population			
Variables	Male	Female	Total
SOCIAL NETWORK (SIZE):			
Representative Urban Sample			
Mean	6.2118**	5.6188**	5.9123
Median	4.0000	4.0000	4.0000
Standard deviation	(6.1297)	(5.1551)	(5.6649)
Minimum	0.00	0.00	0.00
Maximum	55.00	50.00	55.00
Sample size	1072	1094	2166
Laid-off Sample			
Mean	6.2090**	5.3541**	5.7193
Median	4.0000	4.0000	4.0000
Standard deviation	(17.9194)	(8.3247)	(13.2997)
Minimum	0.00	0.00	0.00
Maximum	400.00	200.00	400.00
Sample size	598	802	1400
INDIRECT SOCIAL NETWORK			
(0-1 DUMMY VARIABLE):			
Representative Urban Sample			
Mean	0.0156	0.0170	0.0163
Median	0.0000	0.0000	0.0000
Standard deviation	(0.1239)	(0.1292)	(0.1266)
Minimum	0.00	0.00	0.00
Maximum	1.00	1.00	1.00
Sample size	1347	1415	2762
Laid-off Sample			
Mean	0.0549	0.0560	0.0555
Median	0.0000	0.0000	0.0000
Standard deviation	(0.2280)	(0.2300)	(0.2291)
Minimum	0.00	0.00	0.00
Maximum	1.00	1.00	1.00
Sample size	710	947	1657
SOCIAL CAPITAL (STOCK):			
Closeness			
Mean	4.5792	4.5689	4.5729
Median	5.0000	5.0000	5.0000
Standard deviation	(0.8395)	(0.8681)	(0.8568)
Minimum	1.00	1.00	1.00
Maximum	5.00	5.00	5.00
Sample size	378	604	982

Time Spent			
Mean	2.8423	2.8289	2.8341
Median	2.3000	2.5000	2.5000
Standard deviation	(1.4333)	(1.2856)	(1.3441)
Minimum	1.00	1.00	1.00
Maximum	6.00	6.00	6.00
Sample size	372	587	959
Mean Value of Gifts			
Mean	185.5296	179.9758	182.0313
Median	100.0000	100.0000	100.0000
Standard deviation	(281.4040)	(356.7722)	(330.6347)
Minimum	0.00	0.00	0.00
Maximum	2000.00	5000.00	5000.00
Sample size	208	354	562
Total Annual Gifts			
Mean	500.5077	508.4463	505.5082
Median	210.0000	300.0000	300.0000
Standard deviation	(729.2628)	(975.7832)	(891.8385)
Minimum	0.00	0.00	0.00
Maximum	4360.00	15,000.00	15,000.00
Sample size	208	354	562
Social Capital I			
<i>(Closeness*Time*Value of Gifts)</i>			
Mean	4.1470	3.9913	4.0486
Median	1.4679	1.9231	1.8269
Standard deviation	(7.5779)	(7.6908)	(7.6429)
Minimum	0.00	0.00	0.00
Maximum	49.68	100.00	100.00
Sample size	138	347	549
Social Capital II			
<i>(Closeness*Time*Value of Gifts as a Proportion of Income)</i>			
Mean	0.9329*	0.4770*	0.6526
Median	0.1200	0.1985	0.1611
Standard deviation	(7.7085)	(1.2077)	(4.8731)
Minimum	0.00	0.00	0.00
Maximum	100.00	14.21	100.00
Sample size	171	273	444

Source: Urban Household Survey, 1999.

Note: ** indicates that the means for men and women are significantly different at the 5% level, and * at the 10% level, in a two-tailed test using a t-test and an ANOVA test.

The first variable is social networks, measured as the number of contacts within an individual’s network. This indicates the quantity, but not the intensity, of those relationships. For the working-aged population in the representative urban sample, the mean size of social networks is slightly larger than the entire sample including those who are not working-aged, such as retirees (5.91 versus 5.75

contacts). Social networks of working-aged men in the representative urban sample are significantly larger than those of working-aged women (6.21 versus 5.62 contacts).

For the laid-off sample, we find slightly smaller social networks than for the representative urban sample (5.72 contacts as compared with 5.91 contacts). For those individuals who had not experienced unemployment in the past five years, the mean size of their social network was larger (6.11 contacts) than for the laid-off sample and the representative urban sample including these individuals. Men have 6.21 contacts while women have 5.35 contacts in the laid-off sample; the means are significantly different. The medians are not, indicating that the conclusions we draw are based on the upper part of the distribution. With respect to the means, we conclude that men have larger social networks than women in both samples.

The second variable is a proxy for having an indirect social network. This dummy variable is constructed only for individuals who found their current job with the aid of a contact. The question asked whether or not the contact used his/her social network to assist the respondent in finding the current job. There is an upward bias on this variable in terms of returns and a downward bias in terms of descriptives. The returns are upwardly biased because only those who were successful in finding their jobs through social networks are captured in this variable; others who have an indirect social network but did not use it in the immediate job or were unsuccessful are omitted. The variable is included as one of the available approximations for indirect social networks in this data set. Men have a slightly smaller value than women in both samples, but the means are statistically not significantly different.

Our third set of variables provides various measures of social capital. These are for the laid-off sample because, as noted before, this group has had to explore the confines of the labour market. We proxy the time and monetary and nonmonetary resources invested in social networks. The variable for time is a scaled response of time spent by the respondent with a contact over the past month. Monetary investment is the gift variable, which is the value of gifts given over the past year. Closeness serves as a proxy of nonmonetary investment in a contact. We recognise that this can be interpreted as a standalone indicator of the amount invested in a relationship. However, given the importance of the expenditure and time aspects of social capital, the measure of closeness can be viewed as a proxy for psychological or emotional energy expended on a contact. Therefore, to approximate total investment in relationships in a social network, an index variable of these three proxies provides the best measure of the stock of social capital.¹⁶⁷

The time measure ranges from 1 to 6, where 1 indicates that the respondent did not spend any time with a contact in the past month (assuming the last month is not atypical). A response of 6 indicates that the respondent spent at least some time each day with the contact. We find men, on average, spend slightly more time with each contact than women (2.84 for men, as compared with 2.82 for women).

¹⁶⁷ There is a downward bias in our measure of the stock of social capital because there is an upper limit of 10 persons for whom details are given within each respondent's social network. This bias should not be substantial as the mean number of contacts within a social network is between 5 and 6 persons. However, there are differential response rates to the social capital question: more women than men responded (response rates are 75.44% for women and 63.71% for men). We find 381 men reported some details on 3.61 contacts (with a standard deviation of 2.65), while 605 women reported on 4.02 contacts (with a standard deviation of 2.87). However, this measurement error did not significantly affect the social capital variable, as men have larger stock of social capital than women.

The difference in means is not statistically significant and thus we cannot draw inferences regarding gender differences.

The second variable measures monetary resources invested in contacts, proxied by gifts given in yuan in the past year. Men tend to give, on average, slightly higher mean values of gifts per contact than women (186 RMB for men as compared with 180 RMB for women). In terms of annual gifts, men gave less than women (501 RMB as compared with 508 RMB).¹⁶⁸ Again, these differences in means are not statistically significant.¹⁶⁹

The third variable is a self-reported measure of closeness. The question asked: “How familiar [*shouxi*] are you with them?” The answers are: “Not familiar; Not very familiar; Fairly familiar; Familiar; Very familiar.” The scale is from 1 to 5 and proxies nonmonetary or emotional resources invested in a contact, where a 5 represents the highest value of closeness. Men have invested a little more deeply – though not significantly – in each contact than women (4.58 versus 4.57). Inferences regarding gender differences cannot be drawn.

¹⁶⁸ This measure is likely skewed by a few high value outliers for women. For instance, one female respondent gave total annual gifts of 15,000 yuan, all of which were to her parents or parents-in-law. We do not know the reason for the gifts, but they may indicate a medical emergency or other expenditure that though valid, do not necessarily correspond to typical investment in these relationships. The median is also higher for women. When we remove these outliers for women, the mean and median are higher for men. We leave in these observations but further investigate their impact through different formulations of the social capital variable. It turns out that even if the outliers are included, men have larger stock of social capital than women.

¹⁶⁹ There was one gift variable that was measured for the representative urban sample. Approximately 20% of all individuals (98 persons) who were assisted in their job search by a contact gave a gift directly in appreciation, with more men than women doing so (55 men and 43 women). The mean value of this gift variable for men is 160 RMB, while it is 97 RMB for women. The difference in means is statistically significant.

There are potentially multiple formulations of social capital using these components. It is also possible to create an index of two of the three components of social capital, *i.e.*, time and closeness. Consistent with our model, we combine all three components into a social capital stock variable that is an index of time spent, monetary and nonmonetary resources invested in all contacts in a social network. The stock is the product of time spent, closeness and gifts summed over the number of contacts in a social network. Gifts are normalised so the minimum value is 1 RMB. Otherwise, a value of zero for gifts would negate the other investments of time and nonmonetary resources. For the gifts variable, there are several possible configurations, such as actual value, as a proportion of income, by quintiles, in logarithms, etc. Several variations are tried and two are reported in Table 5.2. Social Capital I is an index of time spent, closeness and the actual value of annual gifts given to contacts in a social network. Social Capital II is an index of time, closeness and annual gifts given to contacts computed as a proportion of income. Both are both rescaled to lie between 0 and 100.¹⁷⁰ The difference in means is significant for Social Capital II but not Social Capital I. For all formulations, including Social Capital I and II, men have larger stocks of social capital than women. Therefore, regarding the mean values for both social networks and social capital, we find some support for hypothesis H_1 .

Turning to empirical testing of the returns to these variables in the labour market, we choose the first formulation (Social Capital I) that uses the actual

¹⁷⁰ Social Capital I is rescaled by a factor of 1560 to lie between 0 and 100. A change by a factor of 1560 in the product of gifts, time and closeness would generate a unit change in social capital. Social Capital II is rescaled by a factor of 4.72 to lie between 0 and 100; thus, a change by a factor of 4.72 would change social capital by one unit.

value of total gifts given to contacts because it provides the most information and directly corresponds to the measure in our theoretical model. None of the social network and social capital variables was found to be endogenous (see Appendix 5.1). Social networks and social capital are determined by factors other than those measured in a household income survey. Appendix 5.2 presents the results of attempting to explain the determinants of social networks and social capital using a household income and consumption data set. We do not find income to be a significant determinant, suggesting that other motivations that drive the investment in social capital and social networks. Locale, neighbourhood and other associative factors may hold explanatory power as to why people invest in relationships. This corresponds to the results of the endogeneity tests where we find social networks and social capital to be exogenous to this model, and we can estimate with some confidence their effects on employment outcomes.

5.6.2 Labour Market Outcome I: Earned Income

Our analyses are limited to estimating economic returns. We test for two forms of returns in labour markets – the first pertains to earned income. Table 5.3 investigates the determinants of income for all working-aged individuals in both the representative urban and the laid-off samples, while Tables 5.4A-C report separate income functions for men and women in the two samples.¹⁷¹

¹⁷¹ As discussed earlier, we use the natural logarithm of annual income as the dependent variable and alternatively refer to income and earnings or wages in discussing our results.

Table 5.3

The Determinants of Income for All Individuals in the Representative Urban Sample and the Laid-off Sample

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)					Mean Value or Percentage (standard deviation)	
	Representative Urban Sample		Laid-off Sample			(1)-(2)	(3)-(5)
	(1)	(2)	(3)	(4)	(5)		
Intercept	9.0541 (19.194)***	9.0566 (18.057)***	7.9049 (9.585)***	7.0629 (7.746)***	7.4417 (5.720)***	8.8468 ¹⁷² (0.6840)	8.2875 ¹⁷³ (0.7765)
<u>Social Networks</u>	---	0.0078 (2.022)**	---	0.0002 (0.017)	---	5.9123 (5.6649)	5.7193 (13.2997)
Interaction term with gender	---	0.0007 (0.105)	---	0.0210 (2.408)**	---	2.8380 (4.6165)	3.0671 (6.8336)
<u>Indirect Social Networks</u>	---	0.0381 (0.284)	---	0.0305 (0.253)	---	0.0163 (0.1266)	0.0555 (0.2291)
<u>Social Capital</u>	---	---	---	---	0.0340 (2.400)**	---	4.0486 (7.6429)
Interaction term with gender	---	---	---	---	-0.0265 (-1.662)*	---	2.5227 (6.4076)
<u>Personal Characteristics</u>							
Gender	-0.1585 (-4.786)***	-0.1565 (-2.971)***	-0.3355 (-5.361)***	-0.4921 (-5.830)***	-0.3190 (-2.618)***	0.5123 (0.4999)	0.5715 (0.4950)
Age	-0.0307 (1.377)	-0.0359 (-1.499)	0.0383 (0.947)	0.0816 (1.818)*	0.0592 (0.922)	38.3218 (9.9540)	38.8105 (7.6631)
Age squared	0.0007 (2.313)**	0.0008 (2.362)**	-0.0003 (-0.621)	-0.0008 (-1.502)	-0.0005 (-0.563)	1567.604 (747.4115)	1564.943 (584.122)
Communist Party member	0.0546 (1.123)	0.0527 (1.016)	-0.0739 (-0.708)	-0.1116 (-0.987)	-0.2468 (-1.391)	0.1993 (0.3995)	0.1045 (0.3060)
Years of education	0.0137 (1.617)	0.0132 (1.435)	0.0102 (0.717)	-0.0011 (-0.076)	-0.0143 (-0.606)	10.8932 (2.7893)	10.0260 (2.2937)
Experience	-0.0079 (-1.377)	-0.0075 (-1.175)	-0.0094 (-1.233)	-0.0091 (-1.050)	-0.0156 (-1.285)	18.8683 (9.3242)	18.0607 (8.0582)
Work unit sector	0.0965 (5.651)***	0.0950 (4.830)***	0.0722 (3.041)***	0.0896 (3.500)***	0.0730 (1.803)*	1.9038 (1.3906)	1.6764 (1.4886)
Occupation	-0.0436 (-5.628)***	-0.0410 (-4.653)***	-0.0204 (-1.465)	-0.0177 (-1.147)	0.0088 (0.376)	5.7421 (2.5777)	6.6818 (2.3586)
<u>Cities</u>							
Beijing	0.5281 (5.076)***	0.5797 (5.209)***	0.4836 (2.633)***	0.5679 (2.954)***	0.1809 (0.739)	0.1258 (0.3306)	0.0978 (0.2971)
Shenyang	0.0045 (0.042)	0.0572 (0.509)	0.3428 (1.454)	0.3563 (1.430)	0.6064 (1.515)	0.1143 (0.3183)	0.0682 (0.2522)
Jinzhou	0.0092 (0.078)	0.0433 (0.351)	0.3300 (1.770)*	0.4295 (2.272)**	0.1426 (0.713)	0.0771 (0.2667)	0.1032 (0.3043)
Nanjing	0.4435	0.5015	0.2790	0.4279	0.2882	0.0886	0.0591

¹⁷² Mean and standard deviation of the dependent variable are reported in this and all subsequent tables in the chapter.

¹⁷³ *Ibid.*

	(4.412)***	(4.825)***	(1.543)	(2.309)**	(1.267)	(0.2843)	(0.2360)
Xuzhou	0.1424	0.1582	-0.0810	0.0581	0.1170	0.0655	0.0610
	(1.343)	(1.400)	(-0.421)	(0.300)	(0.587)	(0.2474)	(0.2393)
Zhengzhou	-0.1776	-0.1473	-0.0335	0.0957	0.2289	0.0622	0.0736
	(-1.432)	(-1.076)	(-0.171)	(0.461)	(0.877)	(0.2416)	(0.2612)
Kaifeng	-0.1313	-0.0363	-0.1873	-0.1243	-0.1037	0.0669	0.0682
	(-1.170)	(-0.304)	(-0.940)	(-0.603)	(-0.468)	(0.2499)	(0.2522)
Pingdingshan	0.1694	0.1871	-0.0177	0.0468	-0.1302	0.0666	0.0314
	(1.586)	(1.686)*	(-0.085)	(0.220)	(-0.582)	(0.2493)	(0.1744)
Chengdu	-0.0917	-0.0936	-0.0162	0.1227	0.1575	0.0582	0.1038
	(-0.801)	(-0.765)	(-0.091)	(0.653)	(0.704)	(0.2343)	(0.3051)
Zigong	-0.2137	-0.1156	-0.0036	0.0231	0.5677	0.0677	0.0833
	(-1.808)*	(-0.927)	(-0.019)	(0.119)	(1.463)	(0.2512)	(0.2764)
Nanchong	-0.1351	-0.0672	-0.0849	-0.0193	-0.2405	0.0666	0.0652
	(-1.122)	(-0.520)	(-0.456)	(-0.102)	(-1.124)	(0.2493)	(0.2469)
Lanzhou	0.0831	0.1375	0.1707	0.2115	-0.1487	0.0734	0.1171
	(0.583)	(0.861)	(0.881)	(1.065)	(-0.425)	(0.2609)	(0.3216)
Inverse Mills Ratio	-0.4656	-0.4843	-0.8255	-0.8210	-0.8733		
	(-6.6484)***	(-6.2527)***	(-14.3961)**	(-13.550)***	(-7.6242)***		
Wald X^2	424.37***	389.07***	91.10***	106.19***	57.60***		
Log likelihood	-1825.088	-1553.143	-1598.326	-1349.002	-561.4671		
Number of observations	1196	1017	769	654	280		

Source: Urban Household Survey, 1999.

- Notes: (1) Omitted dummy variables for equation (1) are: male, non-Communist Party members, urban collective sector, healthy individuals and Pinliang. For equation (2), they are: male, individuals without indirect social networks, non-Communist Party members, urban collective sector, healthy individuals and Pinliang. For equation (3), they are: male, non-Communist Party members, urban collective sector, individuals who are not homeowners, and Pinliang. For equation (4), they are: male, individuals without indirect social networks, non-Communist Party members, urban collective sector, individuals who are not homeowners, and Pinliang. For equation (5), they are: male, non-Communist Party members, urban collective sector, individuals who are healthy, single and have drive, and Pinliang.
- (2) The exclusion restriction for equation (1) is poor health, which is significantly negative in the probit estimation at the 5% level. This dummy variable has a value of 0 if the individual is healthy, while a value of 1 represents one of three forms of poor health: frail and chronically diseased, disabled and other. It is also significant in the income function, but is a better exclusion restriction than many others, such as the usual one of having young children in the household. For equation (2), the exclusion restriction, poor health, just missed significance at the 10% level. The p-value is 0.130. The inverse Mills ratio, however, is significant and it appears this variable for poor health is picking up some of the selection effects. Other terms, such as young children in the household, were tried with less success. For equations (3) and (4), the exclusion restriction is positive and significant at the 10% level. It is a dummy variable that equals one for those who own their homes, including homes purchased at preferential prices. Individuals who can raise capital to buy their homes or be able to negotiate preferential prices may have some ability to cope with changing financial circumstances since home ownership became a necessity when the housing allocation from work units was abolished in 1998. This ability to cope may not increase income per se but having this sort of drive can affect selection into employment after experiencing unemployment. For equation (5), the exclusion restriction is a variable capturing having poor health, being married and having no drive, which is significantly negative at the 10% level. It is a dummy variable that equals one for those who are in poor health, are married and have no drive, according to a question that assesses whether an individual has motivation to work to become better off economically. The survey question asked: "Do you agree or disagree with the following statements – In order for yourself to maintain a stable household standard of living in the long-

We include a set of control variables including age, age squared, Communist Party membership, ownership sector of the work unit, occupation, years of education and employment experience, as well as cities in each estimation.¹⁷⁴ We focus on the gender dummy variable and the social network and social capital variables.¹⁷⁵ We provide some limited discussion of indirect social networks, which is a dummy variable, with the understanding that it is an imperfect proxy.

Table 5.3 equation (1) is a base specification in which the variables of social networks and social capital are not included. Out of a total of 1,500 households, there are 1,196 individuals included in the estimations, which reflect incomplete responses. We find that being female has a negative effect of 14.7% on income. In other words, standardising for other explanatory variables, a woman will experience a significantly large income discount.

¹⁷⁴ The specifications and effects of the control variables are standard and we do not discuss them in detail unless otherwise warranted. Briefly, age, age squared, years of education, years of employment experience, work unit ownership sector and occupation are continuous, and Communist Party membership and cities are dummy variables. The work unit sector variable is ranked by mean income, where the lowest value is associated with SOEs and urban collectives is the omitted category. We use the rank variable rather than dummy variables for each type of work unit sector in order to control for the effects of work unit sector and not to investigate differences among work unit sectors. The occupation term is ranked starting with professionals to unskilled labour. The survey questions are provided in English and in Chinese in Appendix 5.3.

¹⁷⁵ Given the formulation of social capital as investment in social networks, we do not estimate these variables together because they are collinear.

In Table 5.3 equation (2), we include social networks, both direct and indirect, in the income function.¹⁷⁶ The inclusion of these variables does not significantly alter the coefficients on the other explanatory variables when compared with equation (1). Social networks have a positive effect while the interaction term with gender and the indirect social network variable are insignificant. This indicates that there are no differences as between men and women with respect to returns to social networks in the combined sample. Indirect social networks are proxied by asking whether the contact that helped the respondent find his current job used her social network in the process. This use or lack of use of a contact's social network does not have a significant effect on income. The coefficient on social networks is small but positive (0.0078) and significant at the 5% level. This means that having a mean sized social network (5.91 contacts) is associated with a positive income premium. Comparing someone with the mean social network with someone without any, the income premium is 4.7%. We also find there is a negative effect on income of 14.5% associated with the female gender dummy variable.

The laid-off sample has a somewhat different income profile from that of the representative urban sample (equations (3)-(5) in Table 5.3).¹⁷⁷ We see in Table

¹⁷⁶ Indirect social networks are excluded to determine the effects of social networks alone. We find the coefficient on social networks increases by 0.0001 and remains significant at the 5% level. The coefficients on the other explanatory variables are largely unchanged (unreported equation). We also estimate indirect social networks without social networks. It remains insignificant, while the other variables are unaffected (unreported equation). We conclude that for the representative urban sample, indirect social networks do not have a significant effect while social networks have a positive and significant effect on income. We include indirect social networks with social networks in all estimations because indirect contacts may be an integral part of a network, but limit the discussion of this variable because of its upward bias. Note that in all our estimations, we tried numerous estimations with different combinations of these social network and social capital variables and find that the results do not vary substantially.

¹⁷⁷ Selection into wage employment also differs for the laid-off sample and the representative urban sample (unreported probit estimations for equations (1) and (3), Table 5.3). For individuals in both

5.3 equation (3) that female gender decreases income by 28.5%, which is almost twice the negative effect found in the representative urban sample. When we introduce social networks and indirect social networks into the income function for the laid-off sample in Table 5.3 equation (4), we find that they are not significant. The interaction term (social networks with gender) has a positive coefficient of 0.0210 (significant at the 5% level), suggesting women with social networks receive a positive premium. Comparing a woman with an average social network (5.72 contacts) with a woman without any, there is a positive income premium of 12.0%.

Moreover, there is still a large negative effect on income of 38.9% associated with the gender dummy variable. The effect is larger when social networks are controlled for, suggesting that gender and social networks are correlated. When social networks are omitted, the gender dummy variable picks up some of the effect of the positive coefficient associated with social networks. This causes the coefficient on the gender dummy to be less negative. When social networks are included, the negative coefficient on the gender variable is expected to be larger.

The characteristics of the laid-off sample are different from the representative urban sample, suggesting that social networks may also have dissimilar effects for these groups of individuals. One possible reason as to why we find different effects for social networks in these two samples is that individuals who were laid-off may not have had the requisite type of social networks to preserve their jobs. Another possibility is that social networks are correlated with unobserved characteristics, such as ability, and less able workers are more likely to become laid-off and are also less likely to receive returns to social networks.

Social capital is included in equation (5), Table 5.3, and is significant for the laid-off sample.¹⁷⁸ A unit of social capital increases income by 3.4%. Comparing someone with an average amount of social capital (stock of 4.05¹⁷⁹) with someone without any, the premium is 13.8%. The interaction term of social capital with gender is significant and has a negative coefficient of 0.0265, equivalent to -10.7%. This indicates that a woman with an average stock of social capital will receive a much smaller income premium (3.1%) than a man with an average stock of social capital. Again, female gender reduces income by 20.6%.

There are several possible reasons as to why social capital and social networks have different effects in the laid-off sample. Following the literature, a simple explanation that is plausible is that social capital captures the depth of relationships while social networks are a measure of breadth. Individuals who have experienced unemployment have had to look for work and deeper relationships help this process more than the quantity of relationships. For individuals in the representative urban sample, in contrast, the quantity of relationships may facilitate their getting work done more efficiently on the job and thus garner higher income.

¹⁷⁸ We estimated social capital with indirect social networks and find the coefficient on social capital is higher by 0.0018 and significant at the 1% level (unreported equations). Unlike social networks where indirect social networks are an integral part of a network, social capital is an independent measure and estimated separately.

¹⁷⁹ Recall that social capital is an index variable of time and monetary and nonmonetary resources, which was rescaled by a factor of 1,560 to lie between 0 and 100. A mean value of 4.05 requires expenditures on gifts of 6,318 RMB (£530) if time and closeness were at their respective minimum, and 211 RMB (£18) if time and closeness were at their respective maximum. A unit increase in social capital will require expenditure on gifts of 1,560 RMB (£131) if time spent and closeness were at their minimums, whereas an expenditure of 52 RMB (£4) will increase social capital by one unit if the time spent and closeness were at their maximums.

These estimations indicate that there are positive effects on income associated with social networks and social capital that are different for the representative urban sample and the laid-off sample, and may differ for men and women. It is also possible that the effects we find for social networks and social capital are due to their correlation with unmeasured characteristics that affect income, such as ability or drive to succeed. For instance, it may be that people who have more ability find it easier to attract other individuals with high ability into their social networks and the network helps them work more efficiently. Or, individuals with more drive may have more social capital because they are more focused and thus better able to cultivate contacts that may prove to be useful in the labour market. Next, we estimate income functions for the sub-samples of men and women to further explore these variables.

Table 5.4A
The Determinants of Income for Men and Women in the Representative Urban Sample
(including Social Networks and Indirect Social Networks)

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)						Mean Value or Percentage (standard deviation)	
	Men			Women			Men	Women
	(1) Probit	(2) Corrected MLE	(3) Uncorrected OLS	(4) Probit	(5) Corrected MLE	(6) Uncorrected OLS		
Intercept	-0.6925 (-0.523)	7.3540 (13.375)***	7.044 (13.128)***	-5.9339 (-5.050)***	9.9545 (13.775)***	7.8782 (11.416)***	8.9666 (0.6294)	8.7071 (0.7182)
Social Network	0.0013 (0.085)	0.0090 (2.344)**	0.0086 (2.341)**	0.0009 (0.072)	0.0085 (1.239)	0.0070 (1.036)	6.2118 (6.1297)	5.6188 (5.1551)
Indirect Social Network	0.3298 (0.664)	0.1344 (0.966)	0.1460 (1.049)	-0.3409 (-1.005)	-0.0498 (-0.227)	-0.0967 (-0.479)	0.0156 (0.1239)	0.0170 (0.1292)
Personal Characteristics								
Age	0.0412 (0.656)	0.0586 (2.126)**	0.0620 (2.297)**	0.3519 (6.539)***	-0.0894 (-2.605)***	0.0131 (0.400)	38.3304 (9.9540)	38.3131 (9.9611)
Age squared	-0.0018 (-2.364)**	-0.0005 (-1.432)	-0.0007 (-2.256)**	-0.0055 (-8.380)***	0.0015 (3.240)***	-0.0002 (-0.518)	1568.225 (747.6332)	1567.045 (747.7275)
Communist Party member	0.3833 (2.001)**	0.1202 (2.143)**	0.1625 (3.031)***	0.4538 (2.567)**	-0.0809 (-0.815)	0.0225 (0.243)	0.2731 (0.4457)	0.1291 (0.3354)
Years of	0.1368	0.0083	0.0244	0.1100	0.0052	0.0313	11.2039	10.5956

education	(4.264)***	(0.684)	(2.182)***	(4.160)***	(0.360)	(2.466)**	(2.8052)	(2.7430)
Experience	0.0919	-0.0127	0.0019	0.0254	-0.0034	0.0065	19.2757	18.4634
Work unit sector	(4.975)***	(-1.561)	(0.265)	(2.113)**	(-0.385)	(0.811)	(9.5240)	(9.1161)
	-0.2257	0.1096	0.0848	-0.1449	0.0900	0.0605	2.1083	1.7890
Occupation	(-4.975)***	(4.644)***	(3.622)***	(-3.588)***	(2.950)***	(2.186)**	(1.3729)	(1.1661)
	-0.0150	-0.0335	-0.0363	0.0006	-0.0454	-0.0495	5.4205	3.3180
No drive	(-0.553)	(-3.028)***	(-3.381)***	(0.026)	(-3.495)***	(-4.108)***	(2.4984)	(0.8719)
	-0.5559	---	---	-0.7006	---	---	0.0483	0.0650
	(-2.449)**			(-4.117)***			(0.2144)	(0.2466)
Cities								
Beijing	0.4523	0.5599	0.6390	0.3312	0.6353	0.6989	0.1307	0.1194
	(1.388)	(4.388)***	(5.397)***	(1.028)	(4.035)***	(4.823)***	(0.3372)	(0.3244)
Shenyang	0.4382	0.0400	0.1157	0.1476	0.0768	0.1112	0.1114	0.1173
	(1.405)	(0.309)	(0.963)	(0.469)	(0.471)	(0.751)	(0.3147)	(0.3219)
Jinzhou	0.0963	0.1211	0.1423	0.0149	-0.0357	-0.0583	0.0772	0.0770
	(0.309)	(0.836)	(1.042)	(0.047)	(-0.201)	(-0.351)	(0.2670)	(0.2667)
Nanjing	0.6268	0.5332	0.6254	0.5337	0.5007	0.6162	0.0861	0.0905
	(1.758)*	(4.289)***	(5.435)***	(1.652)*	(3.338)***	(4.598)***	(0.2806)	(0.2869)
Xuzhou	0.9855	0.1429	0.2649	0.8892	0.1470	0.3269	0.0638	0.0671
	(2.497)**	(1.092)	(2.197)**	(2.553)**	(0.910)	(2.242)**	(0.2446)	(0.2503)
Zhengzhou	0.3752	-0.2443	-0.1922	0.0975	-0.0304	-0.0359	0.0661	0.0587
	(1.020)	(-1.450)	(-1.211)	(0.279)	(-0.163)	(-0.211)	(0.2485)	(0.2351)
Kaifeng	-0.1785	-0.0505	-0.0553	0.0676	-0.0180	-0.0362	0.0631	0.0707
	(-0.522)	(-0.375)	(-0.439)	(0.205)	(-0.106)	(-0.224)	(0.2432)	(0.2564)
Pingdingshan	0.3473	0.1502	0.2098	0.7932	0.1765	0.3550	0.0676	0.0657
	(0.936)	(1.220)	(1.873)*	(2.206)**	(1.077)	(2.400)**	(0.2511)	(0.2479)
Chengdu	1.1315	-0.2487	-0.1088	0.4233	0.0868	0.1537	0.0609	0.0558
	(2.904)***	(-1.683)*	(-0.793)	(1.174)	(0.511)	(0.954)	(0.2392)	(0.2297)
Zigong	0.5751	-0.2253	-0.1516	0.2421	0.0147	0.0247	0.0646	0.0700
	(1.477)	(-1.495)	(-1.020)	(0.703)	(0.077)	(0.138)	(0.2459)	(0.2552)
Nanchong	0.3377	-0.1397	-0.0977	0.7218	-0.0278	0.1165	0.0646	0.0686
	(0.965)	(-0.791)	(-0.578)	(2.047)**	(-0.158)	(0.733)	(0.2459)	(0.2528)
Lanzhou	-0.3267	0.3121	0.2119	0.2376	-0.0150	0.0074	0.0720	0.0749
	(-1.025)	(1.946)*	(1.463)	(0.692)	(-0.062)	(0.031)	(0.2586)	(0.2633)
Inverse Mills Ratio	---	-0.4148	---	---	-0.5967	---	1.3607	0.4805
		(-5.2207)***			(-6.4922)***		(2.0296)	(0.3207)
R ²	---	---	0.3672	---	---	0.2284		
Pseudo R ²	0.2355	---	---	0.4225	---	---		
X ² (22)	152.04***	---	---	540.63***	---	---		
Wald X ² (21)	---	243.25***	---	---	135.90***	---		
F(21, 481)	---	---	14.80***	---	---	---		
F(21, 499)	---	---	---	---	---	8.90***		
Log likelihood	-246.7620	-604.7578	---	-369.5369	-852.3603	---		
Number of observations	639	509	509	929	508	508		

Source: Urban Household Survey, 1999.

- Notes: (1) Omitted dummy variables for both men and women are: no indirect social networks, non-Communist Party members, urban collective sector, individuals with drive and Pinliang.
- (2) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
- (3) Heteroskedasticity-consistent robust adjusted for clustering at the household level are computed.

Table 5.4A equation (2) shows that social networks have a positive effect for men (a coefficient of 0.0090 that is significant at the 5% level), which translates into a premium on income of 0.9% per contact. Comparing a man with an average sized social network (6.21 contacts) with a man without any, there is a

positive premium of 5.6%. Unlike men, social networks have no effect for women. This indicates that a woman with an average sized social network will not receive any income premium, standardising for other characteristics. One explanation is that men and women socialise differently, so that women have more friends and men may have more co-workers in their social networks. Friends may generate noneconomic returns, while co-workers may facilitate returns in the labour market. Another possibility is that women are precluded from building social networks at work because of notions of propriety. We found during fieldwork that it is not generally acceptable for women to drink with men after work, for instance. Thus, it could be that women are unable to participate in the type of networking activities that generate economic returns to their social networks. Finally, indirect social networks are significant neither for men nor women.

Table 5.4B
The Determinants of Income for Men and Women in the Laid-off Sample
(including Social Networks and Indirect Social Networks)

Dependent Variable: Log of Annual Income	Coefficient (t-statistic)						Mean Value or Percentage (standard deviation)	
	Men			Women			Men	Women
	(1) Probit	(2) Corrected MLE	(3) Uncorrected OLS	(4) Probit	(5) Corrected MLE	(6) Uncorrected OLS		
Intercept	-5.2968 (-3.646)***	6.7582 (5.329)***	3.8911 (3.435)***	-1.1635 (-0.934)	6.6935 (5.320)***	4.9962 (4.085)***	8.4862 (0.7587)	8.1324 (0.7552)
Social Network	0.0032 (0.410)	0.0007 (0.619)	0.0018 (1.959)*	-0.0179 (-1.538)	0.0227 (2.462)**	0.0147 (1.804)*	6.2090 (17.9194)	5.3541 (8.3247)
Indirect Social Network	0.6832 (2.232)***	0.0031 (0.016)	0.2692 (1.732)*	0.0095 (0.044)	0.0386 (0.252)	0.0352 (0.279)	0.0549 (0.2280)	0.0560 (0.2300)
Personal Characteristics								
Age	0.2404 (3.593)***	0.1075 (1.755)*	0.2069 (3.583)***	0.0429 (0.710)	0.0697 (1.119)	0.1188 (1.905)*	39.0732 (8.2149)	38.6135 (7.2201)
Age squared	-0.0036 (-4.461)***	-0.0009 (-1.257)	-0.0024 (-3.517)***	-0.0011 (-1.451)	-0.0008 (-0.932)	-0.0017 (-2.046)**	1594.107 (634.8775)	1543.078 (542.2838)
Communist Party member	0.4946 (2.319)**	-0.0486 (-0.310)	0.1481 (1.089)	0.4290 (1.718)*	-0.1844 (-1.116)	0.0226 (0.169)	0.1608 (0.3676)	0.0623 (0.2418)
Years of	0.0351	-0.0065	0.0135	0.0475	-0.0026	0.0188	10.0848	9.9820

education	(1.166)	(-0.266)	(0.644)	(1.731)*	(-0.128)	(1.050)	(2.4300)	(2.1630)
Experience	0.0440	-0.0329	-0.0143	0.0376	0.0029	0.0225	18.6179	17.6452
Work unit sector	(2.605)***	(-2.248)**	(-1.109)	(2.865)***	(0.277)	(2.617)***	(8.6629)	(7.7026)
	-0.0290	0.0692	0.0513	-0.0248	0.1006	0.1001	1.875	1.5359
Occupation	(-0.643)	(1.718)*	(1.509)	(-0.664)	(3.004)***	(3.253)***	(1.5136)	(1.4554)
	-0.0183	-0.0118	-0.0129	0.0364	-0.0272	-0.0133	6.3544	6.9253
Father is/was a Communist Party member*	(-0.619)	(-0.483)	(-0.591)	(1.507)	(-1.420)	(-0.792)	(2.3761)	(2.3170)
danwei	0.0297	---	---	---	---	---	2.3708	---
Own home	(1.972)**	---	---	---	---	---	(4.6256)	---
	---	---	---	0.3365	---	---	---	0.1225
Cities				(2.005)**				(0.3280)
Beijing	0.9723	0.4813	0.8701	0.5073	0.6523	0.8395	0.0915	0.1024
	(2.355)**	(1.471)	(3.860)***	(1.740)*	(2.962)***	(4.901)***	(0.2886)	(0.3034)
Shenyang	0.0247	0.3027	0.1830	-0.4966	0.4090	0.1028	0.0563	0.0771
	(0.058)	(0.681)	(0.461)	(-1.694)*	(1.415)	(0.445)	(0.2307)	(0.2669)
Jinzhou	-0.0309	0.6111	0.5200	-0.1195	0.3761	0.2628	0.0972	0.1077
	(-0.083)	(1.980)**	(2.246)**	(-0.457)	(1.625)	(1.393)	(0.2964)	(0.3102)
Nanjing	1.5153	0.2244	0.8150	0.8353	0.5235	0.8568	0.0465	0.0686
	(3.356)***	(0.700)	(3.729)***	(2.606)***	(2.392)**	(4.883)***	(0.2107)	(0.2530)
Xuzhou	1.4318	0.0319	0.5929	0.7974	0.0600	0.3939	0.0577	0.0634
	(3.353)***	(0.010)	(2.693)***	(2.649)**	(0.251)	(2.041)**	(0.2334)	(0.2437)
Zhengzhou	0.8548	-0.1556	0.2100	-0.1627	0.2692	0.1242	0.0662	0.0792
	(2.131)**	(-0.512)	(0.958)	(-0.574)	(1.039)	(0.584)	(0.2488)	(0.2702)
Kaifeng	0.2790	-0.4685	-0.4095	-0.1347	0.0948	-0.0137	0.0718	0.0655
	(0.715)	(-1.509)	(-1.673)*	(-0.421)	(0.368)	(-0.065)	(0.2584)	(0.2475)
Pingdingshan	0.8169	0.0218	0.4218	-0.1186	0.0942	0.0748	0.0197	0.0401
	(1.426)	(0.055)	(1.379)	(-0.373)	(0.391)	(0.439)	(0.1391)	(0.1964)
Chengdu	1.2025	-0.1634	0.3018	0.3606	0.3851	0.5337	0.1085	0.1003
	(2.927)***	(-0.537)	(1.543)	(1.249)	(1.712)*	(2.915)***	(0.3112)	(0.3006)
Zigong	0.8285	-0.1578	0.1968	0.1651	0.1788	0.2557	0.0901	0.0752
	(2.119)**	(-0.521)	(0.934)	(0.566)	(0.711)	(1.224)	(0.2866)	(0.2639)
Nanchong	0.9587	-0.0625	0.3617	0.5275	-0.0064	0.2372	0.0761	0.0578
	(2.452)**	(-0.206)	(1.706)*	(1.721)*	(-0.027)	(1.288)	(0.2653)	(0.2334)
Lanzhou	0.6307	0.4067	0.7056	0.2600	-0.0278	0.0512	0.1394	0.0981
	(1.695)*	(1.451)	(3.882)***	(0.913)	(-0.107)	(0.229)	(0.3466)	(0.2977)
Inverse Mills Ratio	---	-0.8023	---	---	-0.8339	---	0.7444	0.6596
		(-5.5285)***			(-10.3544)***		(0.3925)	(0.2521)
R ²	---	---	0.2343	---	---	0.2309		
Pseudo R ²	0.1656	---	---	0.0947	---	---		
X ² (22)	102.38***	---	---	83.43***	---	---		
Wald X ² (21)	---	46.29***	---	---	59.18***	---		
F(21, 258)	---	---	3.81***	---	---	---		
F(21, 391)	---	---	---	---	---	6.90***		
Log likelihood	-257.9430	-509.7257	---	-398.6972	-801.7887	---		
Number of observations	450	250	260	655	394	394		

Source: Urban Household Survey, 1999.

Notes: (1) Omitted dummy variables for men are: no indirect social networks, non-Communist Party members, urban collective sector, and Pinliang. For women, they are: no indirect social networks, non-Communist Party members, urban collective sector, not homeowners and Pinliang.

(2) The exclusion restriction for men is a variable that ranges from 0 to 16 and is a composite of an individual's father's characteristics, such as if he is a Communist Party member and work unit.

(3) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.

(4) Heteroskedasticity-consistent robust adjusted for clustering at the household level are computed.

For men and women in the laid-off sample, we find there are returns to social networks for women but not men (Table 5.4B). This confirms our findings in the combined sample in which social networks are not significant but the interaction term with gender is significant and positive (Table 5.3). Social networks increase income by 2.3% per contact for women (equation (5) in Table 5.4B). Comparing a woman with average sized social network (5.35 contacts) with a woman without any, there is a positive income premium of 12.3%. As in the representative urban sample, indirect social networks are not significant for either men or women.

There are several possible explanations as to why social networks benefit women in the laid-off sample and not men, in contrast to the representative urban sample. Men who became laid-off may have been those who did not have the type of social networks that could help them in the labour market. It may be that men who build social networks for social reasons are more likely to become laid-off because they do not have the right connections to preserve their jobs. This similarly holds for women in the laid-off sample, except that we found during fieldwork that women often agreed to be laid-off instead of their spouse. Some of those women had in mind other opportunities to pursue, *e.g.*, opening a small shop or employment at home. We did not find that the same motivation existed for men. Thus, social networks may be correlated with unmeasured entrepreneurial drive that is generating returns for women in the laid-off sample.

Table 5.4C
The Determinants of Income for Men and Women in the Laid-off Sample
(including Social Capital)

Dependent Variable: Log of	Coefficient (t-statistic)	Mean Value or Percentage
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Annual Income							(standard deviation)	
	Men			Women			Men	Women
	(1) Probit	(2) Corrected MLE	(3) Uncorrected OLS	(4) Probit	(5) Corrected MLE	(6) Uncorrected OLS		
Intercept	-7.9107 (-2.511)**	6.1106 (2.840)***	2.9942 (1.169)	-1.0627 (-0.467)	5.3607 (3.550)***	5.3834 (3.360)***	8.4862 (0.7587)	8.1324 (0.7552)
Social Capital	-0.0221 (-1.311)	0.0321 (3.422)***	0.0279 (3.086)***	-0.0051 (-0.471)	0.0048 (1.100)	0.0048 (1.037)	4.1470 (7.5779)	3.9913 (7.6908)
Personal Characteristics								
Age	0.3689 (2.573)**	0.1142 (1.166)	0.2330 (2.028)**	0.0251 (0.213)	0.1204 (1.511)	0.1198 (1.415)	39.0732 (8.2149)	38.6135 (7.2201)
Age squared	-0.0057 (-3.258)***	-0.0006 (-0.476)	-0.0024 (-1.644)	-0.0006 (-0.377)	-0.0015 (-1.485)	-0.0015 (-1.389)	1594.107 (634.8775)	1543.078 (542.2838)
Communist Party member	0.2120 (0.618)	-0.2197 (-1.043)	-0.0412 (-0.191)	0.1983 (0.552)	0.0263 (0.122)	0.0240 (0.105)	0.1608 (0.3676)	0.0623 (0.2418)
Years of education	0.1313 (2.347)**	-0.0621 (-1.737)*	-0.0160 (-0.385)	0.0296 (0.671)	0.0142 (0.530)	0.0140 (0.500)	10.0848 (2.4300)	9.9820 (2.1630)
Experience	0.0894 (2.725)***	-0.0629 (-2.825)***	-0.0374 (-1.220)	0.0259 (1.253)	0.0058 (0.501)	0.0056 (0.467)	18.6179 (8.6629)	17.6452 (7.7026)
Work unit sector	-0.0018 (-0.019)	0.0512 (0.879)	0.0448 (0.696)	-0.0995 (-1.708)*	0.0523 (1.163)	0.0531 (1.121)	1.875 (1.5136)	1.5359 (1.4554)
Occupation	-0.0952 (-1.660)*	0.0902 (2.555)**	0.0627 (1.552)	0.0415 (1.120)	-0.0192 (-0.789)	-0.0194 (-0.767)	6.3544 (2.3761)	6.9253 (2.3170)
Poor health* married*no drive	-1.3617 (-1.995)**	---	---	---	---	---	0.0296 (0.1695)	---
Help with home work	---	---	---	0.1170 (1.879)*	---	---	---	0.9609 (1.4769)
Cities								
Beijing	1.6595 (2.025)**	0.2366 (0.795)	0.7136 (2.627)***	0.6585 (1.451)	0.4635 (1.983)**	0.4585 (1.850)*	0.0915 (0.2886)	0.1024 (0.3034)
Shenyang	-0.3279 (-0.466)	1.7419 (3.535)***	1.4205 (2.410)**	-0.0138 (-0.031)	-0.0078 (-0.027)	-0.0065 (-0.021)	0.0563 (0.2307)	0.0771 (0.2669)
Jinzhou	0.0502 (0.099)	0.5314 (1.635)	0.2917 (0.938)	0.1610 (0.497)	0.0084 (0.047)	0.0076 (0.041)	0.0972 (0.2964)	0.1077 (0.3102)
Nanjing	1.3667 (2.123)**	0.5091 (1.762)*	0.9728 (4.577)***	0.8600 (1.861)*	0.5800 (2.666)***	0.5737 (2.499)**	0.0465 (0.2107)	0.0686 (0.2530)
Xuzhou	1.3174 (2.210)**	0.3640 (1.257)	0.6458 (2.569)**	0.9373 (2.264)**	0.5248 (3.352)***	0.5178 (3.181)***	0.0577 (0.2334)	0.0634 (0.2437)
Zhengzhou	0.4170 (0.705)	0.1717 (0.550)	0.1218 (0.429)	0.0199 (0.048)	0.2385 (0.951)	0.2388 (0.898)	0.0662 (0.2488)	0.0792 (0.2702)
Kaifeng	0.2614 (0.491)	-0.1193 (-0.364)	-0.2253 (-0.750)	-0.2090 (-0.550)	0.0320 (0.163)	0.0329 (0.158)	0.0718 (0.2584)	0.0655 (0.2475)
Pingdingshan	0.7983 (0.998)	0.5761 (1.136)	0.7359 (1.287)	0.5275 (1.280)	0.0099 (0.071)	0.0052 (0.036)	0.0197 (0.1391)	0.0401 (0.1964)
Chengdu	0.8002 (1.334)	0.1707 (0.511)	0.2824 (0.898)	0.7175 (1.761)*	0.5684 (2.866)***	0.5626 (2.719)***	0.1085 (0.3112)	0.1003 (0.3006)
Zigong	0.2447 (0.313)	0.6428 (1.433)	0.5039 (1.174)	-0.1338 (-0.283)	0.6054 (1.910)*	0.6068 (1.810)*	0.0901 (0.2866)	0.0752 (0.2639)
Nanchong	1.1186 (1.758)*	0.1930 (0.488)	0.4649 (1.257)	1.0174 (2.547)**	0.1156 (0.637)	0.1082 (0.593)	0.0761 (0.2653)	0.0578 (0.2334)
Lanzhou	0.4269 (0.721)	0.4049 (1.342)	0.5757 (2.828)***	0.1904 (0.391)	-0.5145 (-0.872)	-0.5159 (-0.828)	0.1394 (0.3466)	0.0981 (0.2977)
Inverse Mills Ratio	---	-0.8001 (-6.5792)***	---	---	0.0159 (0.1463)	---	0.8652 (0.5798)	0.5950 (0.2388)
R ²	---	---	0.3896	---	---	0.1741		
Pseudo R ²	0.2247	---	---	0.0832	---	---		
X ² (21)	51.99***	---	---	32.16*	---	---		
Wald X ² (7)	---	18.84***	---	---	---	---		
Wald X ² (20)	---	---	---	---	60.59***	---		
F(20, 91)	---	---	4.99***	---	---	---		
F(20, 187)	---	---	---	---	---	2.45***		
Log likelihood	-89.6904	-152.385	---	-177.1323	-370.7839	---		

Number of observations	168	92	92	295	188	188
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Source: Urban Household Survey, 1999.

- Notes:
- (1) Omitted dummy variables for men are: non-Communist Party members, urban collective sector, not household head and Pinliang. For women, they are: non-Communist Party members, urban collective sector, no assistance with home duties and Pinliang.
 - (2) The exclusion restriction for women is a variable that ranges from 0-5 and captures the degree of home work obligations. It is a composite of child care responsibilities, the number of generations in a household greater than one, whether an individual is married and the number of persons in the household. It is the only variable of many tried that significantly affects the likelihood of participating in the labour market.
 - (3) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
 - (4) Heteroskedasticity-consistent robust adjusted for clustering at the household level are computed.

When we estimate the determinants of income including social capital for the laid-off sample (Table 5.4C), social capital has a significant and positive effect for men but not women. Social capital increases income for men by 3.21% per unit (Table 5.4C, equation (2)). For women, social capital has a positive coefficient, but is not significant (Table 5.4C, equation (5)). Comparing a man with average stock of social capital (stock of 4.15) with a man without any, there is a positive income premium of 13.3%.

There are numerous potential explanations as to why men receive returns to social capital while women do not. Men may have invested more in social capital with co-workers than friends or relatives, while women may have invested more in family and friends than with co-workers. We found during fieldwork that women were more willing to spend time with close friends than acquaintances from work. Men, on the other hand, chose more frequently to socialise with co-workers and influential individuals from work. In fact, we found that men often sought out higher ranked co-workers to spend time with outside of work, as well as attend events at which influential individuals were expected. Therefore, the social capital variable

behaves differently because men and women invest in different types of relationships. Men may develop deeper relationships with co-workers and will receive more economic returns, while women tend to invest more in friends and family and less so in co-workers with perhaps lower returns in the workplace.

We conclude that social networks and social capital have different effects on income for men and women. For the representative urban sample, men earn returns from social networks, while women do not. For the laid-off sample, women and not men receive returns from social networks. However, there are returns to social capital for men but not women in the laid-off sample. To explore the effects of the clear gender differences in returns to these variables, we contemplate some counterfactuals.

Consider the counterfactual of a woman with an average sized social network (5.62 contacts) receiving the returns of a man in the representative urban sample (a coefficient of 0.0090 on social networks for men). She would receive a positive income premium of 5.1%. If a woman also has a man's average social network (6.21 contacts), then the income premium is 5.6%. This can be contemplated in light of the income disadvantage of 14.5% associated with female gender that is found in the combined sample after standardising for other measured characteristics. Thus, a woman who receives the returns of a man to social networks could improve her earned income.

If a woman in the laid-off sample with an average stock of social capital (3.99) has the returns of a man (a coefficient of 0.0321 on social capital for men), she

would receive a positive income premium of 12.8%. If she also has the average stock of social capital of a man (4.15), the premium would be 13.3%. This is again considered in light of the pure effect of gender that decreases income by 20.6% in the laid-off sample, standardising for other characteristics. These simulations suggest that if women were to earn returns to social networks in the representative urban sample and to social capital in the laid-off sample, then the positive returns to these variables could improve the income of women.

Finally, men in the laid-off sample have larger social networks than women but do not receive returns. We consider the counterfactual of a man with an average sized social network (6.21 contacts) in the laid-off sample receiving the returns of a woman (a coefficient of 0.0227 on social networks for women). He would earn a premium of 14.1%. This would provide men in the laid-off sample with more income.

Therefore, we find positive income premiums associated with social networks and social capital together with striking gender differences in the returns to these variables. Our simulations show that, standardising for other characteristics, if women earn the returns of men to social networks in the representative urban sample and the returns of men to social capital in the laid-off sample, they could improve their income. If men in the laid-off sample have the returns to social networks of women, then they would also have more income. These findings are consistent with our theoretical arguments that these variables might provide different opportunities for otherwise similarly productive individuals. We have evidence of gender inequality in

earned income that is consistent with differences in social networks and social capital in support of hypothesis H_5^a .

5.6.3 Labour Market Outcome II: Likelihood of Re-Employment

Hypothesis H_5^b predicts that women are less likely than men to find re-employment after experiencing unemployment. Our estimations are for those who are currently re-employed. This may underestimate the rate of re-employment as we do not have data on the previous times an individual has left and re-entered employment. We simply investigate whether social networks or social capital are factors in the probability of re-employment for the laid-off sample.

Table 5.5A					
Binomial Logit Analysis of the Likelihood of Re-Employment for All Individuals in the Laid-off Sample					
Dependent Variable: Re-Employed = 1 (439) Unemployed = 0 (632)	Coefficient (t-statistic)				Mean Value or Percentage (standard deviation)
	(1)	(2)	(3)	(4)	
Intercept	-3.2526 (-1.455)	-4.3992 (-1.753)*	-4.7910 (-1.905)*	-3.1067 (-0.793)	0.4099 (0.4920)
<u>Social Network</u>	---	-0.0145 (-0.625)	-0.0165 (-0.559)	---	5.7193 (13.2997)
Interaction term with gender	---	0.0272 (0.839)	0.0240 (0.659)	---	3.0707 (6.8365)
<u>Indirect Social Network</u>	---	---	1.2587 (3.687)***	---	0.0163 (0.1266)
<u>Social Capital</u>	---	---	---	0.0458 (0.875)	3.9630 (7.5175)
Interaction term with gender	---	---	---	-0.0348 (-0.639)	1.3134 (4.7636)
<u>Personal Characteristics</u>					
Gender	0.0013 (0.007)	-0.0470 (-0.184)	-0.0176 (-0.064)	0.0624 (0.189)	0.5715 (0.4950)
Age	0.1554 (1.400)	0.1843 (1.505)	0.2091 (1.694)*	0.1426 (0.757)	38.8105 (7.6631)
Age squared	-0.0017 (-1.208)	-0.0021 (-1.330)	-0.0024 (-1.553)	-0.0008 (-0.359)	1564.943 (584.122)
Years of education	-0.0336 (-0.890)	-0.0190 (-0.464)	-0.0293 (-0.699)	-0.0569 (-0.862)	10.0260 (2.2937)
Communist Party member	0.2726 (1.018)	0.2360 (0.828)	0.2711 (0.950)	0.0125 (0.031)	0.1045 (0.3060)

Poor health	-1.0852 (-3.988)***	-0.9952 (-3.438)***	-0.9773 (-3.298)***	-1.1801 (-2.745)***	0.0851 (0.2791)
Head of household	0.2893 (1.574)	0.2956 (1.513)	0.3226 (1.624)	0.5449 (1.804)*	0.4043 (0.4909)
Experience	-0.0144 (-0.737)	-0.0065 (-0.302)	-0.0037 (-0.177)	-0.0527 (-1.679)*	18.0607 (8.0582)
Work unit sector	0.0920 (1.546)	0.0932 (1.442)	0.0986 (1.521)	0.1621 (1.640)	1.7142 (1.3181)
Occupation	-0.0317 (-0.897)	-0.0565 (-1.504)	-0.0553 (-1.477)	-0.0584 (-0.974)	6.6818 (2.3586)
Drive	0.4435 (2.763)***	0.4137 (2.382)**	0.4034 (2.310)**	0.3686 (1.408)	0.4359 (0.4961)
<u>Cities</u>					
Beijing	-0.4697 (-0.964)	-0.1007 (-0.179)	-0.3112 (-0.544)	-0.6492 (-0.853)	0.0978 (0.2971)
Shenyang	-0.2848 (-0.584)	0.1034 (0.184)	0.1229 (0.219)	-0.1496 (-0.210)	0.0682 (0.2522)
Jinzhou	1.2409 (2.599)***	1.6499 (3.023)***	1.6299 (2.985)***	1.1398 (1.871)*	0.1032 (0.3043)
Nanjing	0.8060 (1.610)	1.2858 (2.249)**	1.2565 (2.190)**	0.5689 (0.794)	0.0591 (0.2360)
Xuzhou	0.3456 (0.685)	0.7084 (1.237)	0.6767 (1.185)	0.1913 (0.289)	0.0610 (0.2393)
Zhengzhou	-0.6083 (-1.124)	0.0248 (0.041)	-0.0566 (-0.092)	-0.8446 (-1.160)	0.0736 (0.2612)
Kaifeng	-0.4620 (-0.905)	0.0515 (0.089)	0.0388 (0.067)	-0.6250 (-0.952)	0.0682 (0.2522)
Pingdingshan	-1.8160 (-2.605)***	-1.2935 (-1.721)*	-1.5419 (-1.935)*	-1.4082 (-1.729)*	0.0314 (0.1744)
Chengdu	-0.8055 (-1.450)	-0.2782 (-0.425)	-0.3868 (-0.587)	-0.6976 (-0.700)	0.1038 (0.3051)
Zigong	-0.3575 (-0.624)	0.3409 (0.543)	0.2281 (0.362)	0.1076 (0.119)	0.0833 (0.2764)
Nanchong	-0.8632 (-1.458)	-0.2911 (-0.444)	-0.3781 (-0.576)	-0.5226 (-0.654)	0.0652 (0.2469)
Lanzhou	-0.5423 (-0.963)	-0.0443 (-0.071)	-0.0585 (-0.093)	--- ¹⁸⁰	0.1171 (0.3216)
Pseudo R ²	0.1157	0.1180	0.1310	0.1450	
Wald X ² (23)	109.52***	---	---	---	
Wald X ² (24)	---	---	---	51.11***	
Wald X ² (25)	---	94.72***	---	---	
Wald X ² (26)	---	---	7.29***	---	
Log likelihood	-493.7390	-426.9363	-420.6270	-202.8226	
Predicted probability of re-employment ¹⁸¹	42.20%	41.85%	41.85%	47.23%	
Marginal effect of social networks ¹⁸²	---	-0.0033	-0.0038	---	
Marginal effect of indirect social networks	---	---	0.2886	---	

¹⁸⁰ Lanzhou was dropped as it predicts failure perfectly.

Marginal effect of social capital	---	---	---	0.0113
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Source: Urban Household Survey, 1999.

- Notes: (1) Omitted dummy variables for equations 1, 2 and 4 are: male, non-Communist Party members, urban collective sector, not household heads, healthy individuals, individuals who lack drive, and Pinliang. For equation 3, they are: no indirect social networks, male, non-Communist Party members, urban collective sector, not household heads, healthy individuals, individuals who lack drive, and Pinliang.
- (2) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
- (3) Heteroskedasticity-consistent robust standard errors adjusted for clustering at the household level are computed.

Virtually every variable is insignificant in Table 5.5A, including gender.

Although the social network and social capital variables are insignificant, there are differences in the predicted probabilities of re-employment when they are included in the logit estimations.¹⁸³

We find that there is a 42% probability of re-employment after experiencing unemployment (equation (1), Table 5.5A). When we include social networks in equations (2) and also indirect social networks in equation (3) of the same table, social networks have a very small and negative marginal effect. This suggests that social networks do not have a positive effect on re-employment. As expected, having an indirect social network is significant and has a large and positive effect on becoming re-employed since this variable captures individuals who successfully found

¹⁸¹ This is the predicted probability of becoming re-employed estimated at the mean values of the independent variables.

¹⁸² This is the slope or marginal effect of a variable estimated at the mean values of all independent variables (see Greene 1997[1993]: 873-880). The formula is $[e^{\beta'x}/(1+ e^{\beta'x})^2]\beta$, where β' denotes the coefficients of the vector of independent variables, x , evaluated with respect to the coefficient, β , on either the social network or social capital variable.

¹⁸³ We also estimated a logit specification for the likelihood of re-employment that includes the value of gifts given directly in appreciation for job assistance and found it to be insignificant (unreported equation).

their current job using a contact. We include it with social networks in equation (3) to ensure all of the effects of the social network variables on re-employment are considered, but refrain from drawing conclusions on account of its upward bias.

Unlike social networks, social capital increases the probability of becoming re-employed (Table 5.5A equation (4)). The probabilities of re-employment for someone with an average amount of social capital (stock of 3.96) and someone without any are 51.7% and 42.8%, respectively. Although insignificant, there is a positive effect on the likelihood of re-employment associated with social capital but not social networks. We now estimate the probabilities of re-employment for men and women separately.

Table 5.5B Binomial Logit Analysis of the Likelihood of Re-Employment for Men and Women in the Laid-off Sample								
Dependent Variable:	Men				Women			
	182 262				257 370			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Intercept	-6.8628 (-1.930)*	-8.3640 (-1.880)*	-8.5918 (-1.933)*	-9.7870 (-1.228)	-2.8930 (-0.819)	-4.3510 (-1.170)	-4.4224 (-1.183)	1.6110 (0.301)
Social Network	---	-0.0248 (-0.559)	-0.0279 (-0.601)	---	---	0.0018 (0.070)	-0.0015 (-0.057)	---
Indirect Social Network	---	---	0.8729 (1.190)	---	---	---	1.3620 (3.178)***	---
Social Capital	---	---	---	0.0582 (0.700)	---	---	---	0.0111 (0.591)
Personal Characteristics								
Age	0.2702 (1.595)	0.2784 (1.407)	0.2983 (1.497)	0.3650 (0.864)	0.1407 (0.831)	0.2320 (1.281)	0.2453 (1.340)	-0.0082 (-0.032)
Age squared	-0.0023 (-1.100)	-0.0019 (-0.770)	-0.0022 (-0.901)	-0.0026 (-0.495)	-0.0018 (-0.845)	-0.0031 (-1.341)	-0.0033 (-1.396)	0.0007 (0.217)
Communist Party member	-0.1253 (-0.343)	-0.0575 (-0.141)	-0.0803 (-0.197)	-0.3790 (-0.567)	0.8365 (1.909)*	0.7603 (1.697)*	0.8226 (1.871)*	0.7005 (1.134)
Years of	-0.0268	-0.0127	-0.0124	-0.1198	-0.0260	-0.0180	-0.0427	-0.0575

education	(-0.436)	(-0.188)	(-0.180)	(-0.968)	(-0.471)	(-0.304)	(-0.720)	(-0.629)
Poor health	-2.2084	-2.0371	-2.0269	-2.8180	-0.6155	-0.5135	-0.4461	-0.4418
Experience	(-4.020)***	(-3.476)***	(-3.463)***	(-3.171)***	(-1.753)*	(-1.373)	(-1.167)	(-0.844)
	-0.0629	-0.0810	-0.0738	-0.1022	0.0042	0.0124	0.0095	-0.0460
Work unit	(-2.073)*	(-2.107)**	(-1.823)*	(-1.313)	(0.156)	(0.435)	(0.327)	(-1.092)
sector	0.0431	-0.0110	0.0041	0.2462	0.1053	0.1316	0.1325	0.1648
Occupation	(0.439)	(-0.100)	(0.037)	(1.078)	(1.319)	(1.577)	(1.576)	(1.321)
	-0.0229	-0.0694	-0.634	0.0615	-0.0484	-0.0591	-0.0574	-0.0851
Drive	(-0.354)	(-0.920)	(-0.836)	(0.397)	(-1.138)	(-1.322)	(-1.285)	(-1.297)
	0.3646	0.4511	0.4661	0.2704	0.5030	0.4963	0.4790	0.5614
Head of	(1.298)	(1.443)	(1.491)	(0.511)	(2.432)**	(2.241)**	(2.141)**	(1.637)*
household	0.3265	0.4369	0.3874	1.1205	0.5923	0.5473	0.6081	-0.2149
Father is a	(0.940)	(1.068)	(0.938)	(1.538)	(1.787)*	(1.543)	(1.665)*	(-0.398)
Communist Party	0.7079	0.9932	0.9885	0.7417	-0.1683	-0.2218	-0.2163	0.4071
member	(2.176)**	(2.632)***	(2.610)***	(0.932)	(-0.691)	(-0.878)	(-0.843)	(1.161)
Mother is a	0.3786	0.4891	0.4285	0.0532	-0.7536	-0.6064	-0.6004	-0.6035
Communist Party	(0.728)	(0.759)	(0.685)	(0.056)	(-1.648)*	(-1.260)	(-1.241)	(-0.953)
member								
Number of	0.3004	0.2737	0.2192	0.4502	-0.0408	-0.1703	-0.1588	-0.5307
household	(1.640)	(1.133)	(0.916)	(1.184)	(-0.250)	(-0.999)	(-0.940)	(-2.129)**
members								
Home owner	-0.1930	-0.2670	-0.2450	0.0643	-0.3083	-0.3083	-0.2781	0.2983
	(-0.559)	(-0.672)	(-0.623)	(0.105)	(-0.724)	(-0.691)	(-0.609)	(0.479)
Cities								
Beijing	-0.7423	0.0788	-0.1365	-1.3590	-0.3212	-0.1028	-0.2888	-0.3284
	(-0.758)	(0.054)	(-0.091)	(-0.645)	(-0.531)	(-0.163)	(-0.446)	(-0.360)
Shenyang	0.0326	0.6831	0.6586	-0.0182	-0.2238	-0.0132	0.0155	0.0524
	(0.033)	(0.459)	(0.440)	(-0.011)	(-0.371)	(-0.021)	(0.024)	(0.064)
Jinzhou	1.9205	2.7731	2.7545	0.7206	1.2816	1.3927	1.3912	1.2386
	(1.829)*	(1.859)*	(1.830)*	(0.432)	(2.187)**	(2.297)**	(2.295)**	(1.795)*
Nanjing	0.9193	1.9226	1.8072	-0.4292	1.0222	1.2541	1.2889	1.4863
	(0.921)	(1.278)	(1.190)	(-0.255)	(1.643)	(1.918)*	(1.962)**	(1.737)*
Xuzhou	0.3791	1.4883	1.4784	-0.1361	0.5843	0.5739	0.5325	0.4134
	(0.382)	(1.011)	(0.997)	(-0.082)	(0.948)	(0.899)	(0.837)	(0.523)
Zhengzhou	0.0143	1.2813	1.2058	-1.3560	-0.8179	-0.5912	-0.6843	-0.2458
	(0.014)	(0.821)	(0.766)	(-0.806)	(-1.157)	(-0.788)	(-0.906)	(-0.285)
Kaifeng	-0.5885	0.4903	0.4674	-1.1212	-0.0508	0.0397	0.0570	-0.1486
	(-0.596)	(0.333)	(0.315)	(-0.690)	(-0.081)	(0.061)	(0.088)	(-0.190)
Pingdingshan	-1.1485	-0.1797	-0.3102	-1.5897	-2.0475	-1.9020	-2.0475	-1.6815
	(-0.921)	(-0.102)	(-0.172)	(-0.847)	(-2.160)**	(-1.985)**	(-2.153)**	(-1.589)
Chengdu	-1.4252	-0.0547	-0.0670	--- ¹⁸⁴	-0.3173	-0.0153	-0.1990	0.2177
	(-1.323)	(-0.035)	(-0.042)		(-0.422)	(-0.018)	(-0.238)	(0.160)
Zigong	-0.5388	0.8623	0.8770	2.5104	0.0336	0.3893	0.1487	0.0780
	(-0.480)	(0.554)	(0.560)	(1.331)	(0.046)	(0.512)	(0.202)	(0.078)
Nanchong	-1.1783	-0.0058	-0.0741	0.1535	-0.0918	0.0775	-0.0255	-0.3905
	(-1.102)	(-0.004)	(-0.047)	(0.075)	(-0.116)	(0.096)	(-0.030)	(-0.433)
Lanzhou	-1.0707	0.1243	0.1245	--- ¹⁸⁵	0.1185	0.3739	0.3215	--- ¹⁸⁶
	(-0.967)	(0.081)	(0.081)		(0.163)	(0.494)	(0.414)	

¹⁸⁴ Chengdu was dropped as it predicted the outcome of failure perfectly.

¹⁸⁵ Lanzhou was dropped as it predicted the outcome of failure perfectly.

¹⁸⁶ *Ibid.*

Pseudo R ²	0.1888	0.2116	0.2164	0.2652	0.1258	0.1266	0.1411	0.1475
Wald X ² (25)	---	---	---	36.18*	---	---	---	---
Wald X ² (26)	54.86***	---	---	---	62.97***	---	---	37.04*
Wald X ² (27)	---	53.27***	---	---	---	54.02***	---	---
Wald X ² (28)	---	---	52.07***	---	---	---	56.46***	---
Log likelihood	-172.8993	-142.7340	-141.8768	-58.3168	-292.5829	-259.0181	-254.7356	-131.7623
Predicted probability of re-employment ¹⁸⁷	42.95%	42.11%	42.11%	53.91%	41.58%	41.97%	41.97%	44.44%
Marginal effect of social networks	---	-0.0056	-0.0004	---	---	0.0004	-0.0003	---
Marginal effect of indirect social networks	---	---	0.0128	---	---	---	0.3139	---
Marginal effect of social capital	---	---	---	0.0010	---	---	---	0.0026

Source: Urban Household Survey, 1999.

- Notes: (1) Omitted dummy variables for equations 1, 2, 4, 5, 6, and 8 are: non-Communist Party members, urban collective sector, not household heads, healthy individuals, individuals who lack drive or own their homes, whose parents are not Communist Party members and Pinliang. For equations 3 and 7, they are: no indirect social networks, non-Communist Party members, urban collective sector, not household heads, healthy individuals, individuals who lack drive or own their homes, whose parents were not Communist Party members and Pinliang.
- (2) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
- (3) Heteroskedasticity-consistent robust standard errors adjusted for clustering at the household level are computed.

As in the combined sample (Table 5.5A), not many variables are significant, including social networks and social capital. Indirect social networks are significant for women but not men, indicating gender differences. Among other variables that are significant, there are some that may imply additional social network or social capital effects. These are father’s Communist Party membership that increases the probability of re-employment for men, while themselves being a Party member helps women. Communist Party membership is likely to be a form of cultivating contacts and accords with the definition of social capital used by Putnam,

¹⁸⁷ This is the predicted probability of becoming re-employed estimated at the mean values of the independent variables.

Leonardi and Nanetti (1993) in which social capital is measured by the number of associational memberships. The nature of Communist Party membership is difficult to disentangle and is open to several possible interpretations. It is also possible that Communist Party membership is a signal to employers that an individual has ambition or other unmeasured characteristic that is desirable, especially in the state-owned sector. Other significant determinants are poor health, which decreases the probability of re-employment for men, and drive that increases the likelihood of re-employment of women. We concentrate our analyses on our measures of social networks and social capital.

Men have a 43% probability of becoming re-employed, while the probability is just slightly lower for women at 42% (equations (1) and (4) in Table 5.5B). Social networks have a small and negative marginal effect on the likelihood of re-employment for men (Table 5.5B, equations (2) and (3)). For women, the marginal effect of social networks is similarly small, but it is positive in equation (7) and negative in equation (6) (Table 5.5B). The effects of social networks are negligible when we compute the probabilities of re-employment for someone with an average sized network and someone without any.

In contrast, social capital has a positive and small effect on the probability of re-employment when comparing someone who has invested and someone who has not invested in this form of capital. From Table 5.5B equation (4), men with mean social capital (stock of 4.15) have a probability of re-employment of 54.3%, while men without any social capital have a probability of 53.5%. Comparing women with average social capital (stock of 3.99) to women without any stock of

social capital, the predicted probabilities of re-employment are 45.5% and 43.4%, respectively. Although insignificant in the logit estimations, having an average stock of social capital appears to increase the likelihood of re-employment more for women than for men, *e.g.*, by approximately 2% for women and 1% for men.

Consider the counterfactual of a woman having more social capital, *i.e.*, if she has the average social capital of men (stock of 4.15) and her returns, her predicted probability of re-employment is 45.5%. This suggests that despite having higher returns, women have a lower predicted probability of re-employment than men for the same amount of social capital. Thus, social capital helps women more than men in job search, but there are other impediments to becoming successfully re-employed for women. These could be due to taste or statistical screening or labour supply differences. Thus, we find support for hypothesis H_5^b in that women have a lower probability of becoming re-employed than men in our estimations of the likelihood of re-employment after experiencing unemployment.

Further, with the understanding that these variables are insignificant, social capital increases the probability of re-employment, while the effect of an average sized social network is negligible. This provides evidence that is contrary to what is known as the folk theorem in the social network literature, likely traced to the “strength of weak ties” theory advanced by Granovetter (1995 [1974]). The hypothesis is that the breadth, rather than the closeness of contacts, is important in finding a job. Our evidence suggests that social capital (the depth of ties) and not social networks (the breadth of ties) matters for re-employment.

5.7 Conclusion

In this chapter we explored gender inequality within the labour market and tested the hypotheses concerning the employment outcomes for men and women when their respective amounts of social networks and social capital are considered. Our theory posits that social capital generates returns in the form of opportunities in the labour market. By providing employment options, individuals with social capital can decrease some of the frictions in imperfect markets and have more elastic labour supply curves (hypothesis H_2). Thus, hypothesis H_3 predicts that the group with the relatively less elastic labour supply with respect to a firm will suffer from discrimination, *i.e.*, holding productive characteristics constant, they will earn less income and have a smaller likelihood of re-employment after experiencing unemployment. We now assess the cumulative evidence from H_1 , H_5^a and H_5^b to determine whether the labour market outcomes of men and women in urban China are consistent with our hypotheses.

We find that women have smaller social networks and less social capital than men. This may be due to their bearing a greater share of home work (*i.e.*, less time to invest in relationships). Women will also have less income with which to invest in social capital and we find that they have a smaller mean value of gifts than men. More home responsibilities, such as childcare, also mean less nonmonetary resources.

The two forms of labour market outcomes we examine are earned income and re-employment. Through counterfactuals, that is, if women were to have

the returns of men to social networks in the representative urban sample and to social capital in the laid-off sample, they would earn income premiums of over 5% and about 13%, respectively. If men in the laid-off sample were to earn the returns of women to social networks, they would earn an income premium of 14%. Also, even though social capital increases the likelihood of re-employment more for women than men (2% versus 1%), men have higher probabilities of becoming re-employed than women. The evidence shows that social capital and, to some extent social networks, can improve earned income and re-employment prospects. The better labour market outcomes of men, moreover, might be correlated with men having larger social networks and more social capital than women.

Our findings are potentially consistent with several explanations for gender inequality within labour markets. The significantly negative coefficient on the female gender variable in the income functions may be attributable to a taste for discrimination against women, some form of statistical screening or labour supply differences not accounted for by social capital. Nevertheless, social networks and social capital tend to be significant and positive along with the female gender dummy variable. This can be interpreted as support for the notion that social capital garners economic returns in at least two respects. The first is that there are efficiency gains, so a worker with social capital – perhaps by reducing the transaction costs of getting things done on the job – is more productive and is rewarded by a positive income premium. In none of our estimations of income functions is social networks or social capital associated with a negative coefficient. A second effect is that by generating employment opportunities that are not related to productivity on the job, social capital reduces the frictions impeding mobility that characterises an imperfect labour market.

In this way, social capital affects the labour supplied to a firm. We further find that having a larger stock of social capital has a positive effect on re-employment. This implies that social capital may assist the job search process by reducing transaction costs. We cannot rule out alternative, more conventional explanations. Nevertheless, our evidence suggests that social capital provides employment opportunities, so increasing the elasticity of labour supplied to firms and thus raises wages and decreases frictions associated with job search.

In conclusion, it is possible that women and men with equal productive characteristics will experience differential treatment in the labour market if they have different sizes of social networks and amounts of social capital. These outcomes may be explained by the opportunities associated with economic returns to these variables. They further provide support for discrimination to be economically motivated in imperfect labour markets. The gender income inequality in the current reform period in urban China might, at least in part, be explained by the differential opportunities available to men and women that are more apparent in a more market-oriented system.

Appendix 5.1 Endogeneity Tests

Using the Durbin-Wu-Hausman or an augmented regression test, we tested for the endogeneity of the social network and social capital variables in the income functions and the logit estimations of re-employment. We regressed each potentially endogenous right-hand-side variable on all exogenous variables and an instrument (Davidson and MacKinnon 1993). We then included the residual in a regression of the desired model. If the coefficient on the residual is significant in the desired specification (including the potentially endogenous variable and excluding the instrument), then OLS is not producing consistent estimates and the variable in question is not exogenous.

We tested for significance at the 1% and 5% levels and used a variety of instruments for the different social network and social capital variables. For the representative urban sample, the instrument for social networks was the number of people in the household or of generations living in the household, which is equal to zero if it is a three-generation household, 1 if other type of household, 2 if two-generation household and 3 if one-generation household. Social networks were not endogenous.

For indirect social networks, the instrument was how an individual obtained his/her current job. The question asks: “How did you get your current job? 1) assigned by government; 2) inherited it; 3) through an open examination; 4) through an employment agency; 5) found it through the newspaper; 6) found it through a referral by someone you or your family knows; 7) found it on your own; 8) started your own business; (9) not working currently; (10) other (please specify): _____.” Indirect social networks were found not to be endogenous.

For the laid-off sample, the instrument for social capital was drive, which was 1 if they disagreed with the following question: “Just want to follow the crowd.” It was zero if they agreed. Social capital was not endogenous.

Appendix 5.2

The Determinants of Social Networks and Social Capital¹⁸⁸

Table 5.2.1

The Determinants of Social Networks for all Working-Aged Individuals in the Representative Urban Sample

Dependent Variable:	Coefficient	Mean Value or Percentage
Social Network	(t-statistic)	(standard deviation)
Intercept	10.7517	5.9123 ¹⁸⁹
	(2.165)**	(5.6649)
Logarithm of annual income	0.5087	8.8463
	(1.558)	(0.6842)
<u>Personal Characteristics</u>		
Gender	-0.0761	0.5123
	(-0.268)	(0.4999)
Age	-0.4573	38.3218
	(-2.203)**	(9.9540)
Age squared	0.0021	1567.604
	(1.219)	(747.4115)
Years of education	0.0674	10.8932
	(0.706)	(2.7893)
Experience	0.1735	18.8683
	(2.842)***	(9.3242)
Communist Party membership	0.3042	0.1993
	(0.446)	(0.3995)
Work unit sector	0.1384	1.9038
	(0.667)	(1.3906)
Occupation	-0.1661	5.7421
	(-2.008)**	(2.5777)
Married	0.9265	0.8129
	(1.037)	(0.3901)
Experienced unemployment in the past five years	-0.2851	0.1748
	(-0.515)	(0.3799)
Poor health	-0.5118	0.0655
	(-0.701)	(0.2475)
Had been an intellectual youth	0.2019	0.8332
	(0.409)	(0.3729)
<u>Household characteristics</u>		
Migrant household	4.2668	0.0210
	(2.095)**	(0.1434)
<u>Characteristics of parents</u>		
Father:		
Communist Party member	0.0080	0.3374
	(0.018)	(0.4729)
Completed professional school	-2.9802	0.0456
	(-2.859)***	(0.2087)
Completed middle level professional school	-1.8064	0.0590
	(-1.986)**	(0.2357)

¹⁸⁸ We attempted to estimate the determinants of our proxy for indirect social networks, but even an estimation that includes only city dummies has an F-value that is not significant (unreported equation).

¹⁸⁹ Mean and standard deviation of the dependent variable, which is a measure of a social network comprising the number of contacts, are reported.

Completed lower middle school	-1.4029 (-2.165)**	0.1878 (0.3907)
Occupation	-0.2023 (-2.688)***	6.3525 (3.2152)
Mother:		
Communist Party member	-0.4088 (-0.462)	0.0966 (0.2954)
Completed middle level professional school	3.2962 (2.120)**	0.0402 (0.1964)
Completed lower middle school	1.4097 (2.279)**	0.1459 (0.3530)
City-specific effects		Yes
R ²		0.1547
F(48, 601)		3.01***
Number of observations		858

Source: Urban Household Survey, 1999.

- Notes: (1) Omitted dummy variables are: male, non-Communist Party members, single individuals who have never experienced unemployment, are in good health, had not been an intellectual youth, is not head of household, has no young children present in the household, do not own their homes, are not migrants, whose father had not been a Communist Party member and completed less than primary school, whose mother had not been a Communist Party member and completed less than primary school, and Pinliang.
- (2) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
- (3) Heteroskedasticity-consistent robust adjusted for clustering at the household level are computed.
- (4) Not all variables are reported for brevity.

Table 5.2.2
The Determinants of Social Capital for all Working-Aged Individuals in the Laid-off Sample

Dependent Variable: Social Capital	Coefficient (t-statistic)	Mean Value or Percentage (standard deviation)
Intercept	-7.8519 (-0.669)	4.0486 ¹⁹⁰ (7.6429)
Logarithm of annual income	0.8379 (1.568)	8.2875 (0.7765)
<u>Personal Characteristics</u>		
Gender	0.8005 (0.728)	0.5715 (0.4950)
Age	0.1476 (0.302)	38.8105 (7.6631)
Age squared	-0.0031 (-0.474)	1564.943 (584.122)
Years of education	0.0859 (0.352)	10.0260 (2.2937)
Experience	0.1601 (1.080)	18.0607 (8.0582)
Communist Party membership	1.1314 (0.775)	0.1045 (0.3060)
Work unit sector	0.1224 (0.374)	1.6764 (1.4886)
Occupation	0.1586 (0.745)	6.6818 (2.3586)
Married	1.0724 (0.776)	0.9059 (0.2921)
Poor health	-0.7286 (-0.477)	0.0851 (0.2791)
Had been an intellectual youth	-0.8755 (-0.865)	0.7727 (0.4192)
<u>Household characteristics</u>		
Head of household	-1.8792 (-1.737)*	0.4043 (0.4909)
<u>Characteristics of parents</u>		
Father:		
Communist Party member	0.6054 (0.508)	0.2827 (0.4505)
Occupation	-0.3388 (-1.648)*	6.3877 (2.9277)
Mother:		
Communist Party member	2.1488 (0.843)	0.0772 (0.2669)
Completed upper middle school	5.0840 (1.679)*	0.0531 (0.2243)
Completed primary school	3.8080 (2.014)**	0.2625 (0.4401)
City-specific effects		No
R ²		0.1834
F(19, 2871)		1.64**
Number of observations		247

Source: Urban Household Survey, 1999.

¹⁹⁰ Mean and standard deviation of the dependent variable, which is a measure of social capital comprising of the time spent, amount of gifts given and closeness to the contact, are reported.

- Notes:
- (1) Omitted dummy variables are: male, non-Communist Party members, single individuals in good health, who had not been an intellectual youth, not head of household, have no young children present in the household, do not own their homes, whose father had not been a Communist Party member and completed less than primary school, whose mother had not been a Communist Party member and completed less than primary school, and Pinliang.
 - (2) *** denotes statistical significance at the 1% level, ** at 5% level, and * at 10% level.
 - (3) Heteroskedasticity-consistent robust adjusted for clustering at the household level are computed.
 - (4) Not all variables are reported for brevity.

Appendix 5.3 Survey Questions

QUESTIONNAIRE I FOR URBAN HOUSEHOLDS INCOME, CONSUMPTION AND EMPLOYMENT (1999)

107. Current status of members

- 1) working or employed; 2) officially off-duty (*lixiu*);
- 3) retired; 4) waiting for job assignment; 5) laid-off from SOEs;
- 6) early retirement; 7) unemployed; 8) full-time homemaker;
- 9) currently a full-time student; 10) disabled, injured or had chronic disease, unable to work;
- 11) other

111. Educational level

- 1) college and above; 2) professional school;
- 3) middle level professional school; 4) upper middle school;
- 5) lower middle school; 6) elementary school; 7) below elementary school

131. Ownership of your work unit

- 1) SOE at central/provincial level
- 2) Local SOE
- 3) Urban collective
- 4) Private firm (including partnership)
- 5) Self-employed
- 6) Sino-foreign joint venture
- 7) Foreign company
- 8) State share-holding company
- 9) Other share-holding company
- 10) Rural private enterprise
- 11) Rural individual enterprise
- 12) Other ownership

133. Occupation

- 1) Owner (manager) of private firm or self-employed
- 2) Professional
- 3) Responsible person of government agent, institution and enterprise
- 4) Department responsible person of government agent, institution and enterprise
- 5) Clerical/office staff
- 6) Manufacturing worker at or below Skill Level 3
- 7) Manufacturing worker at or above Skill Level 4
- 8) Unskilled worker
- 9) Salesclerk
- 10) Service worker
- 11) Farmer
- 12) Other

146. In the past year, how many relatives, friends, colleagues or acquaintances did you exchange gifts with or often maintain contact?

146a. Have any of them helped you find a job? 1. Yes 2. No

146b. Is your current job the one that you found with their help? 1. Yes 2. No

147. If "Yes," please answer the following questions about the person who helped you find a job.

147a. Sex 1. Male 2. Female

147b. His or her age (approximately)

147c. His or her current status (answer selections are same as question 107)

147d. His or her educational level (answer selections are same as question 111)

147e. His or her occupation (answer selections are same as question 133)

147f. Is he or she a CPPC member? 1. Yes 2. No

147g. Ownership of his or her work unit (answer selections are same as question 131)

147h. Did you give him or her gifts or cash gifts when you asked him/her for help? 1. Yes 2. No

147i. If "Yes," how much were they worth in monetary value?

- 147j. Did he/she make use of his/her connections when he /she looked for job opportunities for you?
1. Yes 2. No
- 147k. Did he/she find a job for you in his/her work unit? 1. Yes 2. No

Questionnaire II for the Unemployed/Laid-Off

37. Please list 10 relatives (including family members), friends and acquaintances within your *guanxi* network with whom you exchange gifts. Answer the following 21 questions for each person.

Name										
37a										
37b										
37c										
37d										
37e										
37f										
37g										
37h										
37i										
37j										
37k										
37l										
37m										
37n										
37o										
37p										
37q										
37r										
37s										
37t										
37u										

- 37a) Their relationship to you
- 1. Spouse
 - 2. Child
 - 3. Grandchild
 - 4. Parent
 - 5. Parent in law
 - 6. Grandparent
 - 7. Sibling
 - 8. Other relative
 - 9. Friend
 - 10. Classmate
 - 11. Fellow villager

12. Neighbour
 13. Colleague
 14. Other
- 37b) Gender: 1. Male 2. Female
- 37c) Age (Years)
- 37d) Employment status
1. Employed
 2. Off-duty
 3. Retired
 4. Youth waiting for a job assignment
 5. Laid off
 6. Internal retired
 7. Unemployed
 8. Home maker
 9. School student
 10. Disabled
 11. Other
- 37e) Ownership of work unit (choose from the same selections as listed in question 8)
- 37f) Industrial sectors of work unit (choose from the same selections as listed in question 11)
- 37g) Their occupation (choose from the same selections as listed in question 13)
- 37h) If they are professionals and cadres, what are their professional titles and ranks
- 1) Senior title
 - 2) Middle title
 - 3) Junior title
 - 4) Technician level
 - 5) Bureau chief level and above
 - 6) Division chief level
 - 7) Section chief level
 - 8) Section member
- 37i) Their educational level
1. College or above
 2. Professional school
 3. Middle level professional school (technical school, vocational school)
 4. High school
 5. Middle school
 6. Elementary school
 7. Below elementary school
- 37j) Are they CPPC members? 1. Yes 2. No
- 37k) What are their incomes approximately (Yuan)?
- 37l) How familiar are you with them?
8. Not familiar
 9. Not very familiar
 10. Fairly familiar
 11. Familiar
 12. Very familiar
- 37m) If you did not have a job, can you ask them to help you find a job? 1. Yes 2.No
- 37n) Did they help you to find a job in fact? 1.Yes 2.No
- 37o) If “Yes,” did they find a job for you in their work unit? 1. Yes 2. No
- 37p) If “Yes,” the job that you got with their help is: 1. Your current job 2. Your previous job
3. Other
- 37q) Did they make use of their connections when helping you to find a job? 1. Yes 2. No
- 37r) Did you give them any gifts to express your appreciation around the time of the assistance?
1. Yes 2. No
- 37s) If “Yes,” how much were your gifts worth (Yuan)?
- 37t) What was the value of your gifts to each of them in the past year (Yuan)? (Please estimate the monetary value of all goods and cash gifts)
- 37u) How many times did you get together with them in the past month (including meals, chatting, going to movies, watching TV, and other activities)?

1. None
2. One or two times
3. Once a week
4. Two or three times a week
5. Almost every day
6. At least once a day

【问卷 I】 城镇住户收入、消费与就业调查主要问卷 (1999 年)

107 成员现状与身份

1. 工作或就业 2. 离休 3. 退休 4. 待业青年
5. 下岗职工 6. 内退人员 7. 失业人员 8. 家务劳动者
9. 在校学生 10. 丧失劳动能力者 11. 其他

111 文化程度

1. 大学或大学以上 2. 大专 3. 中专（中技、职高）
4. 高中 5. 初中 6. 小学 7. 小学以下

131 就业单位所有制性质

- | | | |
|------------------|--------------|------------|
| 1. (中央、省) 国有独资 | 2. (地方) 国有独资 | 3. 城镇集体所有制 |
| 4. 城镇私营 (包括合伙企业) | 5. 城镇个体 (企业) | 6. 中外合资企业 |
| 7. 外资企业 | 8. 国家控股企业 | 9. 其它股份企业 |
| 10. 农村私营企业 | 11. 农村个体 | 12. 其它所有制 |

133 职业种类

1. 私营企业主（经理）或个体户主
2. 各类专业技术人员
3. 机关、企事业单位负责人
4. 机关、企事业单位部门负责人
5. 办事人员
6. 技术 3 级及 3 级以下生产工人
7. 技术 4 级及 4 级以上生产工人
8. 非技术工人
9. 商业人员
10. 服务人员
11. 农民
12. 其他

146 在过去一年中您有多少个与您相互赠送礼物或经常来往的亲戚、朋友、同事和熟人?

- 146a 他们中的一些人是否帮助过您找过工作? 1. 是 2. 否

- 146b 这个工作是您现在的工作吗? 1. 是 2. 否

147 如果回答“是”，请回答帮您找过这个工作的这个人的以下情况：

- 147a 他（她）的性别 （1 男 2 女）

- 147b 他（她）的（大概）年龄（岁）

- 147c 他（她）的身份（按 107 题中的分类进行选择）

- 147d 他（她）的文化程度（按 111 题中的分类进行选择）

- 147e 他（她）的职业（按 133 题中的分类进行选择）

- 147f 他（她）是否中共党员 1. 是 2. 否

- 147g 他（她）的就业单位的所有制性质（按 131 题中的分类进行选择）

- 147h 在求他（她）帮您找工作时，您是否给他（她）送过礼物或礼金？ 1. 是 2. 否

- 147i 如果回答“是”，请问它的货币价值大约多少？

- 147j 他（她）帮您找工作时是否动用了他（她）的关系网？ 1. 是 2. 否

- 147k 他（她）是否帮您在他（她）单位找到了工作？ 1. 是 2. 否

【问卷 II】 城镇失业（下岗）人员调查问卷（1999 年）

37 请在下表中列出 10 位属于您关系网中的相互送礼的亲戚（包括家庭成员），朋友和熟人，并根据各人的情况，回答以下 21 个问题。

[illegible]

37c										
37d										
37e										
37f										
37g										
37h										
37i										
37j										
37k										
37L										
37m										
37n										
37o										
37p										
37q										
37r										
37s										
37t										
37u										

- 37a 他（们）与您的关系
1. 配偶

2. 儿女

3. 孙子女

4. 父母

5. 岳父母（公婆）

6. 祖父母

7. 兄弟姐妹

8. 其他亲属

9. 朋友

10. 同学

11. 老乡

12. 邻居

13. 同事

14. 其他
- 37b 他（们）的性别：

1. 男性

2. 女性
- 37c 他（们）的（大概）年龄（岁）
- 37d 他（们）的就业状况
1. 工作或就业

2. 离休

3. 退休

4. 待业青年

5. 下岗职工

6. 内退人员

7. 失业人员

8. 家务劳动者

9. 在校学生

10. 丧失劳动能力者

11. 其他
- 37e 他（们）工作单位的所有制性质（选择答案与第 8 题相同）
- 37f 他（们）就业的所在行业（选择答案与第 11 题相同）
- 37g 他（们）的职业种类（选择答案与第 13 题相同）
- 37h 如果他（们）是专业技术人员和干部，其职称和级别（选择答案与主要调查问卷中 134 题相同）
- 37i 他（们）的文化程度
1. 大学或大学以上

2. 大专

3. 中专（中技、职高）

4. 高中

5. 初中

6. 小学

7. 小学以下
- 37j 他（们）是否党员？

1. 是

2. 否

- 37k 他（们）的收入大约是多少（元）？
- 37l 你与他（们）的熟悉程度
1. 很不熟悉

2. 不太熟悉

3. 比较熟悉

4. 熟悉

5. 很熟悉
- 37m 如果您没有工作，您能求助于他（们）帮您找工作吗？
1. 是

2. 否
- 37n 他（们）实际上是否帮助过您找工作？
1. 是

2. 否
- 37o 如果回答“是”，请问是帮您在他（们）单位找工作吗？
1. 是

2. 否
- 37p 如果回答“是”，请问帮您找的工作是：
1. 您现在的工作

2. 您前一个工作

3. 其它
- 37q 他（们）帮您找工作时是否动用了他（们）的熟人关系？
1. 是

2. 否
- 37r 在他（们）帮您找工作时，您是否给他（们）送过礼表示感谢？
1. 是

2. 否
- 37s 如果回答“是”，请问礼品的大概价值多少（元）？
- 37t 在过去一年中，您送给他（们）每个人的礼物、礼金价值（元）。
- 37u 在过去一个月中，您与他（们）相聚过几次（包括一起吃饭、聊天、看电影、电视、娱乐活动）？
1. 没有

2. 1-2 次

3. 每周一次

4. 每周 2-3 次

5. 几乎每天一次

6. 每天至少一次

Part IV

Conclusion

Chapter 6

Conclusions and Implications

Our attempt to understand the growing inequality in the incomes earned by men and women in urban China led to an examination of the role of social capital and opportunities in employment success. This thesis comprises a model of earnings discrimination under conditions of imperfectly competitive markets and a set of empirical chapters that analyse aspects of pre-labour market and within-labour market gender inequality in the current reform period.

The conclusion is in three parts. We begin with a summary of our main findings on gender inequality, specifically regarding education and employment outcomes. This is followed by a discussion of the welfare and policy implications for women in urban China in light of this evidence. A discussion of possible directions for future research concludes the thesis.

6.1 Summary of Main Findings on Gender Inequality

Our two primary areas of concern are to investigate gender differences in education and in employment in urban China in the current period, where there is evidence of an inequality in the incomes earned by men and women [in Chapter 1]. Gender earnings differentials will affect the accumulation of human capital as well as

investment in social capital. Both forms of capital would then differ for men and women, leading to unequal productive characteristics and differential opportunities, which will in turn allow income inequality to persist.

We find there are unequal household expenditures on the education of girls and boys related to their perceived future employment success [in Chapter 4]. Parents spend more on the education of boys than girls aged 13-15, corresponding to the higher returns to education for men on account of gender earnings differentials in the labour market. However, this finding is coupled with evidence that households spend more on the education of girls aged 16-18 than of boys of the same age group. In both instances, we show that parents are efficient investors in the human capital of their children insofar as there are two rates of returns to consider.

The first rate of return is based on an efficient trade-off between the parents' own consumption and investment in children in the hopes of generating future income for the children, with more being spent on the capital yielding greater returns. We term this the personal rate of return. The second rate is driven by the desire of parents to have resources for consumption when they retire. Thus, they will invest more in the capital that generates more future transfers. In the case of urban China, they will favour daughters for reasons of positive assortative mating and the nature of household expenditure decisions. We term this the familial rate of return.

In summary, for urban China in 1995, we show that the personal rate of return effect dominates investments in boys through roughly lower middle school, while the familial rate of return is the stronger effect for girls who attend upper

secondary school. However, despite more educational expenditure on this cohort of girls, there remains some gender inequality in educational enrolment beyond lower middle school that is relevant when considering future labour market outcomes.

Regarding our investigation of within-labour market inequality, we find that the urban labour market is still underdeveloped [in Chapter 3]. It is characterised by less than perfect information about jobs, as well as costs and risks that hamper mobility. The labour market is characterised by frictions. Social capital decreases some of these frictions and helps an underdeveloped urban labour market to work more efficiently, consistent with our theoretical arguments [in Chapter 2].

Our second empirical chapter is based on original data gathered from a national urban household survey in China conducted in February/March 2000 and pertaining to 1999. Specifically, the author designed a module of the survey that provides a concrete and original measure of social capital – computed as the time, monetary and nonmonetary resources invested in contacts in a social network. The rich data available in the survey allow us to link social capital to opportunities and to employment outcomes for men and women.

The context of the survey is the recent large-scale reform of the state-owned sector that changed employment in urban China from a system of lifelong, allocated jobs to one in which job change and even re-employment after experiencing unemployment are possibilities. We find evidence that an important factor in labour market success is *guanxi* – the Chinese variant of social capital [in Chapter 5].

Social networks and the stock of social capital (*guanxi*) are measured for men and women. Economic returns are then estimated with respect to two sets of labour market outcomes – earned income, and the likelihood of re-employment. Men have larger social networks and more social capital than women both in the representative urban sample and in the sample that had experienced unemployment in the five-year period from the end of 1994 to the end of 1999. In the interest of brevity, the latter is referred to as the laid-off sample.

We find that gender differentials exist in earned income and the likelihood of finding successful re-employment after standardising for social networks and social capital. There are also clear gender differences in the returns to social networks and social capital, which suggest that the opportunities generated by these variables can improve employment outcomes, but differently for men and women, consistent with our theoretical arguments. We explore some counterfactuals that might shed light on the implications of such differential opportunities.

Our simulations show that if women were to have the returns of men from social networks in the representative urban sample and social capital in the laid-off sample, women would earn an income premium of over 5% and approximately 13%, respectively. If men in the laid-off sample were to earn the returns of women to social networks, they would earn an even higher income premium of 14%. Moreover, even though social capital increases the likelihood of re-employment more for women than men (2% versus 1%), men have a higher probability of becoming re-employed than women. If women were counterfactually to have the larger stock of social capital of men, they would still have a smaller probability of re-employment. The evidence

shows that social capital and, to some extent social networks, can improve earned income and likelihood of re-employment, but differently for men and women.

These findings are consistent with social networks and social capital reducing transaction costs in an imperfect labour market characterised by frictions. In a job, this may increase efficiency, *i.e.*, individuals who have this form of capital are more productive and are rewarded with positive income premiums. A further possibility is that transaction costs differ as between men and women, which affect their mobility and employment opportunities. This will cause the labour supplied to a firm to differ among individuals with otherwise equal productive characteristics. Women will have fewer labour market options and thus have relatively less elastic labour supplies with respect to a firm. This is accentuated by social network and social capital, but would be true if social networks and social capital were standardised. They will experience worse labour market outcomes than men under imperfectly competitive conditions. This might be evidenced by the significant and negative coefficient on the gender dummy variable in our income functions and women's smaller probability of becoming re-employed after experiencing unemployment. Whether it is on account of labour supply differences, a taste against women or unfavourable statistical screening, gender income differential exists in urban China in the current reform period. However, unlike mobility or taste or screening, social networks and social capital are more capable of being altered through additional investment by an individual and can play a role in bettering labour market outcomes.

In summary, the evidence concerning gender inequality in education and employment in urban China in 1995 and 1999 is consistent with an approach to

discrimination that is premised on imperfect markets and differential opportunities associated with social capital.

6.2 Social Welfare and Policy Implications

The existence of rent-seeking behaviour in imperfectly competitive markets leads to social deadweight loss and to sub-optimal equilibria, as the wage paid to labour is less than the value of its marginal product. A change in market structure to a more competitive one can reduce rents and increase total social welfare. Social losses can also be decreased if frictions in factor markets are reduced and labour supplied to firms are more elastic.

We find that opportunities linked to economic returns to social capital seem to reduce transaction costs in imperfect labour markets. This form of capital can increase efficiency, but unequal amounts of social capital will simultaneously cause inequity. That is, opportunities can reduce labour market frictions but do so unequally for individuals with different stocks of social capital. If men have more social capital than women, then they will experience better labour market outcomes, suggesting that social welfare on the whole has increased but with the consequence of more gender inequity in the distribution of the benefits.

As a policy matter, individual investments in *guanxi* do not require government intervention. But, the recognition that social capital serves to ease

frictions can lead to policies and programmes aimed at decreasing some of the same frictions that impede the development of a well-functioning labour market.

6.3 Future Research

We conclude with a discussion of future extensions of this research.

There are many possible directions that can expand our understanding of gender inequality in particular, and discrimination in general. We mention five. First, in terms of investment in human capital when children are under the supervision of parents, we find that educational expenditures are related to rates of return to education that are in turn affected by future labour market outcomes. Insofar as an individual's own social capital can improve his success in employment, the social capital of his parents may also influence the returns to his human capital. Additional investigations could be usefully undertaken of the effects of social capital and social networks of parents or other relatives on the decision to invest in children (see Borjas 1992). Moreover, our approach is measurable in terms of calculable returns to the children and that which goes toward the future consumption of parents. Thus, if data on cross-generation transfers were available, the implications could be further tested.

Second, regarding labour market outcomes, we suggest additional investigations of supply-side imperfections, *i.e.*, the form and sources of frictions that cause labour supply to be upward sloping with respect to a firm. We identify one potentially important factor – social capital – that can affect such elasticities. Others

include the limited transferability of firm-specific skills (Stevens 1994). Future research may usefully further explore the role of employment opportunities, which is often discussed but rarely quantified (see Becker 1993 [1964] concerning the importance of opportunities in addition to ability in the returns to human capital). We also propose further exploration of social capital as one reason for the persistence of inequalities in labour markets not only for women but also for other groups, such as ethnic minorities. Differential opportunities conceptualised in this way may suggest a long-run explanation for various groups whose success and failure in labour markets are not explained by differences in their productivity and have not been well understood through the rubric of existing models of economic discrimination.

A third extension is to answer a well-researched question with the new data set. Knight and Song (1999*d*) explored changes in the gender earnings gap using the 1988 and 1995 data sets, and Gustafsson and Li (2000) decomposed the gender earnings gap for the same period. We chose to answer new questions concerning a potential cause of labour market discrimination rather than to answer old questions using the new data set for 1999. Although *guanxi* is well known anecdotally as being important for economic success, it has never been satisfactorily quantified in China. Using survey questions we designed, we formulated original measures of this Chinese variant of social capital, estimated returns in the labour market and found clear gender differences with respect to social capital. We do not have measures of *guanxi* in the earlier data sets. Nevertheless, one extension of the thesis is to decompose the gender earnings gap for 1999 in the way that it has been decomposed for 1988 and 1995. By exploring the extent of the discrimination experienced by various sub-groups, such as older people, less skilled workers, by the ownership sector of the enterprise, and by the

degree of market-oriented reform in different provinces, it may be possible to throw light on the relative importance of the other potential causes of gender discrimination, to make comparisons with the earlier years, and to decompose the rising gender earnings gap in the period 1995 to 1999.

A fourth direction for future research is to investigate other dimensions of *guanxi*. While our focus has been on gender differences in social networks and social capital, there are numerous other aspects that can be usefully explored. In underdeveloped labour markets where job search is hampered by both demand and supply side factors, individuals might choose to invest in specifically chosen contacts, *e.g.*, cadres (see Oi 1989). Further, social capital (“the depth of ties”) and not social networks (“the breadth of ties”) is found to be important in re-employment after experiencing unemployment in urban China. This provides evidence that is contrary to the “folk theorem” of social network literature, likely traced to Granovetter’s (1995 [1974]) “strength of weak ties” hypothesis. It is thought that it is not the depth but the breadth of ties that contributes to success in job search. Our findings suggest that there may be distinct strategies for investing widely and other times when it is more fruitful to invest deeply, *i.e.*, there are larger returns to social capital than social networks in the laid-off sample. Also, the implication that *guanxi* reduces transaction costs in labour markets indicates its potential with respect to other forms of relationships, such as firm-level linkages.

Finally, social capital has gained increasing recognition as having potential to explain economic growth and development (Putnam, Leonardi and Nanetti 1993; Knack and Keefer 1997; Dasgupta 2000; Zak and Knack 2001). We have

presented an original measure of social capital – modelled as an individual investment decision – that is both more quantifiable and empirically testable, concerning its stock and returns, than the current approach. There is much further work to be done. By formalising the reciprocal aspects of social capital, our approach can also provide a better measure of the current conception of social capital as a societal-level variable. In other words, the level of social capital can be measured by evaluating the stocks possessed by individuals who cooperate with each other in a society. As a first attempt, we hope to have contributed to this promising and evolving field.

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