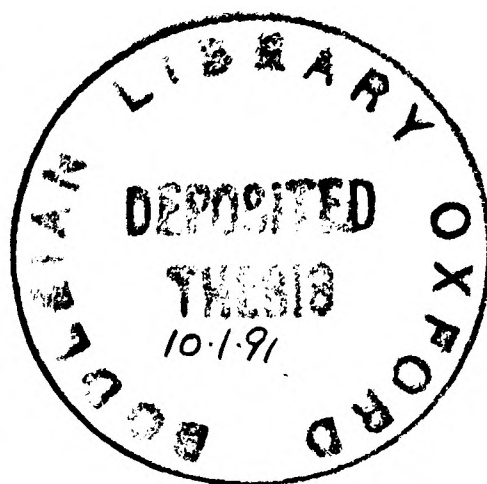


PRIVATE INVESTMENT AND PUBLIC POLICY IN EGYPT, 1960-1986

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ABSTRACT

The determinants of private investment and the role of government policy in Egypt are analyzed with a focus on the debate over "crowding out" versus "crowding in," the implications of administered interest rates, and the consequences of uncertainty. A theoretical model of investment is developed that integrates the microfoundations of firm decision making with the determinants of investment at the macroeconomic level. The model, which draws on case studies of fifty private firms in Egypt, is characterized by oligopolistic markets, putty-clay technology, credit rationing, and rigidities in the supply of capital goods. Econometric testing of the model uses the recent literature on cointegration and error correction to address the problem of spurious correlations while retaining long run information about the equilibrium relationship between aggregate investment and its determinants.

The empirical evidence shows that the investment decision depends on expected profits which are a function of demand, costs and mark ups. The impact of government policy on private capital formation operates through these determinants, such as the positive effects of protection or restrictive licensing on private sector mark ups. Using the model to analyze the oil boom of the 1970s, it is possible to explain the sectoral distribution of private investment, which diverged from the predictions of conventional Dutch disease theory about the consequences of a trade shock.

The findings indicate that the sharp rise in the private investment ratio during the 1970s in Egypt stemmed more from the consequences of the foreign exchange windfall on demand, costs, and mark ups than from the effect of fiscal incentives introduced by the state. However, government policy was crucial in determining the structure of incentives in the economy which favoured capital intensive, heavily indebted, import substituting investments in protected sectors. The private sector responded to this incentive structure by concentrating on those activities where economic rents were highest.

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PART ONE: BACKGROUND

CHAPTER I: INTRODUCTION

The Issues

The economic literature on investment has been characterized by considerable controversy, even by the standards of economists. A number of different, often overlapping, models of investment determination have been hypothesized and the empirical evidence has done little to clarify which, if any, are accurate representations of the way in which capital formation occurs in the economy. This intellectual disarray is made all the more disconcerting given the rare consensus among economists about the crucial role of capital formation in economic growth and development.¹ As Kalecki once said, the question of the determinants of investment remains "the central *pièce de résistance* of economics."²

Part of the problem has been the absence of integration in empirical work between the microeconomics of the firm and the analysis of aggregate investment at the macroeconomic level. Although recent macroeconomic models of investment have been characterized by greater theoretical attention to microfoundations, this has rarely been accompanied by empirical verification. Much of the

¹ For econometric evidence on the relationship between capital formation and growth, see Robinson, 1971; Michalopolous and Jay, 1973; Balassa, 1978; Tyler, 1981; Blejer and Khan, 1984. On average, these studies show that an increase of the ratio of investment to GDP would, ceterus paribus, raise the overall growth rate by about 0.2%.

² Kalecki, 1971, p. 165.

macroeconomic empirical work loses sight of underlying hypotheses about the objectives and operations of firms.

In developing economies, the question of what determines private investment is particularly crucial as a result of growing dissatisfaction with the public sector-led import substitution industrialization that characterized economic policy for much of the post-colonial period. As many developing country governments face fiscal austerity, there is a growing realization that future growth will depend increasingly on capital formation in the private sector. However, the determinants of private investment and, in particular, the effects of government policy on private capital formation, remain poorly understood. This is particularly so in developing economies where structural features reinforce the need to look closely at microfoundations before making assumptions about aggregate investment behaviour.

For Egypt, the question of what determines private investment is one of the most important issues on the national economic agenda. Egypt was one of the earliest countries in which a highly statist import substitution policy was implemented. A partial reversal of this policy occurred in the early 1970s as the high import demands and poor export performance associated with import substitution resulted in a balance of payments crisis. The investment promotion policies adopted by Egypt, a fairly typical package of tax concessions and subsidies, have produced mixed results. Without a realistic model of investment determination, it is not possible to assess the relative efficacy of alternative government policies or their broader economic consequences.

The limited treatment of government policy in the literature on private investment is another major weakness.³ This is somewhat surprising given the extensive role of government in the evolution of private investment in the economic history of many countries. The effect of government on private investment is implicit in much of the economic literature and/or limited to a fairly narrow range of factors, such as the interest rate and taxation. Instead, this study intends to make explicit the role of government and to consider a wider range of policy instruments, many of which are particularly important to a developing economy.

Three areas in which public policy can affect private investment will be analyzed. The first is the debate as to whether the public sector "crowds out" or "crowds in" private activity. However, rather than adopting the conventional focus on crowding out that results from higher interest rates caused by government borrowing, the question will be defined to include crowding in and out through quantities in rationed markets. This is more relevant in a developing economy characterized by supply bottlenecks and administered prices. In addition, more unconventional channels for crowding in and out will be considered such as through the composition of government investment, the trade regime, and the granting of a variety of privileges to private sector producers.

The second issue will be the implications for private investment of administered interest rates in financial markets. This question

³ In contrast, the more general issue of the economic role of the state vis a vis the private sector is a very classical and well-treated subject. For a recent survey, see Helm, 1986.

has been much debated in the context of credit markets in the literature on financial "repression" or "shallowness."⁴ The usual argument is that artificially low administered interest rates, although intended to promote greater capital formation, actually result in reduced savings and less investment because of credit rationing. However, the economic implications of rationing for investment depend on government policy concerning the supply of credit and the operations of the banking system.

The implications of uncertainty for investment will be the third area to be analyzed. Economists have had a difficult time dealing with uncertainty, often trying to force it into the more familiar framework of probability distributions associated with risk.⁵ Keynes' writings on uncertainty, embodied in the oft-quoted phrase "animal spirits," have been dismissed as "nihilism"⁶ and "an opportunistic but mild flirtation with subjectivism."⁷ However, empirical work on firm decision making generally finds a crucial role for just the type of uncertainty that Keynes described.⁸ This is particularly so with the investment decision because of the enormous array of often poorly defined variables that must be evaluated, the uniqueness of the choice at any point in time, and

⁴ McKinnon, 1973; Shaw, 1973.

⁵ In a situation of risk, agents know the probability distribution of outcomes and simply calculate the expected utility of the outcome. In contrast, uncertainty is a situation where agents do not have full knowledge of the probability distribution. This distinction between risk and uncertainty was originally made by Knight, 1921.

⁶ Shackle, 1974.

⁷ Coddington, 1982.

⁸ For example, Helliwell, after conducting a survey of over 1200 Canadian corporations and interviewing over 300 entrepreneurs, concluded that, "The more decisions that were studied in depth, the more obvious it became that uncertainty was a prevailing influence. This was particularly so in the case of capital expenditures, whose expected profitability depend on a broad range of interlocking guesses and plans." Helliwell, 1968, p. xi.

the irreversible character (at least in the short, and often in the medium, run) of the decision. Theoretical attempts at analyzing uncertainty are still a long way from empirical tractability.⁹ Consequently, the focus will be on an empirical analysis of the defensive strategies adopted by firms to minimize the costs of uncertainty as well as the impact of government policy on the types of uncertainties faced by the firm.

Research Outline

The background material to this research is provided in part one. This consists of a brief economic history of Egypt with special emphasis on the evolution of private-public sector relations. Some of the institutional characteristics of the economy are described such as legislative changes associated with investment incentives, the structure of the financial system and the foreign exchange regime. A summary of the private sector response to investment incentives is provided as well as a brief description of the external environment and more recent economic stabilization efforts. This section provides a backdrop to the theoretical and empirical work that follows.

Part two considers the microfoundations of the investment process in a developing economy. Chapter III summarizes the neoclassical and non-neoclassical literature on the theory of the firm. A model of firm behaviour in a developing economy is developed that draws on the literature on oligopoly, particularly mark up pricing and game theory. The determinants of the mark up are considered in light of

⁹ See Frydman and Phelps, 1986 for an interesting collection of theoretical essays.

the existence of protection. The implications for the firm's decision about the optimal capital stock are analyzed. The emphasis throughout is on making explicit an array of factors that influence decision-making about investment, such as market shares and exchange rates, that are often neglected in the literature.

These theoretical microfoundations are compared with the results of a survey of fifty private firms in Egypt. The survey findings in chapter IV both confirmed and informed the development of the theoretical microfoundations as well as guiding the macroeconomic specification. The case studies of firm decision-making focused on the structure of markets, access to credit and foreign exchange, the effects of government policy, and strategies for coping with uncertainty. This chapter is intended to give a flavour of the complex environment in which firms operate and to facilitate the interpretation of the macroeconomic results.

Part three considers the investment process at the macroeconomic level. The extensive and often confusing theoretical literature on investment is summarized in chapter V. A wide range of models are considered - accelerator, flexible accelerator, neoclassical, putty-clay, Kaleckian, Keynesian, "q", and structuralist. The emphasis is on the distinguishing features of these models which consist of the explanatory variables chosen and the assumptions made about the context in which the investment decision is made. The empirical evidence in both developed and developing countries is summarized briefly. The movement toward more eclectic models and the limited consideration of the effects of government policy are described.

These trends in the literature influence the macroeconomic model of investment for Egypt developed in chapter VI.

The investment model in chapter VI uses elements of the putty-clay, Kaleckian, Keynesian and structuralist approaches to explain the evolution of aggregate investment in Egypt. The choice of the elements of this eclectic model were made on the basis of the results of the microfoundations in part two. An error correction approach is adopted to describe the process by which firms move from actual to desired levels of capital stock. The resulting model depicting the determinants of the long run equilibrium capital stock includes structural factors such as rationing in financial markets and the government budget. The use of an error correction model allows for the adjustment of agents' expectations in response to prediction errors in an uncertain environment.

The macroeconomic model of investment is tested econometrically in chapter VII. Some of the standard models in the investment literature are estimated and the problem of spurious correlation between trended variables is explored. In order to overcome this problem, the time series are tested to determine whether they are stationary, and, if not, what degree of differencing is required to induce stationarity. The stationary time series are then used to explore the equilibrium relationship between investment and its determinants based on the recent work on cointegration and error correction models. Two different estimation procedures, the Engle-Granger two step method and unrestricted dynamic modelling, are used to evaluate the effect of a range of variables on the evolution of investment. The resulting investment function provides a number of

insights into the implications of the exchange rate, government investment, and credit rationing on capital formation in the economy. In addition, the findings at the macroeconomic level are consistent with the firm-level survey results in chapter IV.

Part three considers an application of such an approach by analyzing the implications for investment of a trade shock. Chapter VIII uses the literature on "Dutch disease" to analyze the effect of a trade shock and consequent real appreciation in the context of the model of investment behaviour described previously. The effect on the sectoral distribution of investment and factor shares from the oil windfall experienced by Egypt during the 1970s is analyzed. The important role of protection, the capital goods supply industry and uncertainty are highlighted. The results provide a number of insights into the often unexpected consequences of a foreign exchange windfall.

In attempting to integrate so many strands in the economic literature (theory of the firm, macroeconomic determinants of investment, crowding in and out, financial repression, uncertainty, structuralism, cointegration and error correction, and Dutch disease), this thesis may appear to sit uncomfortably astride many intellectual fences. There are several justifications for such an eclectic approach. Firstly, the inadequacies of the existing literature on investment lend support to the search for a different perspective. Secondly, the focus on the experience of one country, Egypt, provides a unifying focus. By concentrating on one case it is possible to draw on different strands in the literature when they are relevant to the Egyptian experience.

Underlying the approach is the view that searching for a universal model of investment determination may be an elusive endeavour. Investment is different from other economic aggregates, like consumption, where the dictates of survival and purchasing power provide some fundamental rules. The importance of country-specific structural and institutional factors in the investment process may override variables such as interest rates considered in more conventional general models.

The dilemma faced in emphasizing the importance of country-specific institutional factors in empirical work is that one is led to progressively smaller units of analysis (from country to sector to industry to firm and ultimately to the individual) all in the name of developing increasingly realistic microfoundations. Hopefully, in the work that follows, a balance has been struck between the desirability of theoretical generalization and that of presenting a realistic representation of the empirical complexity and nuances.

CHAPTER II

PRIVATE INVESTMENT IN EGYPT: HISTORY AND INSTITUTIONS

The Public and Private Sectors in Developing Economies

The evolution of the private sector in developing countries has depended heavily on the granting of privileges and incentives by the government. Fitzgerald draws a distinction between the "entrepreneurial" business ethos in the industrial economies and the "proprietary" equivalent in developing countries.¹ This distinction is somewhat artificial since the development of the private sector in most of the industrialized economies certainly depended on favourable government policies. Nevertheless, it is perhaps useful to rank the prevailing perceptions of private-public relations along a spectrum from antagonistic to mutually beneficial. The complementarity of private and public activity has meant that political as well as economic factors and their effect on the incentive structure have been critical determinants of the pattern of investment.

In many countries, including Egypt, the period of state activism in the economy was preceded by an effort to promote indigenous private investment in industry. Etatist policies, usually associated with import substitution strategies, only evolved after it became evident that, for a variety of reasons, the private sector was not going to take the initiative to achieve national industrialization. Even in

¹ Fitzgerald, 1979, p. 35. Waterbury uses this same theme to analyze the evolution of private-public relations in Egypt. Waterbury, 1983. Gillespie analyzes the shifting coalitions between government, foreign investors and local investors that emerged in Egypt. Gillespie, 1984.

economies where the private sector was historically relatively dynamic, such as in Egypt, there was a reluctance by private investors to take on high risk projects of the type and scale that were perceived as necessary for national economic development.

When etatist policies fell into disfavour, the attempt to promote private enterprise was, like the early industrialization of many now-developed economies, closely linked to the state through the granting of oligopoly rights over a limited market via tariffs and licensing, the creation of effective demand through public subcontracting to private enterprises, the creation of a range of subsidies and fiscal incentives to the private sector, and the establishment of close links of patronage to reduce uncertainty.

The Pre-1952 Private Sector in Egypt²

Prior to 1952, private industry in Egypt was dominated by entrepreneurs of European or Levantine origin who operated in the textile, food processing, building materials, and some chemical and metallurgical industries. There is disagreement about the historical role of foreigners in Egypt's early industrialization. Some authors, such as Davis, argued that foreigners resident in Egypt represented the interests of foreign capital in the traditional mode of dependent capitalism.³ In contrast, Tignor argued that foreign businessmen, despite being a social enclave, genuinely sought to diversify and industrialize the economy.⁴

² For a more detailed historical analysis see O'Brien, 1966; Radwan, 1974; Mabro and Radwan, 1976; Tignor, 1984; Davis, 1983; Wahba, 1986; and Hansen, 1988.

³ Davis, 1983.

⁴ Tignor, 1984, pp. 251-2.

Indigenous Egyptian investors during the 1880-1913 period tended to prefer agricultural land and urban property, despite the high profitability of joint stock industrial companies. Although inexperience and risk aversion provide a partial explanation for this pattern, Mabro and Radwan identify the importance of the following factors: (1) the consolidation of an Egyptian bourgeoisie dependent almost exclusively on land ownership; (2) the privileged position of foreigners protected by capitulations and well connected to sources of finance and technology abroad; and (3) the government's policy of laissez-faire which favoured specialization in cotton.⁵

One of the earliest calls for state support to private investment came in 1918 with the publication of a report which identified the importance of government support to industrialization to offset the vulnerability of an economy that relied so heavily on cotton exports.⁶ As a growing number of indigenous landowners and merchants shifted their investments into industry, there was greater pressure on the government to provide protection and credit facilities.

As in many developing countries, the World Wars provided an opportunity for import substituting industries to flourish. The focus was on the diversification of exports through import substitution and domestic savings mobilization to reduce the dependence on foreign capital. This strategy was implemented

⁵ Mabro and Radwan, 1976, pp. 23-26.

⁶ For a description, see Wahba, 1986.

through a major tariff reform beginning in 1930⁷, investment and production subsidies offered by the state, and the establishment of a national private bank, Bank Misr, in 1919 to channel domestic savings to indigenous entrepreneurs. Although government economic policy remained laissez-faire until the mid-1950s (with public investment restricted to irrigation, transportation infrastructure, and utilities), these represented the first attempts at a more activist policy. The economy remained dominated by the private sector, however, with 87% of total value added and 95% of total civilian employment generated by private activity.⁸

In response to nationalist pressure and under strong opposition from foreign entrepreneurs, the state passed the so-called "Egyptianization" laws after the second World War which required majority ownership by Egyptian nationals.⁹ The culmination of this sentiment was the nationalizations of 1956 - beginning with the Suez Canal and followed by the state taking control of British, French, and later, Belgian, interests in Egypt in exchange for not demanding war reparations.

⁷ For a detailed description of the evolution of tariff protection between 1930-60, see Mabro and Radwan, 1976, pp. 50-64. Mabro and Radwan point out that in the early period, the tariff legislation was intended to serve government fiscal needs first, the protection of the agricultural sector second, and the promotion of industry third. Consequently, the tariff structure was not particularly well-designed to protect domestic industry.

⁸ Ahmed et al, 1985, p.1.

⁹ Besides the uproar among foreign investors, this legislation spawned a flood of applications for Egyptian citizenship. See Wahba, 1986.

The Free Officers and the Private Sector

The government's attitude toward the indigenous private sector, and even to foreign capital, continued to be favourable after the Free Officer coup in 1952.¹⁰ The government concentrated on its traditional role of providing infrastructure and a regulatory structure and established the Permanent Council for the Development of National Production (PCDNP) to collaborate with private capital in evaluating and undertaking investment projects. The PCDNP used most of its budgetary resources to finance infrastructure rather than industrial projects. Instead of being an instrument of state economic activism, the PCDNP represented another channel for the government's traditional supportive stance vis à vis private enterprise.

With a few exceptions, the Free Officers' policies supported private enterprise, were willing to protect private property, and were opposed to socialism. Their tolerance of foreign capital was evidenced by a series of legislative changes that granted repatriation rights, tax exemptions, and the right to majority ownership to foreign nationals.¹¹ The exceptions to the government's favourable attitude to the private sector were, for example, the requirement that private firms buy government stock with 5% of profits available for distribution.¹² The

¹⁰ For a description of this period, see O'Brein, 1966, pp. 64-72.
¹¹ Law 156/1953 permitted foreigners to repatriate profits up to 10% of capital invested each year. Laws 430 and 475 of 1953 granted tax exemptions on new investment and on income from mobile values. Decree-Law 120/1952 reduced the minimum of 51% ownership under the Egyptianization laws to 49%.

¹² See O'Brien, 1966 and Wahba, 1986. Other examples include the nationalization of the Cairo Water Company in 1957, the administrative accountability imposed on 13 utility companies in 1959, the placement of the previously independent Industrial Bank

nationalization of Banque Misr in 1960, the single largest private investor in the economy and the perceived stronghold of private entrepreneurs, was a particularly symbolic act. Nevertheless, the Free Officers originally sought to facilitate private investment in order to industrialize the country.

Later, the responsibilities of the PCDNP were passed on to the Economic Development Organization established by the Nasir government in 1959 to manage the 12% of industrial output that it controlled as a result of the 1956 nationalizations of foreign property. In addition to its managerial role of the newly acquired public sector, the Economic Development Organization provided preferred access to foreign exchange, import licenses, and government contracts to private industrialists who were willing to cooperate with state investment plans. However, the private sector response to these incentives was a disappointing 50-60 million Egyptian pounds (LE).¹³ There was also evidence of a decline in the growth of the capital stock from 7.1% per year in 1956 to 0.1% in 1961.¹⁴ It was only after this weak private sector response to government encouragement that the Egyptian government adopted an overtly socialist ideology that justified its taking the primary role in the economy.

under the control of the Ministry of Industry in 1959, the gathering of detailed information by the Ministry of Planning in 1959 that later facilitated nationalization, and the nationalization of the National Bank of Egypt, the Banque Belge, and Banque Misr in 1960. Note that the state's attitude to the agricultural private sector was altogether different than that in industry. The series of land reforms in during the 1950s and early 1960s affected almost every large landowner in the country. See Radwan and Lee, 1986.

¹³ Mabro and Radwan, 1976, p. 66-68.

¹⁴ The trend in the decline of capital stock growth was: 7.1% in 1956, 0.4% in 1957, 4.5% in 1958, 4.5% in 1959, 2.4% in 1960, and 0.1% in 1961. Note that that investment which did occur in the 1958-61 period was largely in buidings. See Radwan, 1974, p.162.

The Egyptian private sector was responding to a political climate of uncertainty rather than an economic climate of generous government concessions. The unenthusiastic investment response to the tax exemptions, subsidized credit, tariff protection, and infrastructure improvements offered by the state reflected the aversion to risk of a relatively inexperienced entrepreneurial class.¹⁵ To some extent, the state's expectations exceeded the indigenous private sector's capacity given that its early evolution had depended heavily on foreign expertise. In addition, the government's policy was oriented to diverting private capital to slow-gestating projects in heavy industry without providing any guarantees against future expropriation or of the limits to public sector expansion.¹⁶ Instead, there was a shift of private resources away from industry to trade and real estate as investors sought low risk, profitable investment opportunities.¹⁷

The sequestrations of 1961, referred to as the "July Socialist Laws", reflected the frustrations of a state that had, until 1961, adopted a generally conciliatory and supportive attitude to the private sector. These laws gave the state control over all remaining private banks; insurance companies; utilities; transport organizations; and 42 major industrial, financial, commercial, or land reclamation companies. In addition, 148 firms in Egypt and

¹⁵ O'Brien, 1966, pp. 313-4.

¹⁶ O'Brien points out how "remarkably optimistic" the state was about its ability to plan an economy in which the vast majority of productive resources were not under its control. O'Brien, 1966, pp. 112-3.

¹⁷ Zaalouk's study of commercial agents found that private trading activities were attractive even when all trade was nominally in the hands of the government. Many of the public sector trading companies contracted considerable work to private commercial agents. Many of these same private traders would emerge on a much larger scale after the open door policy, or "infitah." Zaalouk, 1982.

Syria were forced to give 50% ownership to the government under joint stock arrangements.¹⁸ Some firms volunteered for partial nationalization, thereby exchanging 50% of their shares for preferred access to credit and government contracts.¹⁹ Because of the high concentration of ownership in Egypt, the number of individuals affected by the sequestrations was very small; however the wider implications for business confidence were to be profound and far reaching.²⁰

The economic history of Egypt during the 1960s and early 1970's is largely one of the evolution of the public sector and is well documented elsewhere.²¹ The public sector expanded into new intermediate and capital goods industries as well as controlling the nationalized traditional consumer goods industries. By 1966/67, the public sector generated 90% of gross value-added in manufacturing establishments employing ten or more workers and 64% in establishments employing 1-9 employees. Public sector enterprises benefited from direct government grants, an overvalued exchange rate for imports, tariff protection, subsidized input prices (energy, transport, credit, and raw materials) and often had priority access to inputs when there was rationing. The overall

18 These firms received compensation in the form of 15 year government bonds bearing 4% interest that were redeemable after 10 years. Since they were of so little value, these bonds have never been redeemed and remain in the Central Bank of Egypt. See Wahba, 1986, p.147.

19 Presidential Decree 1203/1961 restricted all public works contracts in excess of LE 30,000 to firms with a minimum of 50% government ownership. The most well known firm to take advantage of this legislation was the contractor Osman Ahmed Osman.

20 Waterbury points out that even though the 1961 sequestrations gave the state control of all significant industries, financial and commercial enterprises, only 767 individuals were affected. Waterbury, 1983.

21 See Mabro, 1974; Radwan, 1974; Mabro and Radwan, 1976; Ikram, 1980; Waterbury, 1983.

ratio of investment to GDP rose from its level of 13.5-14% during the 1950s to 19.7% in 1963/4.²² Because the domestic savings ratio was falling, the government was forced to rely on foreign borrowing to finance its recurrent balance of payments deficits.²³

Although the private sector was considerably diminished as a result of the sequestrations, some smaller scale manufacturers did survive. The private sector share in total value added fell from 98% in 1952 to 27% in 1973. The private share in manufacturing employment fell from 100% in 1952 to 39% in 1973.²⁴ Throughout this period, the little that remained of the private sector had restricted access to credit, foreign exchange, production inputs, and certain markets which were set aside for the public sector.²⁵ Although the number of private manufacturing establishments increased, from 4047 in 1961 to 5259 in 1966/67, about 83% of these new firms had less than 50 employees.²⁶ The small scale of private investment was a response to an uncertain environment where scale had become a criterion for nationalization.

There was a slight resurgence of private activity after 1967 as the public sector faced budgetary constraints caused by the war with Israel. The increased private share of total investment from 8.19% in 1966/67 to 14.3% in 1967/68 coincided with negative investment

²² Mabro and Radwan, 1976, p. 45.

²³ Mabro and Radwan, 1976, pp. 45-46; Ahmed et al, 1985, p. 4.

²⁴ Ahmed et al, 1985, p.1.

²⁵ These policies were enforced through the industrial licensing system administered by the General Organization for Industry, the lending of the public sector banking system, and the rules governing the trade regime.

²⁶ During the same period the number of public enterprises with over 500 workers increased substantially whereas firms with between 40-100 and 100-500 workers experienced little growth. Arthur D. Little International Inc., 1982, pp. III/3 - III/4.

rates in the public sector.²⁷ However, this revival was closely linked to the public sector through contracts and public funds. Private activity concentrated in the construction sector, textiles, transportation and wholesaling, but generally remained modest in size.²⁸ The construction of middle and high income housing was one of the most lucrative outlets for private investment, particularly prior to 1974 when there were few alternative investments.

Although the size of the private sector was considerably diminished, those firms that did survive the sequestrations enjoyed a period of high profitability. Surveys of entrepreneurs from this period show that, although the 1960s was a time of considerable uncertainty, it was a very lucrative time for the private sector.²⁹ The reasons for the high profitability were the highly protected market, the lack of domestic competition, and the growing demand, particularly from the expansionary public sector. The existence of a highly lucrative black market also sustained some private sector entrepreneurs, many of whom could use their commercial expertise in a more legal framework during the period of liberalization.³⁰ In fact, contrary to popular belief, the Nasir period was one of opportunity for many small and medium scale entrepreneurs.³¹

27 Wahba, 1986, p.189.

28 Waterbury, 1983, p. 426.

29 See Mokhtar, 1980; Zaalouk, 1982, p. 139 ; and the survey results in chapter 4 of this thesis.

30 Wahba cites an article in Al-Ahram Al Iqtisadi (no. 270, 15 November 1966, p. 31) that gives an indication of the mark ups in the black market in Egypt in the 1960s: 120% for toilet soap, 400% for a tonne of portland cement, 20% on a Fiat automobile, 200% on beans and lentils, 143% on staple foodstuffs, and 150% on iron bars. Wahba, 1986, pp. 196-8.

31 This point is discussed in greater detail in chapter 4.

The Infitah

A number of factors contributed to the economic decline of the late 1960's that provided the catalyst for the series of reforms intended to revive private economic activity that came to be known as the "infitah", or open door policy. Balance of payments problems emerged as a result of the high import needs of the government's import substituting strategy combined with low export growth, resulting in part from protection. The shortage of foreign exchange was exacerbated by the costs of the war in Yemen and the consequent suspension of concessionary U.S. wheat sales, by the loss of revenues from the closing of the Suez Canal and the loss of oil fields that resulted from the 1967 war, and by the decline in tourism and growing military debt in response to conflicts in the region.³² The ratio of total investment to GDP fell to an all-time low of 12.5% in 1968.³³

The infitah evolved out of both international and domestic, political and economic pressures, the result of which was the growing perception that the combination of Western technology, Arab capital, and Egyptian skills would be the key to the country's economic development. Although the passage of law 43 in 1974 is usually cited as the watershed, the infitah actually involved a series of policy changes that reflected the changing government perception of private investment that began in the mid 1960s. As early as 1965, the government initiated reforms to offset the

³² See Handoussa, 1987, pp. 17-20 for an analysis of the economic crisis that preceded the infitah.

³³ Shura Council, 1985.

privileged position of the public sector, liberalize the exchange and trade regime and promote private investment.³⁴

The centrepiece of the infitah was law 43/1974 which granted foreign investors a five to ten year tax holiday, unrestricted repatriation of profits, and immunity from sequestration.³⁵ Its amendment law 32/1977 removed all restrictions concerning the exchange rate at which profits would be repatriated and regulations governing foreign exchange accounts of enterprises. Trade liberalization was achieved through law 118/1975 which permitted the private sector to import up to 3000 different types of goods through the "own exchange" system which allowed the use of black market foreign exchange for the opening of letters of credit. The evolution of the system of own exchange imports was further developed with Law 93/1974 concerning imports and representation of foreign companies by Egyptians. Law 97/1976 and Decree 64/1974 allowed private individuals and firms to hold foreign exchange accounts, thereby providing a channel for remittances of migrant labour to be used for imports. Law 120/1975 gave greater autonomy to the banking system.

34 Wahba documents the economic policy changes that reflected the shift in favour of the private sector after 1965. Wahba, 1986.
 35 Ordinarily, Law 43 projects are expected to have some Egyptian participation (article 4), but no minimum level is specified in the legislation, except for certain activities (51% Egyptian participation required of banks dealing in LE; 50% for construction companies; 49% for technical consultancy). The actual level of Egyptian participation is determined as a result of negotiations between the investors, the concerned ministry, and the General Authority for Investment and Free Zones. Note that Law 43 distinguishes between inland and free zone projects. Free zone projects are supposed to be export-oriented and are exempt from Egyptian taxes, duties, foreign currency regulations, and requirements concerning local participation. Note that firms established under law 43 are hypothetically free to set their output prices on the condition that all inputs are purchased at world prices. This condition became particularly important when there was a large divergence between subsidized domestic energy prices and world prices.

A classical conflict of interest between domestic and foreign capital emerged in Egypt as indigenous entrepreneurs sought to take advantage of the changing investment climate.³⁶ After much lobbying, the same privileges were granted to domestic investors as those given to foreigners under law 43.³⁷ The new companies law 159/1981 and its accompanying fiscal legislation law 157/1981 extended most of the tax privileges of law 43 to indigenous firms.³⁸ These laws replaced the old companies legislation, Law 26/1954 and its many amendments. Foreign investment was permitted under Law 159 although the majority of foreign capital has entered under Law 43.³⁹ Law 159/1981 also revoked many of the socialist measures such as profit sharing, profit and wage ceilings, and worker participation in management, instituted during the Nasir period.⁴⁰ An investment allowance was also included in Law 157/1981 that

36 For a discussion, see Gillespie, 1984 and Hinnebusch, 1985, pp. 144-149.

37 The main exception was repatriation of profits unless the original investment was made in foreign exchange.

38 Law 157/1981 set the basic tax rate for companies (after deductions) at 20% on the first LE1000; 23% on the following LE1500; 27% on the following LE2000; and 32% on all profit over and above LE4500. The modified tax law also included the abolition of certain special taxes and the granting of various tax holidays and fiscal incentives. See Ahmed et al, 1985, pp. 47-9 for details.

39 Only approximately 4-5% of the capital under Law 159 has been in foreign currency. The rules under Law 159 governing foreign capital are that up to 100% of the capital may be foreign with a limited liability company while there is a 51% ceiling under joint stock or partnerships. Interview, Director, Companies Registry, December 1987.

40 Firms were no longer obligated to distribute profits to workers if it caused financial restrictions. The worker's share in company profits was reduced from 25% to 10% and could not exceed the firm's total wage bill. Maximum annual profits of LE10,000 and maximum annual salaries of LE5000 set in 1961 were abolished. The limit of 25% of total votes held by any one shareholder was abolished. No worker representation on the board of directors was required if an alternative channel, such as an advisory committee, was provided. Firms were no longer required to purchase government bonds. Applications to establish a new company no longer required a Presidential Decree and were considered approved if no answer was given within 60 days.

allowed firms to deduct an additional 25% depreciation.⁴¹ The new communities Law 59 extended additional tax incentives to investors who located their plants in certain newly developed industrial areas established around the major metropolitan centres.

Economic Performance under the Infitah: Growth without Development?

Criticism of the infitah focused on the quality, or "parasitic" nature, of much of the investment that occurred causing some authors to describe it as a period of "growth without development."⁴² The conspicuous consumption associated with the seemingly overnight millionaires spawned by the infitah was dubbed "la dolce vita."⁴³ Opposition to the infitah came from organized labour, civil servants, the poor, and the leftist political parties.⁴⁴ Much of the criticism was leveled at the private sector itself, rather than at the structure of incentives, both domestic and international which created wedges between financial, economic, and social returns, and therefore predetermined the pattern of investment that evolved.

The remainder of this chapter will provide a summary of aggregate economic performance, the investment response to the infitah legislation, and the changing relationship between the public and private sectors. Thereafter, some of the institutional characteristics of the economy will be described, particularly the

⁴¹ Ahmed et al found that virtually no investors took advantage of this investment allowance provision. Ahmed et al, 1985.

⁴² Amin, op cit., p.15. Some of the considerable press criticism of the infitah is compiled in Hinnebusch, 1985, p. 278.

⁴³ Hansen, 1988.

⁴⁴ See Aulas, 1982; Gillespie, 1984; and Pususney, 1988 for a discussion of the sources of opposition to the infitah.

foreign exchange regime and the financial system. This discussion is intended to lay the groundwork for a number of issues that will be analyzed in subsequent chapters.

Aggregate Economic Performance and the External Environment

Between 1974 and 1980, the Egyptian economy grew at the rapid pace of an average of 12% per year in real terms. However, an analysis of economic performance and investment during the infitah period must take into account the international context in which Egypt was experiencing considerable foreign exchange windfalls from petroleum exports, workers' remittances and, to a lesser extent, tourism, Suez Canal revenues, and aid. The ratio of exogenous resources to total resources available to the economy increased from 6% in 1974 to 45% in 1981.⁴⁵ The four major sources of foreign exchange (petroleum exports, remittances, Suez Canal tolls, and tourism) grew from \$700 million in 1974 to \$8.8 billion in 1980/81. In addition, Egypt became the recipient of large amounts of aid from the United States after the signing of the Camp David accords in 1977. Much of the observed growth in GDP, approximately 75% according to one calculation, came from petroleum exports, the Suez Canal, trade and finance.⁴⁶ Unlike most economies experiencing natural resource shocks (in contrast to commodity price shocks) where much of the windfall accrues to the government, the existence of workers'

⁴⁵ Exogenous resources are defined as petroleum revenues, worker's remittances, Suez Canal earnings, and foreign capital flows. Total resources are defined as GDP plus net imports. See Dervis et al, 1984, p. 9.

⁴⁶ Hansen, 1988, p. 16.

remittances and the own exchange market gave the private sector a significant share of the foreign exchange bonanza.⁴⁷

The foreign exchange inflow financed substantial growth in imports: capital goods imports rose by 33%, intermediates by 9%, and consumer goods by 15% per year.⁴⁸ Food imports consumed a major share of the windfall, particularly items that were subsidized by the government such as wheat, maize, vegetable oils and fats, and sugar. Building materials were also an important component of foreign exchange expenditure as construction boomed in the wake of the windfall. Capital goods imports were divided between machinery (60%), transport equipment (33%), and intermediates for the construction sector. The rise in non-food consumer goods was facilitated by the infitah legislation that liberalized trade and was stimulated by the rising incomes of a large part of the population.⁴⁹

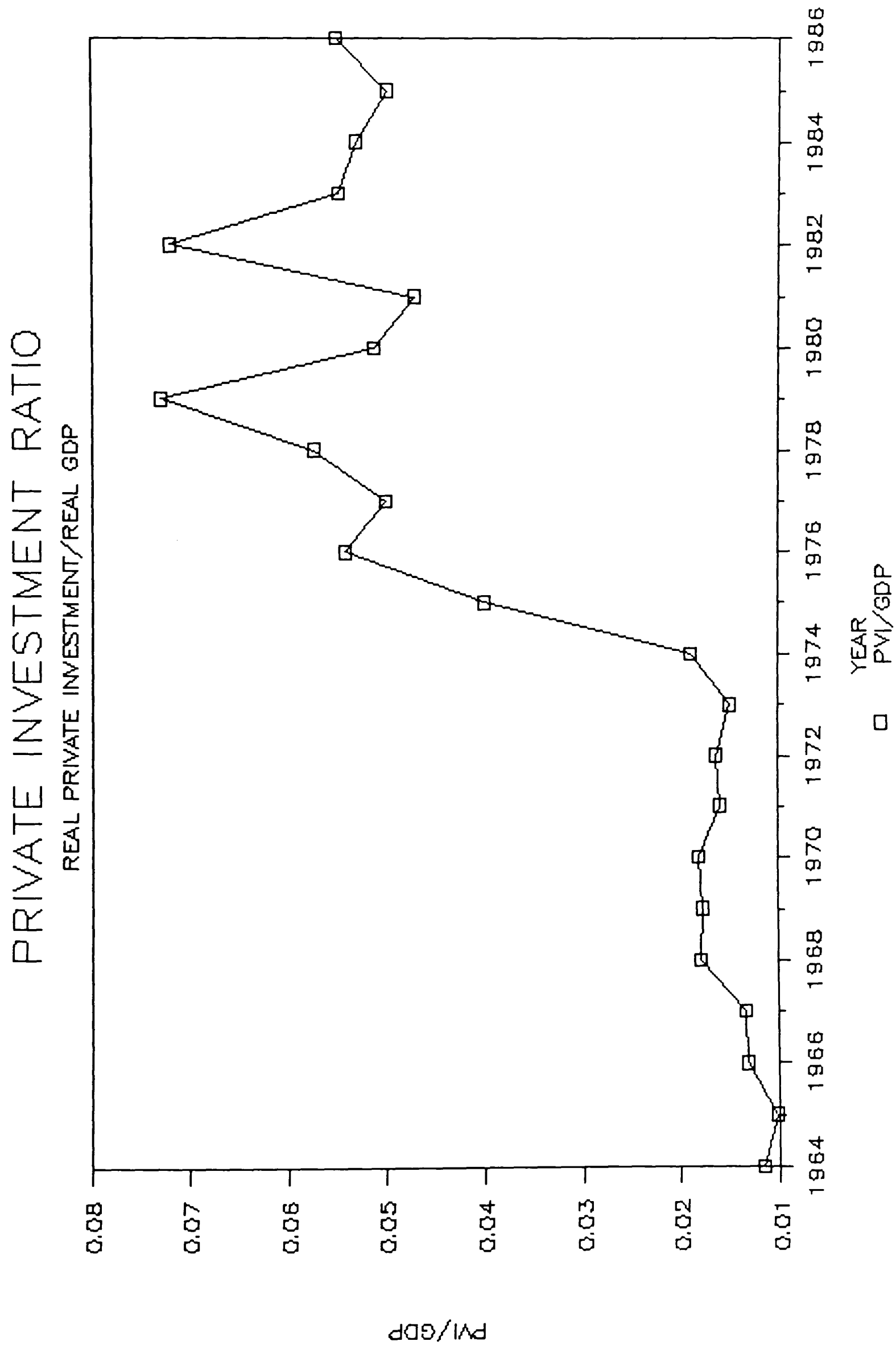
Much of the economic growth occurred in the private sector. Figure II-1 shows an impressive rise in the ratio of real private investment to GDP to 6-7% after 1974 from the ratio of 1-2% during the 1960s. The private sector's share in total investment rose from

47 Note that figures for remittance flows are likely to be underestimates since much of it does not come through the banking system and often enters the country in the form of goods, usually durables.

48 World Bank, July 1986, p.1. The growth in consumption imports, a source of much criticism, grew from LE 161.9 million in 1974 to LE1611.6 million in 1981. Abdel-Fadil, Salah and Osada, 1984, p.169.

49 Handoussa provides a useful summary of the uses to which Egypt put its foreign exchange windfall. Handoussa, 1987. Waterbury points out that the official import statistics may be underestimates, especially for luxury goods, because of the existence of two categories for which no license was required for importation. These categories are for individual shipments valued at less than LE5000 and for imports valued at less than LE10,000 of industrial producer's goods. Waterbury, 1983, p. 178.

Figure II-1



9% in 1973 to 21% in 1981/2.⁵⁰ The private sector's share in total value added rose from 46% in 1973 to 55% in 1981/2; that in manufacturing value added increased from 27% in 1973 to 33% in 1981/2; and that in services value added rose from 37% in 1973 to 47% in 1981/2.⁵¹ By 1985, one-third of industrial output, 60% of GDP and between 55-70% of industrial jobs were generated by private activity.⁵²

The revenues from petroleum exports also enabled the government to increase spending substantially without a concomitant increase in the deficit (GOVDEF). Figure II-2 shows the considerable rise in total government expenditure (GOVEX) and investment (GOVI) that was made possible by the windfall. Much of this spending was motivated by political pressures in a fairly classic redistribution of rents by the state in exchange for political support. The military build up, the maintenance of consumer subsidies and state employment guarantees were used as mechanisms for sharing the windfall wealth with political allies.

The existence of the windfall puts the rapid growth, particularly of investment, into perspective. An exceptionally high investment rate would be expected when national income is dependent on the decumulation of natural resources. Although there is no distinction made in conventional national income accounting, income from the extraction of a natural resource is different from that derived from resources like a factory since extraction activities deplete the nation's wealth. Consequently, a higher investment

⁵⁰ This is excluding investment by foreign oil companies. Ahmed et al, 1985 p. 4.

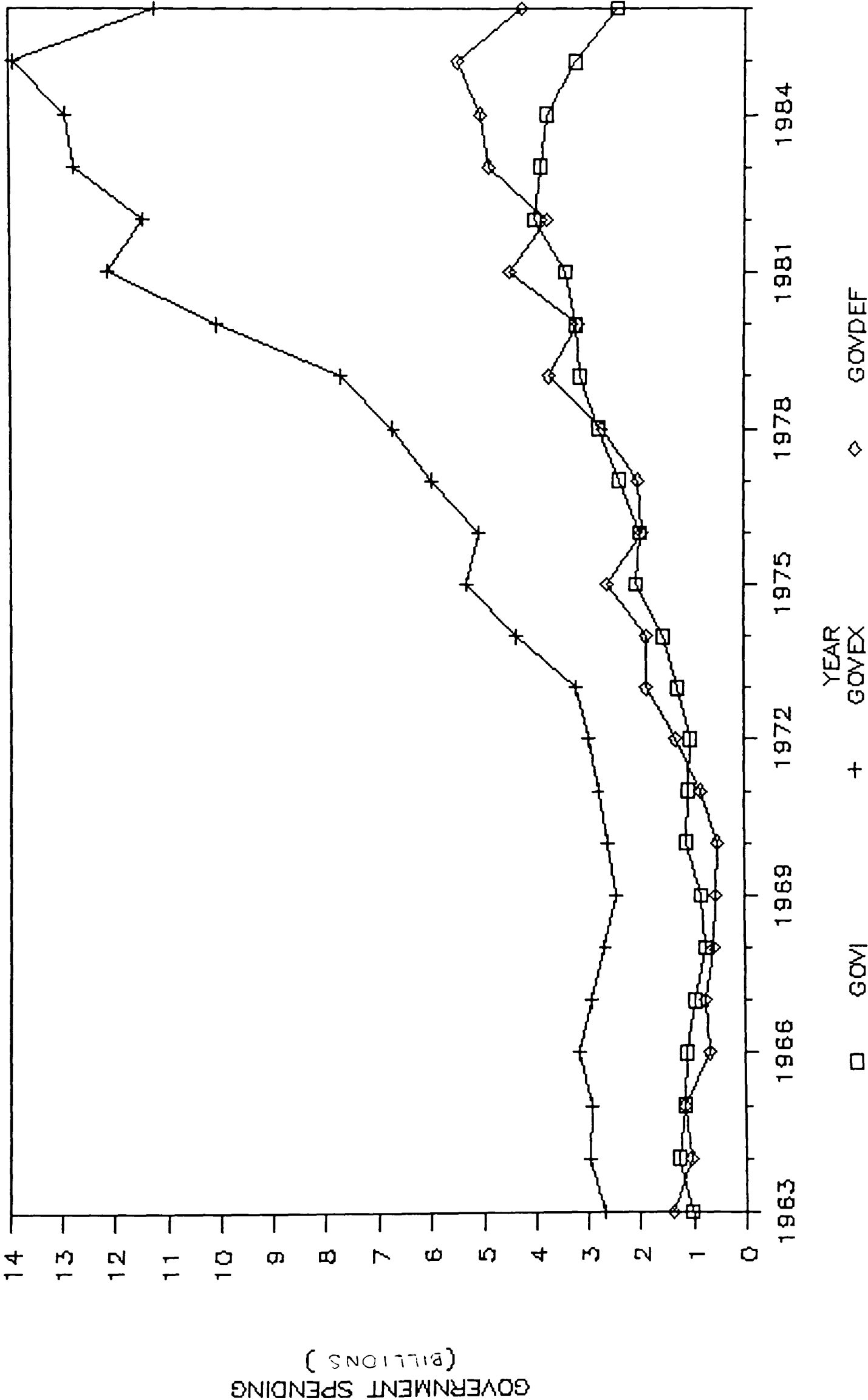
⁵¹ Ahmed et al, 1985, p. 4.

⁵² Partnership for Productivity, 1985, volume 2, p. 2.

Figure II-2

GOVERNMENT SPENDING IN REAL TERMS

INVESTMENT, EXPENDITURE, AND DEFICIT



rate would be expected in order to establish alternative sources of wealth when the natural resource is depleted.⁵³ The implications of the windfall for the sectoral distribution of private investment will be discussed in chapter VIII.

Investment under the Infitah Laws

Law 43 of 1974

The quantity of investment mobilized under the infitah laws was significant.⁵⁴ By 1985, the Investment Authority had approved 1350 law 43 applications with equity of LE 5.9 billion and total investment costs of LE 11.9 billion.⁵⁵ Table II-3 provides a sectoral breakdown of inland investments approved under Law 43 for the 1976-1985 period. The figures show that the largest number of projects with the largest average size and the majority of total capital were in finance, industry and services. Firms in industry and services tended to have the largest average size, whereas those in finance, agriculture and construction were smaller on average,

53 See Dervis et al for further discussion of the optimal investment rate under a windfall. Dervis et al, 1984, p. 96.

54 It is difficult to assess the share of infitah investments in total private investment because of inadequate monitoring of implementation by the General Authority for Investment and Free Zones for Law 43 and by the Companies Registry of the Ministry of Economy for Law 159. After 1974, the old companies law 26 fell into gradual disuse because of the more attractive tax advantages offered under laws 43 and 159. Evidence from the survey discussed in chapter 4 indicated that virtually all the firms established after 1974 were incorporated under one of the infitah laws. In addition, national accounts figures for aggregate private investment theoretically include data on capital expenditures made by already established firms. This is an additional source of discrepancy between infitah investment figures and national accounts data on total private investment.

55 For discussions of investment performance under Law 43, see General Authority for Investments and Free Zones, December 1983; Federation of Egyptian Industries, 1983/4, pp. 80-115; Ahmed et al., 1985, p. 85; and Mohareb, 1986, pp. 12-14;

TABLE II-3: PROJECTS APPROVED UNDER LAW 43, 1976-1985 (INLAND PROJECTS IN LE COU)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	TOTAL
INDUSTRIAL SECTOR											
NUMBER	99	41	44	59	50	87	24	63	65	51	583
EQUITY	360436	133381	71323	164882	364583	529040	56374	204123	240712	123725	2248579
TOTAL COSTS	751437	642447	175288	389275	1010789	1620749	102356	408635	531149	281293	5913418
DEBT/EQUITY	1.08	3.82	1.46	1.36	1.77	2.06	0.82	1.00	1.21	1.27	1.63
AVG SIZE	7590	15669	3984	6598	20216	18629	4265	6486	8172	5516	10143
FINANCE SECTOR											
NUMBER	43	26	21	22	48	43	21	11	7	4	246
EQUITY	456439	213698	137470	220879	267001	208690	65468	41840	52200	16500	1680185
TOTAL COSTS	551179	219998	137470	249370	267001	208690	65468	41840	52200	16500	1809716
DEBT/EQUITY	0.21	0.03	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.08
AVG SIZE	12818	8461	6546	11335	5563	4853	3118	3804	7457	4125	7357
AGRICULTURE AND LIVESTOCK											
NUMBER	2	7	11	5	12	20	3	21	18	5	104
EQUITY	8647	79633	35436	8567	23147	46152	2020	50800	48573	20552	323527
TOTAL COSTS	19103	195528	55546	19289	56454	110924	3480	96952	106411	30819	694506
DEBT/EQUITY	1.21	1.46	0.57	1.25	1.44	1.40	0.72	0.91	1.19	0.50	1.15
AVG SIZE	9552	27933	5050	3858	4705	5546	1160	4617	5912	6164	6678
CONSTRUCTION SECTOR											
NUMBER	12	17	22	34	26	27	13	21	20	11	203
EQUITY	21695	35645	17323	58924	57640	41911	82220	73005	142768	36580	567711
TOTAL COSTS	115629	65837	35781	118019	203777	114424	144440	100393	286621	79144	1264065
DEBT/EQUITY	4.33	0.85	1.07	1.00	2.54	1.73	0.76	0.38	1.01	1.16	1.23
AVG SIZE	9636	3873	1626	3471	7838	4238	11111	4781	14331	7195	6227
SERVICES SECTOR											
NUMBER	51	26	20	25	14	28	9	23	12	6	214
EQUITY	290567	218416	89349	101129	14738	101067	21677	118560	93695	30906	1080104
TOTAL COSTS	695448	404953	156122	200579	33120	240914	39384	248950	134242	74634	2228346
DEBT/EQUITY	1.39	0.85	0.75	0.98	1.25	1.38	0.82	1.10	0.43	1.41	1.06
AVG SIZE	13636	15575	7806	8023	2366	8604	4376	10824	11187	12439	10413
TOTAL OF ALL SECTORS											
NUMBER	207	117	118	145	150	205	70	139	122	77	1350
EQUITY	1137784	680773	350901	554381	727109	926860	227759	488328	577948	228263	5900106
TOTAL COSTS	2132796	1528763	560207	976532	1571141	2295701	355128	896770	1110623	482390	11910051
DEBT/EQUITY	0.87	1.25	0.60	0.76	1.16	1.48	0.56	0.84	0.92	1.11	1.02
AVG SIZE	10303	13066	4748	6735	10474	11199	5073	6452	9103	6265	8822

NOTE: -THERE ARE NO DISAGGREGATED FIGURES FOR THE YEARS 1974 AND 1975.
THIS IS BECAUSE APPROVALS DID NOT ACTUALLY START UNTIL 1975 AND THE PROCEDURES WERE NOT FULLY ESTABLISHED UNTIL 1976. CONSEQUENTLY, THE FIGURES FOR 1976 INCLUDE APPROVALS FROM 1974 AND 1975.
-THE FIGURES FOR TOTAL INVESTMENT COSTS REPRESENT THE TOTAL EXPECTED COST OF THE ENTERPRISE BEYOND THAT INCLUDED IN EQUITY.
-DEBT/EQUITY RATIOS WERE CALCULATED AS THE RATIO OF THE DIFFERENCE BETWEEN TOTAL COSTS AND EQUITY DIVIDED BY EQUITY.
-AVERAGE SIZE OF THE ENTERPRISE WAS CALCULATED AS TOTAL INVESTMENT COSTS DIVIDED BY THE NUMBER OF ENTERPRISES.

SOURCE: GENERAL AUTHORITY FOR INVESTMENT AND FREE ZONES

reflecting lower capital requirements. The debt/equity ratios were considerably higher for the industrial sector. The pattern of investment approvals shows a sharp downturn after 1981, reflecting the passage of Law 159/1981 under which many new firms were established in order to have access to subsidized energy.

An evaluation of investment under the infitah laws must analyze actual, rather than simply approved, investments. Table II-4 provides a summary of the implementation rate of approved investments under Law 43. This shows the relatively low implementation rate for Law 43 projects, except for those in finance and services. Implementation was particularly slow in housing, livestock, chemicals, engineering industries, building materials, metals, mining, and pharmaceuticals. Part of the explanation for the low implementation rate is the natural time lags associated with investment.⁵⁶ However, since the figures in table II-4 report implementation of all projects up to 1986, a higher proportion of firms in operation would be expected for those that received approval during the 1970s. In general, the implementation rate improved over time, but remained slowest in sectors such as industry, construction, and agriculture.

The pattern of investments for projects established in the free zones under Law 43 is presented in table II-5. The four free zones in Egypt in Alexandria, Suez, Nasr City and Port Said were established with the objectives of employment generation, technology transfer and export promotion. Free zone projects are exempt from

⁵⁶ On average, firms surveyed as part of this thesis reported experiencing a lag of two years between conception and implementation of an investment project.

TABLE II-4: PROJECTS APPROVED AND IMPLEMENTED UNDER LAW 43 UP TO DECEMBER 1986
(INVESTMENT COSTS IN LE MILLION)

SECTOR	APPROVED		IN OPERATION		RATIO IMPLEMENTED	
	NUMBER	INVEST COSTS	NUMBER	INVEST COSTS	NUMBER	INVEST COSTS
MANUFACTURING	575	6235	304	2315	53	37
TEXTILES	79	925	48	787	61	85
FOOD&BEVERAGES	93	607	50	241	54	40
CHEMICALS&WOOD	149	1656	95	409	64	25
ENGINEERING	67	672	29	182	43	27
BUILDING MATL	106	1286	40	486	38	38
METALS	48	756	32	113	67	15
PHARMACEUTICALS	33	333	10	97	30	29
MINING	6	101	3	16	50	16
AGRICULTURE	106	722	43	372	41	52
AGRO-INDUSTRY	10	266	4	151	40	57
LAND RECLAIM	17	64	10	44	59	69
LIVESTOCK	79	392	29	177	37	45
CONSTRUCTION	197	1391	100	429	51	31
HOUSING	81	1133	23	264	28	23
CONTRACTING	116	258	77	165	66	64
FINANCE	252	1945	217	1701	86	87
INVESTMENT CO.	178	1350	148	1119	83	83
BANKS	74	595	69	582	93	98
SERVICES	219	2219	149	1096	68	49
TOURISM	104	1453	57	626	55	43
TRANSPORT	12	99	10	76	83	77
HOSPITALS	30	205	16	102	53	50
CONSULTANCY	29	19	26	18	90	95
OTHER SERVICES	44	443	40	274	91	62
TOTAL	1355	12613	816	5929	60	47

SOURCE: GENERAL AUTHORITY FOR INVESTMENT AND FREE ZONES

TABLE II-5: PROJECT APPROVALS AND IMPLEMENTED UNDER LAW 43 IN THE FREE ZONES
(INVESTMENT IS IN LE MILLIONS)

***** APPROVALS *****							***** IMPLEMENTATION RATE (%) *****	
	NUMBER	EQUITY	TOTAL COSTS	DEBT/EQUITY	AVG SIZE	NUMBER	CAPITAL	
1974	2	21.1	22.1	0.05	11.05			
1975	53	141.1	145.9	0.03	2.75			
1976	35	53.8	57.5	0.07	1.64			
1977	50	38.5	61.8	0.61	1.24			
1978	20	21.3	25.6	0.20	1.28			
1979	23	20.8	29.9	0.44	1.30			
1980	45	77.3	174.0	1.25	3.87			
1981	11	66.2	134.9	1.04	12.26	60.6	52.9	
1982	29	150.0	181.2	0.21	6.25	69.3	22.0	
1983	2	36.2	87.4	1.41	43.70			
1984	5	13.1	26.0	0.98	5.20	81.1	68.3	
1985	4	6.4	8.5	0.33	2.13	86.8	63.7	

SOURCE: CONSTRUCTED FROM DATA IN ESFAHANI, 1988, TABLES 5 AND 13, PAGES 39 AND 43.

taxes, customs restrictions and import duties. Rather than develop into export-oriented manufacturing along the lines of Korea, the free zones in Egypt provided a tax free haven for the temporary storage of goods destined for the domestic market. The vast majority of the investments in the free zones were in storage and warehousing facilities. The sectoral share of projects in the free zones was divided between storage (64%), industry (22%), services (11%), and finance and trade (3%).⁵⁷ The profitability of storage projects stemmed from buying on world markets at favourable prices, storing cheaply in the free zone and postponing paying customs duties, and "exporting" the goods to the Egyptian market when the price is favourable. This pattern of investment in the free zones explains the low debt/equity ratios observed and the high implementation rates.

In contrast to the free zones, the new industrial communities established by the government in proximity to the major urban centers seem to have been more successful. Firms that locate in the new industrial cities have access to sites and infrastructure services as well as eligibility for incentives analogous to those under Laws 43/1974 and 159/1981. The rising land prices in the new

⁵⁷ Esfahani, 1988, table 9, p. 41. A case study of the Alexandria free zone, the largest of the four, was conducted as part of the survey reported in chapter four. Over 80% of the projects in the Alexandria free zone were in warehousing or storage of goods that were ultimately destined for the domestic market. Thirty percent of these warehousing projects were in petroleum or maritime services. Specialized equipment for these industries was stored in the free zones to avoid paying duties, leased in Egypt for the periods needed under special permits and then returned to storage in the free zone. The few industrial projects in the Alexandria free zone had differing degrees of success, but generally faced problems when regulations restricting access to the domestic market were enforced. The reasons for the poor export performance of the free zone projects were the more lucrative domestic market, poor quality of output, the absence of scale economies, the lack of backward linkages to domestic production and bureaucratic obstacles.

industrial towns is one indication of the demand for sites supplied with infrastructure. Although no rigorous cost-benefit analysis of the social returns to government investment in infrastructure in these new towns has been conducted, the private returns to the enterprises established have been positive.⁵⁸

Evaluations of the performance of investments during this period are generally not favourable. Ahmed et al's study of Law 43 investments found that inland projects (i.e. those not in the free zones) were characterized by "short gestation periods, high financial rates of return and low levels of technology."⁵⁹ The pattern of investment followed the pattern of profitability which was above average for finance, services, and construction and below average for agriculture and industry.⁶⁰ Another study by the ex-Minister of the Economy Sultan Abu Ali found that 33.4% of the enterprises established under Law 43 up to 1985 suffered losses and a large number failed to show any profits.⁶¹ Note, however, that the prevalence of tax evasion makes the interpretation of these types of findings difficult. In addition to responding to the structure of financial incentives, Amin has argued that the pattern of investment that emerged after 1974 also reflected a process of

⁵⁸ See Meyer, 1988 for a description of industrial development in the new communities.

⁵⁹ Ahmed et al, 1985, p. 26.

⁶⁰ Ahmed et al evaluated the rates of return for 206 law 43 enterprises and found this pattern of profitability. The average rate of return is 28.1% with high profit activities in banking, housing, consultancy, petroleum services, textiles, building materials, and iron and steel products. Branches of foreign banks received returns of 61.2% and joint ventures 76.4%. High loss activities were chemicals, mining, hospitals and tourism. Ahmed et al, 1985, tables 3.13 and 3.14, pp. 36-7. The previous Minister of Economy and director of THE INVESTMENT AUTHORITY estimates that approximately 35% of law 43 firms are now suffering losses. (interview with Sultan Abu Aly, ex-Minister of Economy, January 1987).

⁶¹ Harik, 1988, p.17.

social change and entrepreneurial development. The emergence of social groups that only recently had access to surplus income contributed to the prevalence of "unproductive investment" in areas such as real estate, transport, tourism, and imports.⁶²

Although a major objective of Law 43 was the attraction of foreign, especially Arab, investment, the vast majority of the capital under the law was Egyptian. Table II-6 provides a breakdown of the sources of the capital invested under Law 43. The table reveals that only 22% of the total investment was made by foreign (non-Arab) capital and 37% by Arab capital. These figures exaggerate the actual levels since the General Authority for Investment and Free Zones' classification is based on the currency invested, not the nationality of the investor. Many Egyptians, especially those investing funds previously held abroad, invested in foreign currency so that they would have the right to repatriate their profits overseas.

While the foreign investment response was weak, considerable resources were mobilized from the indigenous public sector through joint ventures with private firms. A gradual de facto privatization of public assets occurred as state enterprises established joint ventures with private, often foreign, firms. This allowed public enterprises to take advantage of the *infatih* incentives and, more importantly, to attain private legal status which exempted them from some of the more restrictive public sector laws governing

⁶² These new investors had smaller amounts of capital, less education and experience, and greater insecurity about their newly acquired social position. Consequently, they were reluctant to invest in industry and agriculture which involved substantial risk, more capital, longer gestation, and greater expertise. Amin, 1988, p.9.

TABLE II-6: BREAKDOWN OF PARTICIPATION IN LAW 43 PROJECTS: PUBLIC, PRIVATE, AND FOREIGN, LE 000
(AS OF JUNE 30 1987)

INDUSTRIAL SECTOR	TOTAL APPROVED PROJECTS	NUMBER PUB SEC SHARE	TOTAL EQUITY	PUBLIC ENTERPRISE SHARE	PUBLIC BANK SHARE	INSURANCE COMPANY SHARE	TOTAL PUBLIC SHARE	TOTAL PRIVATE SHARE	FOREIGN ARAB (NON-ARAB) INVESTOR INVESTOR SHARE SHARE	
TEXTILES	67	7	109870	20163	34750	850	55763	71593	19330	50343
FOOD	95	19	84005	7034	21045	350	28429	114014	15881	24813
CHEMICALS	110	14	296027	188062	1257	5600	194919	106571	27384	109993
WOOD	16	3	5175	2540	550	252	3342	13861	6031	3414
ENGINEERING	49	14	67834	21501	3307	103	24911	53338	11561	44271
BUILD MATL	80	19	163420	59546	22159	8830	90535	121291	24276	28800
METALS	45	6	209502	89428	70752	16576	176756	36720	18215	36009
MEDICINE	15	5	33952	19801	0	0	19801	32407	225	7023
MINING	7	3	27250	13400	9450	4188	27038	2087	442	241
TOTAL INDUSTRIAL	484	90	997035	421475	163270	36749	621494	551882	123345	304907
FINANCIAL SECTOR										
FINANCE	222	56	484704	145456	76447	49737	271640	363158	846549	66279
BANKS	76	39	444220	20925	196694	34362	251981	231368	57108	86935
TOTAL FINANCIAL	298	95	928924	166381	273141	84099	523621	594526	903657	153214
AGRICULTURE AND LIVESTOCK										
AGRO-INDUSTRY	9	5	59683	32665	6034	3120	41819	29614	5680	11448
LAND RECLAM	20	11	29280	12753	2600	700	16053	16949	50	5615
FISHERIES	8	6	21950	4729	2535	2080	9344	12661	1485	1960
LIVESTOCK	57	11	41442	6568	15588	1200	23356	51256	13027	5388
TOTAL AGRIC&LIVEST	94	33	152355	56715	26757	7100	90572	110480	20242	24411
CONSTRUCTION SECTOR										
HOUSING	62	6	49122	6117	8500	12133	26750	151474	60956	10626
CONTRACTING	123	12	18979	5215	4000	0	9215	93336	10788	21732
TOTAL CONSTRUCTION	185	18	68101	11332	12500	12133	35965	244810	71744	32358
SERVICES SECTOR										
TOURISM	116	15	101030	37989	4305	4467	46761	375678	111484	61229
TRANS & COMM	21	3	4500	200	2350	0	2550	21603	6322	10896
HOSPITALS	28	3	33300	8050	3872	665	12587	48581	8305	9195
CONSULTANCY	29	5	5312	1599	175	210	1984	5133	165	2500
PETROL SERVICE	5	2	3460	1730	0	0	1730	357	0	12247
OTHER SERVICES	42	9	20648	8864	1970	634	11468	58763	1563	129926
TOTAL SERVICES	241	37	168250	58432	12672	5976	77080	510115	127839	225993

TOTAL ALL SECTORS	1302	273	2314665	714335	488340	146057	1348732	2011813	1246827	740883

SOURCE: GENERAL AUTHORITY FOR INVESTMENT AND FREE ZONES, 1987

output prices, wages, and management.⁶³ For public sector managers this meant higher wages and access to foreign exchange and technology; for the foreign multinationals and indigenous private investors it meant greater certainty because of good government contacts.⁶⁴

Table II-6 also reports investments made by public sector companies, public sector banks, and public sector insurance companies. The public sector participated in 21% of all Law 43 projects and the public sector's share of total equity invested was 40%. This reflected the fact that the public sector tended to enter into larger scale projects than the private sector. Most of the public share under Law 43 came from the public enterprises (21%) that often used their existing plant as their equity shares. The public sector banks held 15% of the equity under Law 43 while the public insurance companies held a more modest 4%.

The characteristics of some of these public-private joint ventures are described in appendix D. It is difficult to analyze the public-private joint ventures in economic terms since their decision-making is often highly politicized. The government's assessment was reflected in the falling number of public-private joint ventures approved as of the mid 1980s. By 1987, it was government policy not to approve such joint ventures between the public and private sectors because of resource constraints in the

⁶³ Wahba documents the establishment of ventures by public entities under law 43 status in agriculture, industry, banking and finance, Wahba, 1986, p.272. The legal issue of the implicit liquidation of public assets has not been addressed.

⁶⁴ Several examples of the implications of growing links between the public and private sectors are described in chapter 4 and in appendix D.

public sector, the poor performance of some of these projects, and evidence of corruption and mismanagement in a number of cases.

Law 159 of 1981

The data for project approvals under Law 159 are presented in table II-7. From 1982/3, when the law was implemented, to 1986/7, 588 joint stock companies were approved with LE 852.4 million in equity. In addition, 446 limited liability companies with equity of LE 58.46 million and 3 limited partnerships with 0.71 million in equity were established. The sectoral distribution of Law 159 investment favoured industry and construction, with financial services constituting an important share in terms of equity size and commerce in terms of the number of firms. Again, as with Law 43, approvals are not always a good measure since many approved projects were never implemented. Unfortunately, the Companies Registry that administers Law 159 does not monitor implementation.

The major incentive for incorporating under Law 159 is to avoid the non-subsidized energy prices paid by Law 43 firms. In theory, because Law 43 firms were exempt from output price controls, they had to pay world prices for their inputs, unlike Law 159 firms that often had access to subsidized inputs. Otherwise, the investment incentives under Laws 43/1974 and 159/1981 were virtually identical. In order to streamline the administrative process, the government has proposed a new amalgamated investment law that combines Laws 43 and 159 as well as investment incentives that appear in other pieces of legislation.

TABLE II-7: PROJECTS APPROVED UNDER LAW 159 FROM 1982/3-1986/7 (LE MILLIONS)

JOINT STOCK COMPANIES		1982/3	1983/4	1984/5	1985/6	1986/7	TOTAL
INDUSTRY							
	NUMBER	9	33	53	45	39	179
	EQUITY	15.9	55.6	102.3	66.7	58.3	298.8
AGRICULTURE							
	NUMBER	2	15	20	13	14	64
	EQUITY	3.3	44.5	15.6	21.8	7.2	92.4
COMMERCE							
	NUMBER	7	21	20	10	20	78
	EQUITY	11.6	16.6	28.7	6.1	15.8	78.8
CONSTRUCTION							
	NUMBER	14	26	31	40	54	165
	EQUITY	8.7	24.5	24.5	30.9	39.7	128.3
SERVICES							
	NUMBER	1	8	14	13	11	47
	EQUITY	0.3	4.6	10	20.5	13.6	49
TOURISM							
	NUMBER	3	4	3	10	13	33
	EQUITY	12.4	4.3	2.6	7	17.5	43.8
FINANCIAL SERVICES							
	NUMBER	0	0	0	6	8	14
	EQUITY	0	0	0	152.2	5.1	157.3
CONSULTANCY							
	NUMBER	0	1	0	3	4	8
	EQUITY	0	0.3	0	2.5	1.2	4
TOTAL							
	NUMBER	36	108	141	140	163	588
	EQUITY	52.2	150.4	183.7	307.7	158.4	852.4
LIMITED LIABILITY COMPANIES							
INDUSTRY							
	NUMBER	12	17	13	19	27	88
	EQUITY	6.23	2.29	2.92	3.03	6.55	21.02
AGRICULTURE							
	NUMBER	3	4	7	4	3	21
	EQUITY	0.86	1.17	0.86	0.52	0.15	3.56
COMMERCE							
	NUMBER	11	17	25	20	33	106
	EQUITY	0.95	2.31	1.98	1.34	1.44	8.02
CONSTRUCTION							
	NUMBER	15	24	30	41	34	144
	EQUITY	1.82	2.75	5.83	6.03	3.67	20.1
SERVICES							
	NUMBER	7	18	12	12	15	64
	EQUITY	0.61	1.09	0.83	0.83	0.7	4.06
TOURISM							
	NUMBER		2	4	4	8	18
	EQUITY		0.35	0.33	0.3	0.57	1.55
CONSULTANCY							
	NUMBER		1		1	3	5
	EQUITY		0.02		0.01	0.12	0.15
TOTAL							
	NUMBER	48	83	91	101	123	446
	EQUITY	10.47	9.98	12.75	12.06	13.2	58.46
LIMITED PARTNERSHIPS							
INDUSTRY							
	NUMBER	1	0	0	0	0	1
	EQUITY	0.25	0	0	0	0	0.25
CONSTRUCTION							
	NUMBER	1	0	0	0	0	1
	EQUITY	0.25	0	0	0	0	0.25
SERVICES							
	NUMBER	0	1	0	0	0	1
	EQUITY	0	0.21	0	0	0	0.21
TOTAL							
	NUMBER	2	1	0	0	0	3
	EQUITY	0.5	0.21	0	0	0	0.71

NOTE: -EQUITY HERE REFERS TO THE ISSUED CAPITAL OF THE COMPANY. THE COMPANY REGISTRY ALSO REPORTS DATA ON TOTAL APPROVED CAPITAL AND CAPITAL PAID UP IMMEDIATELY.

SOURCE: COMPANIES REGISTRY, MINISTRY OF ECONOMY, 1987

The Changing Relationship Between the Public and Private Sectors

The infitah period saw the diminishing importance of public sector industry. The share of public enterprises in the value of industrial output fell from 3/4 in the mid 1970s to 2/3 in 1984/5.⁶⁵ The public sector continued to dominate sectors like weaving, engineering, and metallurgy. Sectors that had previously been the exclusive domain of the public sector such as cement, steel, sugar, and spinning were penetrated by private investors, often through joint ventures between public enterprises and private foreign firms. In general, existing public sector industry was deprived of net investment resources.⁶⁶ This was exacerbated by the shortage of foreign exchange available to the public sector since 1980.⁶⁷ With a shrinking pool of foreign exchange available to the government as a result of the oil price fall, the public sector was forced to turn to the black market where it was outbid by the private sector for hard currency. Government attempts to regain control of the foreign exchange system, such as the short-lived import rationalization committees for rationing foreign exchange established in January 1982, met with considerable opposition from

⁶⁵ This only includes enterprises supervised by the Ministry of Industry. IMF, August 1986, p.15.

⁶⁶ Handoussa provides evidence of the fall in investment in public sector industry: (1) about 25% of the industrial "investment" category actually went to infrastructure which served industry; (2) 40% of project finance in public industry went into replacement of worn out equipment; (3) only six of the fifteen largest recipients of investment funds increased their installed capacity. Handoussa, 1987, p. 31.

⁶⁷ Evidence of the severity of the public sector foreign exchange shortage is the gradual "dollarization" of the economy that occurred. Many public sector manufacturers began demanding payment for their products in dollars. In addition, many public sector international tenders were offered in LE since payment in dollars would be more difficult.

the private sector, especially the black market currency dealers, and were eventually scrapped.⁶⁸

In addition to changing the relative roles of the public and private sectors in the Egyptian economy, the infitah had important fiscal implications for the state. The leftist National Progressive Unionist Party, or Tagammu', estimated the subsidy granted to private firms resulting from infitah fiscal exemptions as between LE 4-5 billion.⁶⁹ Ahmed et al's study of the fiscal implications of the infitah attempted to measure the value of the tax holiday, investment allowance and customs duty exemptions granted under the infitah.⁷⁰ They argued that tax collections from the private infitah sector were growing in importance as firms increased production and began to lose their tax exempt status. However, many firms attempted to extend their tax holiday by filing for bankruptcy and reestablishing themselves as allegedly new enterprises. By 1984/5, an estimated 182 firms were paying approximately LE100 million in taxes, representing about 4% of total tax collections in Egypt.

However, there was evidence that the infitah incentives had significant economic effects: the tax holiday tended to favour more short-term, quick-yielding projects; the investment allowance and customs duty exemptions tended to favour more capital intensive

⁶⁸ In order to undermine the government's policy, the money dealers raised the black market price of the dollar by 10% in only two days. Their demands that the import rationalization committees be abolished and that the then Minister of the Economy, Mustafa El Said, resign were both met. For a description of this incident, see Bianchi, 1985, p. 152 and Kandil, 1985 and 1986. Interview with ex-Minister of Economy Moustafa Said, October 1987.

⁶⁹ Note that no sources are given for this estimate. National Progressive Unionist Party, January 1985.

⁷⁰ Ahmed et al, 1985.

activities. El-Iraqi's calculations of the net present value of the infitah tax incentives found a strong bias in favour of projects characterized by short term, a high growth rate of cash inflow, and low cost of capital.⁷¹ Most importantly, a survey of investors asking about the importance of fiscal incentives at the margin concluded that the majority of the firms interviewed did not consider the infitah fiscal incentives crucial to their decision to invest.⁷² The efficacy of fiscal incentives was also considerably diluted since tax evasion was widespread.⁷³ This contributed to the growing regressiveness of the tax system.⁷⁴

There was also growth in the formal and informal links between the public and private sectors, both through individuals and through commercial transactions. Many officials took advantage of the infitah legislation to establish private businesses, often while still in office.⁷⁵ One author found that 22 ex-ministers and 2 ex-

71 El-Iraqi, 1983.

72 Ahmed et al, 1985, pp. 81-3. Also see the survey results in chapter 4 of this thesis.

73 Amin analyzes tax evasion as an outgrowth of rapid social mobility in Egypt during the infitah period. The main tax payers prior to 1952 were the old class of landlords and early industrialists who felt indebted to a state which provided them with infrastructure and tariff protection. In contrast, much of the wealth in the infitah period was based on state inactivity (trade, real estate, land speculation, black marketeering, etc.). The declining real income of tax collectors, like that of most civil servants, increased their willingness to accept bribes and legislators, many of whom come increasingly from the "nouveau riche", were unwilling to enforce the tax laws strictly. Amin, 1987.

74 Bently, 1981, p. 21.

75 Government records show a number of officials who have used their public positions as a basis for private businesses. See Ayubi, 1982. A study of 30 prominent businessmen by Mokhtar showed that five had recently left public sector careers. Mokhtar, 1980. Some of those who moved to the private sector had actually been involved in formulating the infitah legislation. For example, Mohamed Ibrahim Dakruri, who was head of the parliamentary committee advocating the liberalization associated with law 32/1977, later became the director of a bank operating under the new law. Ajami, 1982(a).

prime ministers were acting as importers or agents of foreign companies under the infitah legislation.⁷⁶ Mahmoud provides a detailed breakdown of shares of former prime ministers and ministers in Law 43 projects.⁷⁷ This phenomenon lends some credence to the argument made by Ajami that in developing countries, the public sector trains the next generation of private sector managers at the taxpayers' expense.⁷⁸ However, these ex-officials were marketing their knowledge of the system and contacts more than their managerial or technical skills.⁷⁹

A number of new institutional channels for private sector lobbying of government have been established alongside the older corporatist groups, such as the Federation of Industry and the Chambers of Commerce, established in the pre-1952 period. Some of the groups have their origins in the Nasir period, such as the Employers and Professional Syndicates, whereas others are products of the infitah period, such as the Egyptian Businessmen's Association, the Bankers' Association, the Investors' Association, and the American Chamber of Commerce. This "hyperfragmentation" of private sector representatives stems from the discontinuity in the evolution of the private sector in Egypt over the last century.⁸⁰ Although there is considerable diversity in representation and conflicts within the private sector, between small and large producers and between

76 Guwaida, 5 April, 1976. There are also a large number of ex-public officials involved in the private banking sector.

77 Mahmoud, 1984. His list does not include activities registered in the names of members of officials' families.

78 Ajami, 1982(b).

79 Examples of this are discussed in the survey findings reported in chapter 4.

80 Bianchi, 1985, p. 154.

traders and industrialists, for example, it has emerged as possibly the most successful interest group in the country.⁸¹

Institutional Background

The infitah period saw the rapid growth of the banking system and a number of reforms of the policies governing finance and the foreign exchange system. These changes in the institutional environment in which the private sector operated will be described below so as to provide some background to the chapters that follow.

The Financial System

Between the nationalizations and the end of 1974 there were four public sector commercial banks, two specialized public sector banks, and two offshore banks. By June 1984, there were 43 commercial banks, 31 business and investment banks, 21 specialized banks, and 2 offshore banks.⁸² This plethora of financial institutions was in response to the growing needs of the private sector and, perhaps more importantly, to the highly profitable structure for banking services provided by the Central Bank's schedule of fees and commissions. The schedule was originally designed to protect the profitability of the public sector commercial banks who would, in theory, be lending on the basis of developmental rather than profitability objectives. However, the government managed the public sector banks on a more or less commercial basis since their inception. Because profitability became an important criterion in

⁸¹ For a discussion of some of the conflicts of interest within the private sector, see Kandil, 1985 and 1986.

⁸² For a survey of the evolution and operations of the banking system, see Foda, 1985.

evaluating the performance of the public sector banks, there is no evidence that they distributed loans in any more or less socially desirable way than do the private banks. With the infitah, private banks could take advantage of the approximately 6% margin over their cost of funds allowed for by the Central Bank's regulations.⁸³

Egypt, like many developing countries, uses Central Bank administered interest rates that are below market levels for loans in domestic currency. Loans in foreign currency are at world market rates.⁸⁴ Not surprisingly, this has spawned considerable arbitrage since firms prefer holding LE denominated debt to that in foreign currencies. Critics of the interest rate structure have argued that raising real interest rates would alleviate the "dollarization" problem by making the Egyptian pound a desirable store of wealth, rationalize borrowing and lead to healthier debt/equity ratios. Opponents of higher interest rates argue that it would have a negative effect on current borrowers who would be subject to the new higher rates, would deter new investment, and possibly have inflationary effects in the economy.

The structure of Central Bank interest rates and the sectoral differentiation between loans is given in table II-8. In theory, the subsidy on interest rates for agricultural and industrial loans was intended to encourage investment in these sectors by reducing the cost of capital. In practice, it meant that banks, both public

⁸³ This is in contrast to the approximately 2% margin for banks in most developed countries on loans to regular clients.

⁸⁴ The interest rate on loans in foreign exchange reflects international prices. Most institutions lend foreign exchange at approximately 2% over 6 month LIBOR for the short and medium term.

TABLE II-8: NOMINAL AND REAL INTEREST RATES (WPI ADJUSTED)

	NOMINAL RATES				REAL RATES		
	CENTRAL BANK DISCOUNT RATE	MINIMUM LENDING RATE	MAXIMUM LENDING RATE	RATE OF CHANGE OF WPI	CENTRAL BANK DISCOUNT RATE	MINIMUM LENDING RATE	MAXIMUM LENDING RATE
DEC 1975	6.0	7.0	8.0	8.0	-2.0	-1.0	0.0
FEB 1977	7.0	8.0	9.0	9.0	-2.0	-1.0	0.0
JUNE 1978	8.0	9.0	11.0	15.0	-7.0	-6.0	-4.0
DEC 1978	9.0	10.0	12.0	15.0	-6.0	-5.0	-3.0
MARCH 1979	9.0	10.0	12.0	10.0	-1.0	0.0	2.0
MARCH 1980	10.0	11.0	13.0	22.0	-12.0	-11.0	-9.0
MAY 1980	11.0	12.0	14.0	22.0	-11.0	-10.0	-8.0
JAN 1981	12.0	13.0	15.0	8.0	4.0	5.0	7.0
AUG 1981	12.0	13.0	15.0	8.0	4.0	5.0	7.0
JULY 1982	13.0	13.0	16.0	9.0	4.0	4.0	7.0
DEC 1983	13.0	11.0	16.0	16.0	-3.0	-5.0	0.0
MAY 1987	13.0	11.0	18.0	16.0*	-3.0	-5.0	2.0

NOTES: - DATES GIVEN REPRESENT CHANGES IN INTEREST RATES. BETWEEN THESE DATES THE RATES WERE CONSTANT.
- IN GENERAL, MINIMUM LENDING RATES APPLY TO AGRICULTURE AND AND INDUSTRY WHILE MAXIMUM RATES APPLY TO COMMERCE.

* THIS IS THE INFLATION RATE OF THE WPI FOR 1986.

SOURCE: CENTRAL BANK OF EGYPT

and private, preferred making loans to the more lucrative commercial sector rather than to higher risk projects in agriculture or industry.⁸⁵ While a 6% margin is generous for "safe" lending such as short term trade transactions, banks would require much higher returns to embark on the kinds of long term investments in manufacturing that the government sought to encourage. Because the Central Bank's rigid interest rate and fee structure does not allow banks to differentiate sufficiently between borrowers, the private banks' role in venture capital is minimal. This is evidenced by the low level of long term lending in the banking system, although the practice of rolling over short term loans has the effect of increasing their effective maturity somewhat, albeit with greater uncertainty.⁸⁶

The operations of the private banks established in Egypt came under heavy criticism since they were more active in financing trade and exporting capital abroad than in channeling resources to "productive" investment. A report of the Central Auditing Authority found that only 42% of total Law 43 bank deposits were invested in local projects; the remainder were held with

⁸⁵ The rate of interest for agricultural and industrial loans have been 13% whereas that for commercial loans has been 16%. The cost of term deposits to banks is at least 13.5% (the interest paid on National Bank of Egypt Investment certificates). Foda, 1985, p.v. Note that banks also charge a variety of fees which raise the effective interest rate by between 2-3%. Foda, 1982, p.8.

⁸⁶ Foda found that if rolling over of loans is taken into account, 50% of the short term loans of one public sector bank to the private sector were actually medium term (over 2 years). Foda describes some of the reasons why banks do make some longer term loans even though they are less profitable than short term lending: (a) to protect an existing client relationship, (b) political reasons such as showing support for the government's policy of increasing "productive investment", (c) loss-leading to generate future business, (d) to enhance bank prestige. Foda, 1982, p. 6.

correspondent banks abroad.⁸⁷ For example, in 1977 twenty foreign banks brought the equivalent of only LE26 million in foreign exchange but transferred LE160 million abroad.⁸⁸ Given the existence of a sizable foreign exchange windfall in this period, holding foreign exchange assets abroad may have been a sensible financial policy. However, politically it was perceived as irresponsible capital flight on the part of the private sector.

The banking sector has remained the major source of institutional finance for the private sector. The non-bank sources of finance such as the curb market, insurance companies, Islamic banks, finance and investment companies have grown gradually in importance.⁸⁹ The stock exchanges in Cairo and Alexandria remain very weak. Although the number of joint stock companies grew considerably under laws 43 and 159, most did not offer their equity shares to the public. Only 337 companies had their shares listed on the stock exchanges at the end of 1985 and the volume of trading in securities was only LE 125.8 million for the entire year.⁹⁰ Much of the trading that did occur was actually between family members and acquaintances within the firm rather than anonymous stock market transactions.

87 Note that the public sector banks also tended to hold their foreign exchange holdings abroad. Waterbury, 1983, pp. 149-150. Foda also found that banks in Egypt were net placers of assets abroad, implying a fair degree of liquidity in foreign exchange. Foda, 1982, p.6.

88 Hinnebusch, 1985, p. 274.

89 For a description of non-bank finance, see Foda, 1982 Annex B and Ikram, 1980, pp. 248-9.

90 The companies listed on the stock market had issued capital of LE 1.9 billion representing 244 million shares. Mohareb, 1986, pp. 12-14.

Bank lending to the private sector was characterized by considerable collateral and guarantees, the use of compensating balances, short term borrowing, and a great deal of importance attached to personal contacts. Bank loans tended to be based more on the soundness of the security, which must have liquidation value, and the reputation of the client, than on the soundness of the project. The bias toward highly collateralized and guaranteed short term loans was a reaction to the uncertain environment in which banks and firms operate.⁹¹ Because of the experience with nationalization, many private firms in Egypt are highly undercapitalized on paper.⁹² Consequently, banks, which cannot rely on firms' audited financial statements because of the prevalence of tax evasion, resort to relying on personal guarantees and collateral when evaluating loans. This serves to reinforce the undercapitalization of firms since banks issue loans without reference to equity. The effect of the collateral, mortgages, and other guarantees required by the banks is to raise the costs of borrowing by over 2% to the loan value.⁹³ In addition, the conservative nature of the banking system made internal or equity financing of investment often more attractive than bank loans.

91 Loans are usually secured by mortgages with the usual percentages advanced of 90% on appraised land value, 75% on appraised building value, and 60-65% on the purchase value of equipment. Working capital credit is often in the form of lending against raw materials placed under the bank's custody. Overdrafts are rarely given and are based on reputation rather than credit analysis. ADLittle, 1982, pp. VI20.

92 Foda reported that banks often complain of the under capitalization of projects submitted to them for financing. It was not uncommon for projects with as little as 15-20% anticipated equity capital to be presented in hopes that the banks would finance the remainder of investment costs. Foda, 1982, p.10.

93 Foda, 1982, p.51.

The Foreign Exchange Regime

The foreign exchange regime has changed fundamentally during the infitah from one in which foreign exchange was rationed exclusively by the public sector to one in which a number of different "pools" served the foreign exchange needs of different borrowers. Rather than attempt to describe Egypt's complicated, multi-tiered foreign exchange system, only a brief summary will be given here of the system that prevailed up to May 1987.⁹⁴

There are a few, relatively unimportant and highly overvalued exchange rates that are used only for accounting purposes on transactions such as barter agreements with the Eastern bloc. The "Central Bank rate" of LE0.70 = \$1 is used only by the government for transactions such as the importation of key commodities, mostly food, which are sold to consumers at subsidized prices. The revenue for this government rate comes from rents that the government extracts from petroleum and cotton exports as well as Suez Canal revenues. The "commercial bank rate" of LE1.35=\$1 is also essentially a government rate which is used to finance lower priority public sector imports with revenues derived from tourism and remittances. The "parallel/black market rate", which varied considerably over time, is supplied largely by remittances and, to a lesser extent, tourism revenues not exchanged through official channels. This parallel market is the rate at which the private sector imports its needs through the "own exchange" system established in 1975. Under this system, the private sector was permitted to open letters of credit for imports through the banking

⁹⁴ For a concise survey of Egypt's currency history, see Pick's, World Currency Yearbook, various issues.

system with no questions asked about the source of the foreign exchange.

A Tenuous Prosperity: Effects of the Oil Price Fall

Despite the apparent boom in private economic activity, there was a sense among many that the infitah was the economic equivalent of the bluffing emperor - strutting about in imported new clothing ascribing his prosperity to the virtues of liberalization while underneath was the naked truth of an economy built largely on rents. These rents were the outcome of the existence of a strategic canal, an abundance of monuments, political importance to aid donors and, most importantly, a supply of petroleum. The tenuousness of Egypt's seeming prosperity in the 1970s became increasingly apparent with the fall in the world price of oil. The current stagnation of the economy is evidence that the 1970s had not laid the groundwork for sustainable growth.

The balance of payments and budgetary crisis that ensued after the oil price fall resulted in renewed pressures to adopt orthodox stabilization measures. The collapse in the world price of oil and the government's sluggish response to price fluctuations resulted in a 70% fall in oil revenues in 1986 and a severe foreign exchange shortage.⁹⁵ Egypt's import capacity (growth of current account receipts deflated by the import price index) dropped sharply from approximately 13% in 1983/4 and 1984/5 to 11.6% in 1985/6 and 12.4% in 1986/7.⁹⁶ The government deficit rose and arrears of \$1.7

⁹⁵ Butter, 1987, p.4.

⁹⁶ World Bank, 1986, p. 42.

billion were accumulated on the approximately \$38 billion debt in 1984/5.⁹⁷

Although official estimates claim that GDP rose by 6% in 1985/6, this was not supported by other indicators of economic activity such as the volume of imports, real public investment spending, consumption of fuel in the manufacturing sector, and financial variables.⁹⁸ Unofficial estimates are that GDP growth averaged only 3% in 1984/5 and 1985/6 and fell to 1.5-2% in 1986/7.⁹⁹ This reduction in growth stemmed mainly from the effects of the oil price fall but also reflected the decline in the investment ratio from 30% in the early 1980s to 21% in 1985/86. Public investment fell by 6% in real terms between 1981/82 and 1985/86.¹⁰⁰ The government's awareness of the need to promote private investment to supplant declining public capital formation was evidenced by the change in the most recent five year plan in which the traditional 75%-25% target shares for investment between the public and private sectors was changed to 50%-50% for the first time.¹⁰¹

97 IMF, 1986, p. 3. Most of Egypt's medium and long term civilian debt is owed to governments and is on concessional terms. Most of Egypt's short term and military debt is on commercial terms. Egypt's total foreign debt includes \$6 billion in private non-government guaranteed debt, \$8-9 billion military debt (not including that to the Soviet Union), and \$8 billion in supplier credits outstanding. For payments arrears figures, see IMF, 1986, p. 49.

98 The IMF argues that the government's GDP growth figures are inflated. IMF, 1986, op cit., pp.3-4. Note that other studies have used similar arguments to assert that the growth rate of real income was actually higher than that reported in official figures for the 1974-9 period. See Choucrist and Eckhaus, 1979; Economic Studies Unit, 1982; and Alboni et al, 1984.

99 U.S. Embassy, 1987, pp. 8-9.

100 IMF, 1986.

101 This target is obviously non-binding, particularly since the private sector has little role in formulating the five year plan. Nevertheless, it did represent a shift in government attitude as to the relative roles of the public and private sectors in capital formation. The government also sought to reduce the foreign exchange dependency of new investment. The foreign component of

The persistence of a large budget deficit meant that the government increasingly had to borrow heavily from the domestic banking system. The banking system has tended to finance between 1/4 and 1/3 of the government deficit.¹⁰² The government deficit was 25% of GDP in 1981/2, 8% of which was financed by the banking sector. Efforts to use non-bank sources of finance in 1982/3 meant that only one quarter of the GDP deficit was financed by domestic banks. However, by 1984/5 the deficit had risen to 24% of GDP, 10% of which was financed through domestic bank borrowing.¹⁰³

Central Bank financing of the public deficit has been the largest component of the expansion in the money supply and may have contributed to inflationary pressures.¹⁰⁴ Since the government's deficit financing through the Central Bank is essentially an overdraft privilege, i.e. it can borrow to spend not to accumulate balances, the increase in the money supply is immediately introduced into the spending stream. Efforts to reduce inflation through reductions in monetary growth seem to have affected private access to credit more than public access. As money supply growth was being curtailed from 1981/2 and 1982/3 when the fiscal deficit had

investment in the current plan is targeted at 32% compared to 42% in the five year plan ending in 1986/7. National Bank of Egypt, 1986.

102 Abdel-Fadil et al, 1984, p. 189.

103 World Bank, July 1986, p.14. Note that some authors believe that the actual deficit has actually been higher than the official figures indicate. A report by the American Embassy states: "Although there are no published figures, the actual deficit is believed to have been about LE 1.8 billion higher in 1984/5 than the projection (LE 5.4) billion, and perhaps LE 2.5 billion higher in 1985/6 (with a projection of LE 5.6 billion). American Embassy, 1987, p.17.

104 The positive relationship between deficit financing and growth in the money supply is reduced by the fact that government deficit spending on imports does not increase liquidity. Albioni et al, 1984, p. 55.

fallen, the growth in credit to the public sector increased by 21% in 1983/4 while that to the private sector fell.¹⁰⁵ However, the effect on credit availability to the private sector of government deficit financing through the banking system is not clear. A number of surveys of private firms during this period found that firms did not perceive the availability of credit as a constraint to new investment.¹⁰⁶

Recent Stabilization Efforts

The government initially adopted gradualist measures, but was ultimately forced to accept a major devaluation and an International Monetary Fund (IMF) stabilization package.¹⁰⁷ The stabilization programme advocated was the usual package of devaluation and unification of Egypt's multi-tiered exchange rate system, increases

¹⁰⁵ After a period of growth in the money supply, there was a sharp decrease in money (currency and private sector deposits) growth from 44% in 1981/2 to 28% in 1982/3 and to 20% in 1983/4. Measures were introduced to restrict credit growth in November 1981. These measures were instituted to control inflation in a period when the government generated a lower fiscal deficit and therefore had less need to draw on bank credit. World Bank, July 1986, p.16. Since September 1982, bank credit has been well below the 65% loan to deposit ratio because of the narrow interest rate spread, growing caution due to poor performance of past loans, borrowers difficulties in servicing loans, reduced demand for credit in the wake of a foreign exchange shortage, and pessimism about economic prospects. IMF, 1986, p.40. Note that the 65% loan to deposit ratio used to control the money supply does not include credit to the public sector. Therefore it is possible to get a higher than intended rate of monetary growth. IMF, 1986, p. 44. Further evidence of the growth in money supply during the 1974-1981/2 period can be found in Abdel-Fadil et al, 1984, pp. 145-151, especially table 4.

¹⁰⁶ Arthur D. Little, 1982; Partnership for Productivity, 1985; Mitchell, 1986. This issue is discussed further in chapters 4 and 8.

¹⁰⁷ The gradualist measures included a series of ministerial decrees issued in 1985 to rationalize the foreign exchange system through regulations on foreign exchange accounts, import licensing, and bond issues by the Central Bank. IMF, 1986, pp. 69-70. U.S. Embassy, 1987, p.8. See IMF, 1986.

in real interest rates, ceilings on credit and government spending, structural reform of the food and energy subsidy systems, reduced government control in the agricultural sector, and changes in industrial policy. Because of political pressures from the United States within the IMF, Egypt's stabilization package was relatively less stringent than those of other countries.

The reform of the foreign exchange regime has brought the own exchange market into the formal banking system and the official exchange rate has been devalued.¹⁰⁸ The market exchange rate is set by the Central Bank in conjunction with the commercial banks.¹⁰⁹ Banks are authorized to sell foreign exchange only for the purpose of opening import letters of credit. This has meant that some demanders of foreign exchange have no legal source of supply, which has provided a continued scope for the black market, albeit on a much reduced scale.¹¹⁰ Importers are required to provide 100% cash cover for imports, only 50% of which can be bank financed.¹¹¹ In order to reduce speculative fluctuations under the new banking system, the Central Bank has made all banks deposit 3% of their

108 Subsidized exchange rates for certain priority imports of the public sector have been maintained, although all imports are supposed to be subject to the market rate within one year.

109 The market rate was set at LE 2.17=\$1 on 11 May 1987. It has remained fairly stable since then, in part because of the depreciation of the U.S. dollar. The government also began to devalue the old commercial bank rate, which is used for lower priority public sector import needs, from LE 1.35=\$1 to LE 1.62=\$1 in September 1987.

110 The black market rate has tended to be approximately 5-10 piastres higher than the bank market rate. Individuals who are excluded from access to foreign exchange include those with dollar debt repayment obligations, foreign companies wanting to repatriate income and fees, Egyptians wishing to travel abroad or wanting to hold foreign exchange so as to protect their savings.

111 In the past, importers only had to provide a buffer cash margin of 30-40%.

foreign exchange assets in the Central Bank so as to have a reserve than can be used to intervene and stabilize the market.

New monetary measures were also introduced in 1987 in an attempt to reduce liquidity while simultaneously increasing bank lending to the government so as to reduce the need for money-creating finance by the Central Bank. The government fixed a 2.5% ceiling on the expansion of bank credit to private and public sector companies while it approved a rise in lending to itself.¹¹² By 1988, nearly 90% of net new credit appears to have gone to the public sector, largely to finance the government deficit.¹¹³ The reform of the interest rate structure intended to mobilize savings has consisted of a 1% increase in the lending rate, rather than the total liberalization originally proposed by the IMF. Since these actions, there has been a substantial slowdown in banking activity with a reduction in the growth rate of lending to the private sector.

The 1987/8 budget reflected the government's attempts to reduce the deficit by raising tax revenues.¹¹⁴ No direct action was taken to eliminate food subsidies, although they have been reduced for the third consecutive year. Instead, there was greater emphasis on reducing energy subsidies. These changes were in addition to

¹¹² The credit squeeze is tighter than it may appear because of the way in which credit growth was defined. The benchmark date for calculating credit growth was 31 December 1986, which was a reporting date where firms try to rid themselves of debt so as to improve their solvency figures and banks accept repayment so as to improve their liquidity situation.

¹¹³ World Bank, 1988.

¹¹⁴ Tax revenues are expected to rise by 21% as a result of the higher customs receipts resulting from the use of the new exchange rate for calculating duties and the reform of tariffs instituted in August/September 1986. For a discussion of the tariff reform, see Harrison, 1987, p. 23.

previous reforms to liberalize tariffs, raise agricultural producer prices, and reduce domestic energy subsidies. However, government wages and pensions have been raised by 20% in order to protect civil servants' incomes against inflation.¹¹⁵ Nevertheless, real wages have fallen on average by 10% between 1983-1988.¹¹⁶

It is clear that the stabilization efforts will not be sufficient to achieve sustainable growth. The Egyptian government faces a fairly classic situation of inadequate or failed adjustment efforts, a deterioration in the terms of trade, a huge budget deficit and trade imbalance, a sizable debt overhang, and a volatile political environment. With limited room for manoeuvre, the government will increasingly have to rely on the private sector to fuel future growth.

Some Concluding Thoughts on Public-Private Sector Relations

This brief history of private investment and public policy in Egypt gives a flavour of the changing nature of the relationship over time. Until 1962, the government's stance vis a vis the private sector was essentially laissez-faire. The nationalizations of 1962 were motivated by the imperative to industrialize, a theme that has dominated post-colonial economic policy in Egypt. However, by nationalizing the medium and large scale private sector, the state created a sense of distrust that would come back to haunt future policy reversals.

¹¹⁵ United States Embassy, 1988, p. 15.

¹¹⁶ World Bank, 1988, pp. xxiii-xxiv.

When the limits of state-led import substitution were felt, the government initially turned to foreign private capital to restore economic growth. Gillespie called this early strategy the "development coalition" where the government sought foreign capital in order to modernize industry.¹¹⁷ The fact that Law 43 originally favoured multinational capital, like the capitulations in the colonial period, reinforced the scepticism of the indigenous private sector.¹¹⁸ The government initially may have perceived foreign capital as less politically threatening and as a source of new technology.

However, the "development coalition" broke down as the government became aware of the fact that domestic, not foreign, capital was more likely to respond to encouragement. In the early stages of the *infitah*, foreign and domestic investors were often allied in a "capitalist coalition" to press for further concessions from the government.¹¹⁹ The passage of Law 159 and a provision in an amendment to Law 43 allowing for the consideration of projects in Egyptian currency were particularly important changes from the point of view of the indigenous private sector.

There was a substantial shift in the government's attitude as its domestic political allies became the business class and the army rather than the coalition of civil servants, peasants, workers and the army that supported the Nasir regime. The "nationalist

¹¹⁷ Gillespie, 1984, p. 20.

¹¹⁸ Note that Egyptian entrepreneurs could be treated as foreign investors under the *infitah* laws if their capital was in foreign currency. However, in the early stages of the *infitah*, the government was far more concerned with foreign than domestic capital.

¹¹⁹ Gillespie, 1984, pp. 21-23.

coalition" of local investors and the state moved to exclude foreign capital from certain markets.¹²⁰ The blurring of the lines between the public and private sectors contributed to this shift with the development of formal ties, such as public-private joint ventures and the emergence of increasingly powerful private sector lobby groups, and informal links, such as the frequent interchange of jobs between public officials and private entrepreneurs. This transformation of the relationship between the public and private sectors was fundamentally affected by the sharp increase in income from rents during the 1970s. This makes it crucial to explore the implications of "Dutch disease" in the Egyptian context, as is done in chapter VIII. Needless to say, the distribution of those rents in the economy reflected the changing configuration of political power.

¹²⁰ Gillespie, 1984, p. 23.

PART TWO: MICROFOUNDATIONS - THEORY AND EVIDENCE

CHAPTER III

THE THEORY OF THE FIRM

Before attempting to analyze the determinants of investment at the macroeconomic level, it is necessary to have an understanding of the structure of decision making at the level of the firm. This requires an analysis of the structure of markets, optimizing behaviour, financing decisions, and the role of expectations. The discussion that follows is a highly selective survey of the literature on the theory of the firm. Topics have been chosen based on their usefulness for analyzing the microeconomic results from a survey of investment behaviour of fifty Egyptian firms in the chapter that follows.

Neoclassical and Non-Neoclassical Theories of Firm Behaviour

The conventional neoclassical or marginalist theory of the firm posits that firms operating in competitive markets maximize profits by equating prices to marginal costs.¹ However this theory should not be understood as an attempt to explain how firms actually behave. Rather, it is an explanation of how resources would be allocated and prices set in a perfectly functioning market economy. Such market conditions represent the end of the spectrum of actual conditions under which firms may operate, with monopoly on the opposite end. The more a market approximates the neoclassical

¹ A formal derivation of the neoclassical optimizing conditions is provided as part of the derivation of the neoclassical model of investment in chapter VI.

ideal, the more likely firms will operate according to marginalist principles. However, as one moves away from perfect competition and closer to the reality in most markets, certainly in developing economies, the usefulness of the neoclassical optimizing conditions diminishes.

There have been a number of attempts to develop alternatives to the neoclassical framework. These non-neoclassical microeconomic theories evolved into a variety of different schools. The behaviouralist theorists emphasized the importance of understanding the internal workings of the firm in order to develop realistic decision rules based on observation.² Although these rules often seemed ad hoc - such as Cyert and March's rule for retail pricing that firms used cost plus a 40% mark up rounded up to produce a convenient price (usually ending in 0.99 cents or 0.95 cents) - they were arguably more accurate for predicting market outcomes.³ Critics of behavioral theory have argued that the firm's choice of a "suboptimal" equilibrium actually reflects the optimization of a different utility function subject to constraints.⁴ In addition, while behaviouralist studies provided a very rich explanation of

² For examples of the behaviouralist school, see Simon, 1955; Cyert and March, 1963; Monsen and Downs, 1965; O. Williamson, 1964; Andrews and Brunner, 1975; Wilson and Andrews, 1951; Downie, 1958; Wiles, 1956; Penrose, 1959; and Loasbey, 1976.

³ Cyert and March's rule was able to predict the vast majority of prices (about 95%) in a study of pricing in retail stores in the United States. See Cyert and March, 1963, pp. 128-148. An interesting example of the behaviouralist approach applied to investment decisions is the work by Morris, 1974. Morris analyzes the investment decision making processes of 200 U.K. manufacturing firms using a multidisciplinary approach. He discusses the differing objectives within the firm, the communications system and functional structure, alternative objectives to profit maximization identified by managers, and maximizing versus satisficing behavior.

⁴ Marris, 1964, pp. 266-270.

reality, it was often difficult to make the transition to generalized theory and policy.

Managerial models posited that because modern corporations are based on the separation of ownership from control, managers subject corporate decisions to utility functions of their own which may differ from those of profit maximizing shareholders.⁵ This resulted in the introduction of a variety of other factors into the firm's utility function. These factors have included the maximization of the size of sales or assets, the firm's market share, the rate of growth, security against takeover bids, the rate of profit or some combination of status-type variables that enter the utility function.⁶ Some authors have argued that firms attempt to achieve minimum acceptable levels of performance.⁷

The post-Keynesian tradition has concentrated on the fact that firms have some degree of market power which they can use to extract a mark up over costs.⁸ In contrast to the neoclassical model where prices depend on demand and supply in the short run and on costs in the long run, under oligopoly the situation is reversed with prices depending on costs in the short run and demand in the long run.⁹ Consequently, it is the quantity of output that responds to shifts in demand whereas prices tend to respond to changes in costs.

⁵ For examples of the managerial approach, see Marris, 1963; J. Williamson, 1966; Baumol, 1967; Marris and Wood, 1971; Wood, 1975.

⁶ Baumol, 1959; Marris, 1964; Williamson, 1964; Helliwell, 1968.

⁷ Simon, 1962; Cyert and March, 1963.

⁸ For examples of post-Keynesian writers, see Kalecki, 1954; Sraffa, 1960; Steindl, 1952; Robinson, 1962; Sylos-Labini, 1962, 1974; Vickers, 1968; Eichner, 1973, 1976; Pasinetti, 1981; Marris, 1964; Coutts, Godley and Nordhaus, 1978.

⁹ Sylos-Labini, 1984. He added the following qualifications: (1) that costs and profits vary across enterprises, and (2) enterprises that are the most protected have the largest profits. Sylos-Labini, 1984, p.123.

Oligopoly and Cost-Plus Pricing

One of the earliest studies in the post-Keynesian tradition is the seminal work by Hall and Hitch which challenged the assumptions of the neoclassical approach as well as the monopolistic competition models of Robinson and Chamberlain.¹⁰ Their survey of businessmen in England found that marginalist pricing rules and notions of elasticity were irrelevant to most of the firms in their sample. Hall and Hitch argued that the neoclassical assumption of atomistic behavior of firms was inappropriate in markets characterized by interdependent rivals. They found the most prevalent market structure was characterized by product differentiation as under monopolistic competition but producers' pricing policies were interrelated as under oligopoly.

Under such market conditions, the overwhelming majority of entrepreneurs set prices based on full average cost including a conventional profit margin.¹¹ In some cases, price was adjusted to costs, in others costs were adjusted through quality to arrive at the given price.¹² Firms did not actually charge this full cost price at every point in time since there was some movement around it in response to demand shifts. However, once the basic full cost

¹⁰ Hall and Hitch, 1939; Robinson, 1933; Chamberlain, 1933.

¹¹ Entrepreneurs gave the following reasons for their belief that price "ought" to equal full cost: (a) perceived fairness in competition; (b) producers did not know their demand or marginal revenue curves; (c) cannot anticipate rival's behavior; (d) collusion to lower prices is not considered worthwhile because of the conviction that the elasticity of demand for the group of products is low; (e) if prices are near full cost, they are not raised so as to discourage new entrants in the long run; (f) changing prices is costly especially since customers are attached to conventional prices.

¹² Hall and Hitch, 1939, p.19.

price was fixed (depending on "historical accidents" like the size and efficiency of the firms in the industry at the time price stability was achieved and their optimism and fear of new entrants), price competition, except in highly abnormal circumstances, virtually ceased.¹³

Since the work of Hall and Hitch there have been a large number of empirical studies that have found strong evidence in support of cost-plus pricing and the prevalence of oligopoly.¹⁴ These studies found that costs play the dominant role in price determination whereas demand is found to have little or no effect on prices. Firms that did not explicitly follow cost-plus rules were likely to match prices set by industry price leaders that used mark up pricing.

Cost plus pricing is an economically rational response on the part of firms to an environment where there are a relatively small number of producers in an industry, especially when product differentiation exists, and there is no reliable information on demand elasticities and marginal revenue curves. Some guardians of economic doctrine have tried to argue that cost plus pricing does not contradict profit maximization since it simply represents the maximization of profits subject to constraints. Profit maximization is not a bad approximation in the narrow case when the mark up is fixed and firms face constant marginal production costs and constant demand elasticities. However, while it is possible to reconcile the two

¹³ Hall and Hitch, 1939, p.30.

¹⁴ Balkin, 1956; Pearce, 1956; Kaplan, 1958; Barback, 1964; Godley, 1959; Neild, 1963; Schultze and Tryon, 1965; Solow, 1969; Silberstein, 1970; Scherer, 1970; Cagan, 1974; Nordhaus, 1974; Coutts, Godley and Nordhaus, 1978; Sylos-Labini, 1979; Okun, 1981; and Chatterji, 1985; Hall, 1986.

approaches at the theoretical level by imposing certain restrictive conditions, this actually obfuscates the issues at the empirical level, especially concerning transmission mechanisms. Retaining a cost plus framework allows one to analyze the way in which firms actually arrive at their price and output decisions rather than having a theory that can arrive at the same outcome but by an empirically irrelevant route.

However, the relationship between normal cost and price movements is not systematic for a variety of reasons. A number of theories of the transmission of costs attempt to explain why prices tend to be less variable than costs. The kinked demand curve explains the observed stickiness of oligopolist prices by positing that firms face two different subjectively estimated demand curves. One demand curve describes the quantity sold if rivals maintain their prices at current levels, as in the Cournot model of oligopoly. The other, more inelastic curve reflects the quantity sold assuming that rivals match all price changes, as in the Bertrand model. The intersection of these two curves is the current price level where oligopolists avoid triggering a damaging price war amongst each other. Although this theory explains why prices are stable at the kink, it does not explain how prices are arrived at initially, the extent to which prices are above marginal costs, the way in which prices change, and other sources of rigidity such as transactions costs, implicit contracts, and price leadership.¹⁵

¹⁵ For a more detailed discussion of the kinked demand curve and other theories of oligopoly pricing behavior, see Scherer, 1970, pp. 17-21 and Waterson, 1984, pp. 17-36.

Other theories of price stickiness relative to costs attach a special role to some aspect of costs, such as wages, which are not passed on to consumers with a full percentage mark up.¹⁶ Where firms face different costs structures, a higher costs producer may not be able to pass on cost increases fully when faced with a more efficient competitor. Historical costs are often empirically important and there is evidence of asymmetry since prices are often downward rigid in response to cost changes. In addition, price stickiness may result from the types of implicit contracts of "goodwill" described by Okun.¹⁷ Because firms want to encourage repeat customers, gradual introduction of cost increases promotes product loyalty, which is desirable from the consumer's point of view because it reduces the transactions costs associated with shopping under limited information. Price stickiness can also protect oligopolist profits by promoting collusion and barriers to entry.

¹⁶ See Sylos-Labini, 1979; Chatterji, 1985, pp. 16-18. Much of this literature is concerned with the movements of costs and prices over the business cycle. The conventional view is that labour costs move counter-cyclically while raw materials costs move pro-cyclically, although this is not always true empirically. Different models have different views of how the mark up behaves over the business cycle. For example, Kalecki argued that since firms attempt to maintain a certain profit margin, mark ups tended to rise in the downswing of the cycle and fall in the upswing. Kalecki, 1971. In contrast, Coutts, Godley and Nordhaus, with a slightly different definition of prime costs, argue that the mark up on normal costs will be constant whereas the mark up on actual or non-normalized cost will move with the cycle. Coutts, Godley and Nordhaus, 1978. In Chatterji's survey of the literature, she concludes that there is no universally valid behavior of costs and prices over the business cycle and that it is necessary to develop hypotheses for specific economies. Chatterji, 1985, pp. 24-33. In the case of India, Chatterji found that prices are almost entirely cost determined and demand had very little influence on the evolution of prices. Chatterji, 1985, pp. 177-183.

¹⁷ Okun, 1981, p. 178.

The determination of the mark up remains a contentious issue. A fixed mark up over costs based on historic levels, rules of thumb, or prevailing rates of return seem to be overly rigid and simplified ways of thinking about how firms behave. On the other hand, the Kaleckian hypothesis that the mark up responds to the firm's desire to invest implies greater market power than most firms realistically have.¹⁸ Higher profits certainly enable entrepreneurs to embark on new investments, especially when internal financing is important. However, firms rarely have sufficient market power to raise their mark ups whenever new investment opportunities emerge. There may be some profit rate that will induce firms to increase their mark ups so as to generate investment funds. In general though, firms are constrained from charging the maximum mark up, and thereby maximizing overall profits, by factors like stay out pricing to avoid inducing the entry of competitors and by long run goodwill with consumers.

Game Theory and the Theory of the Firm

The latest addition to the theoretical tools used to analyze oligopolistic markets is game theory. Unlike the more traditional microeconomics, the game theoretic approach does not deliver generally applicable pricing and output rules. Instead, it provides a framework and set of tools for analyzing markets with different characteristics by considering games played under

¹⁸ Kalecki, 1971. This view is also the basis of much of the post-Keynesian literature. For example, Eichner argues that changes in the mark up are determined by the marginal efficiency of investment funds relative to the marginal supply of funds, both internal and external. The margin above costs charged by oligopolistic firms to obtain more internally generated investment funds is called "the corporate levy." Eichner, 1973 and 1976, p.56.

different rules. Most importantly, game theory is well-suited to dealing with the inherent interdependence of firms that characterizes oligopoly situations as well as the uncertainty under which decisions are made. These strengths of game theory are precisely the weaknesses of traditional oligopoly theories such as those associated with Cournot, Bertrand, Hotelling, Edgeworth, and Stackleberg.

The literature on game theory and its applications to oligopolistic markets is enormous.¹⁹ In general, games are divided into zero-sum and non-zero-sum, cooperative and non-cooperative, and "n" (multi) person games. Zero-sum games are inherently non-cooperative since there is no ultimate motive for cooperation. In contrast there is considerable motive for cooperation in non-zero-sum games, unless it is not possible for reasons such as legal restrictions. Game theoretic models have been extended to take into account technological changes, entry, managerial structures, transportation, advertising, costs of production changes, multiple products, financing, imperfect information, reputation and regret. Rather than attempt to survey the array of theoretically possible games that may operate between oligopolists, the game theoretic elements of the survey findings will be discussed in chapter IV.

Microfoundations for a Developing Economy

The model that follows incorporates elements of a number of the approaches discussed above. The microfoundations adopted combine the structure of mark up models with the game theoretic approach in

¹⁹ For some surveys, see Bacharach, 1976; Freidman, J., 1977; Shubik and Levitan, 1980; Shubik, 1983; and Freidman, J., 1986.

an attempt to describe the behavior of Egyptian firms. An attempt will be made to analyze the economic determinants of mark ups both in terms of the characteristics of indigenous markets and the nature of competition with the world economy. The empirical work that follows in chapter IV is behaviouralist in spirit, but attempts to go beyond "rules of thumb" to analyze the economic underpinnings of market outcomes as well as the economic costs and inefficiencies involved.

The Objective Function

There are a number of problems associated with applying the models discussed previously to a developing country such as Egypt. The inadequacies of behavioral models have already been discussed, although the objective of making theory more realistic through the use of empirical observation of firms is attractive. Managerial models such as those of Marris and Wood are inappropriate in economies where stock markets are weak and shareholders have a decisive say in management.

In fact, the prevalence of owner-operated firms in developing countries in some ways simplifies the analysis of the objective function. Assuming that firms are profit maximizing is not an implausible proposition in Egypt where family-owned firms are the norm. Also, the "black box" assumption that the objective of individual shareholders are the same as the goal of the firm is credible in the case of owner-operators and family dominated joint stock companies. Such assumptions would be implausible in a highly industrialized country where it would not be possible to ignore the

likely existence of multiple objectives within the firm on the part of different decision makers. Consequently, the objective function is hypothesized to be that agents maximize the expected utility of profits:

$$(1) \quad \text{Max } EU(\pi)$$

where π = profits

Risk neutrality can be justified if the ownership structure is such that agents have diversified investments. If not, the utility function is likely to reflect considerable risk aversity.²⁰ The model below will be developed with the assumption of risk neutrality for simplicity of exposition. The empirical implications of risk aversity will be explored in the chapters that follow.

Market Structure

Output markets in developing countries are often characterized by oligopoly. Of course there are different degrees of competition in different markets with some industries, particularly small scale or informal sector activities, characterized by greater competition whereas others may be monopolistic. Nevertheless, oligopoly is the

²⁰ In order to introduce risk aversity formally, it would be necessary to operationalize an objective function where firms maximize the expected value of a concave utility function (where the second derivative, $U'' < 0$). Because of the difficulties in extending a concave utility function to a dynamic framework, the utility function will be left unspecified. Nickell does develop an alternative to maximizing the expected value of a concave utility function of present value, however it depends on a number of restrictive assumptions. These include that there are always a large number of firms whose profits are uncorrelated in any period - unlikely suppositions in markets characterized by high concentration ratios and subject to business cycles. For a discussion of the effects of risk aversion on capacity, see Nickell, 1978, p. 83.

most common market structure and will be used as the starting point of this model.²¹ More or less competitive structures can be encompassed in the model that follows by making different assumptions about the number of firms and their market shares.

The prevalence of oligopoly stems from a variety of reasons including market size, government policies, technological considerations to achieve economies of scale and the structural features of developing economies. The existence of barriers to entry which serve to maintain an oligopolistic situation can take a variety of forms.²² In developing economies where there is not an active stock market, family ownership is preferred, and banking is highly personalized, financial barriers can dissuade new entrants. Technological barriers that encourage larger scale production can reduce the number of economically viable firms in markets of limited size. Advertising constitutes an additional barrier that is equivalent to raising the fixed costs associated with investment. Also, in economies like Egypt where the government takes a paternalistic approach toward indigenous capital, licenses may not be granted to investment projects that compete with existing domestic capacity. Similarly, government tariff protection ensures that imports are permitted to compete only when domestic production is insufficient to satisfy demand. Such government policies contribute to minimizing the competition faced by indigenous oligopolists.

²¹ The prevalence of oligopolistic markets in Egypt will be discussed in chapter IV.

²² See Bain's classic study of the causes of barriers to entry. Bain, 1956.

Optimization and Pricing Under Oligopoly

A modified mark up pricing model will be used to describe firms' optimization because it seems the best framework for conditions in a developing economy. The empirical evidence in support of mark up pricing rules in the Egyptian case is discussed in the survey results.²³

In order to analyze how firms maximize profits, it is necessary to analyze the relationship between costs and prices. It is useful to divide normal per unit costs into direct (sometimes called prime or variable) and indirect (overhead or fixed) and make a distinction between imported and domestically produced inputs:

$$(2) \quad C = C_D + C_I$$

$$(3) \quad C_D = WL + (1-\Phi)P_m^D M^D + \Phi e P_m^W M^W$$

$$(4) \quad C_I = vI$$

where the cost of capital to the firm is defined as:

$$(5) \quad v = [(1-\theta)P_k^D + \theta e P_k^W][(\delta+r-z)(1-i)/(1-u)]$$

²³ The prevalence of mark up pricing in the private sector is described in the results from the survey of Egyptian enterprises discussed in chapter IV. In situations when the government fixes prices, either for public sector output or in cases where it sets prices for the private sector, mark up rules are also used. The Ministry of Supply prices major commodities imported by the private sector using cost (import price plus transport, customs, etc.) plus a mark up of a maximum of 30%. Because the government often made its cost calculations for the private sector based on the overvalued exchange rate, importers used overinvoicing to compensate for the higher price paid for foreign exchange in the black market and as a way to increase the 30% profit margin permitted by the government. Until 1985/6, all output sold by the public sector was sold on a cost-plus system. IMF, 1986, p. 17. After 1985, the government moved away from a cost plus system for public sector output pricing to one that takes into account international price movements. IMF, 1988, p. 9.

where C $\equiv$ total costs

C_D $\equiv$ direct production costs

C_I $\equiv$ indirect production costs

W $\equiv$ wages

L $\equiv$ labour

Φ $\equiv$ share of imported raw materials and
intermediates

P_m^D $\equiv$ price of domestic materials and intermediates

P_m^W $\equiv$ price of imported materials and intermediates

e $\equiv$ exchange rate

M^D $\equiv$ domestic raw materials and intermediates

M^W $\equiv$ imported raw materials and intermediates

v $\equiv$ cost of capital

I $\equiv$ investment

θ $\equiv$ share of domestic capital goods

P_k^D $\equiv$ price of domestic capital goods

P_k^W $\equiv$ price of imported capital goods

δ $\equiv$ depreciation rate

r $\equiv$ interest rate

z $\equiv$ capital gains

i $\equiv$ discounted value of tax savings as a
proportion of the price of capital goods
(investment incentives)

u $\equiv$ rate of corporate taxation

The above definition of "v" in equation (5) takes into account the major determinants of the cost of capital to the firm. In most empirical work, the capital stock deterioration rate, δ , is set at

some arbitrarily constant rate and the capital gains term is neglected. This is justified because firms do not actually realize the capital gain where second hand markets for capital goods are imperfect.²⁴

In a developing economy, it will be necessary to derive the effective interest rate by adjusting for inflation, government subsidized credit through administered lending rates, and the effect of compensating balances. This is complicated by the fact that at the microeconomic level in some developing countries, the investment decision and the costs of capital are related to each other; i.e., the rate of interest is not an independent variable to the firm. The type of investment undertaken by the firm will affect the interest rate it will receive from its financiers. This can operate through the preferential interest rates for favoured clients or, more often, through differing compensating balances required for loans associated with different degrees of risk. Periods of credit tightness or high inflation are likely to be associated with higher compensating balance requirements as banks attempt to circumvent administered interest rates.

This formulation of the cost of capital is also well suited to analyzing the effect of trade shocks, such as a foreign exchange windfall, on investment. For example, a foreign exchange windfall causes a real appreciation which reduces the relative price of imported capital goods and results in a rise in import-dependent

²⁴ Although capital gains are less important when investment decisions are irreversible, they can affect the timing of implementation. For example, in a period of rising prices, firms will want to bring forward their planned investment.

investment and materials expenditure. This will be discussed in greater detail in chapter VIII.

There is considerable debate in the literature on cost-plus pricing about the definition of costs over which the mark up is calculated.²⁵ The debate centers around the issues of whether the mark up is calculated over direct costs only or on unit costs (direct+indirect costs), in which category are salaries and administrative costs classified, and how prices respond differently to changes in direct costs versus changes in unit costs.²⁶ In practical terms, whether one uses direct or unit costs, both approaches generate the same output price, although the mark up differs since in the case of direct cost pricing the mark up includes the percentage allocated to overheads. The debate is fairly academic and the best solution seems to be to tailor one's model to the country-specific evidence. In the following presentation the cost variable (C) can be interpreted as either direct or unit costs, depending on one's empirical preference.²⁷

Consider the simple case where there are N producers of a standardized product, a single selling price, no new entry, and

²⁵ For a detailed survey of the debate, see Chatterji, 1985, pp. 10-16.

²⁶ In her survey of the empirical literature, Chatterji concludes that there is some agreement that direct rather than full cost pricing is the more prevalent and that normal rather than actual cost is the relevant one for price determination. However, she notes that these results are for the post-war boom in the western industrialized countries and may not apply to other times and places. Chatterji, 1985, p.20.

²⁷ The argument for using direct costs is that price changes respond to shifts in direct costs because of oligopolistic rivalry, whereas indirect costs affect firms differently. In the empirical literature, it is generally agreed that direct rather than full cost pricing is more common. See Sylos-Labini, 1984, p.126. Also see Chatterji for a survey of the empirical evidence. Chatterji, 1985, p.20.

inputs and outputs are sold to price-takers.²⁸ These assumptions are made for the sake of simplifying the derivation. While it is possible to develop models with heterogeneous products and differentiated prices, the outcomes tend to depend on the same critical factors that are identified below.²⁹ The following derivation borrows from Waterson who relaxes many of these assumptions in his later work.³⁰

Each firm has a profit function:

$$(6) \quad \pi_i = p(Q)q_i - C_i(q_i) \quad i = 1, 2, \dots, n$$

where $p = f(Q)$ and $Q = \sum q_i$

which allows for the possibility that firms may have different cost functions.³¹ The profit maximizing first and second order conditions are:

$$(7) \quad d\pi_i/dq_i = p + q_i(dp/dQ \cdot dQ/dq_i) - dC_i/dq_i = 0$$

$$(8) \quad d^2\pi_i/dq_i^2 < 0 \quad \text{for all } i$$

28 The assumption of no new entry is perhaps the most controversial. However, given the Egyptian government's policy of protecting the market shares of domestic producers by preventing entry, it may not be that unrealistic. Note that Waterson considers the effects of potential entry for oligopolist behavior. Waterson, 1984, pp. 56-81.

29 For derivations of more complex mark up models with heterogeneous products, see Waterson, 1984, pp. 26-31.

30 Waterson, 1984, pp. 18-20. For example, Waterson derives the same type of model for the heterogeneous product case in pages 26-31. He also includes a discussion of advertising and research and development, areas that will not be considered here. See Waterson, 1984, pp 128-164.

31 Note that marginal cost, dC_i/dq_i , is equivalent to direct costs defined above in equation 3 when the firm faces a horizontal marginal cost curve. This is a realistic assumption for most firms.

The first order condition in equation 7 reflects the familiar marginal revenue equals marginal costs condition. However, the term dQ/dq_i reflects the added dimension of the effect of the i th firm's output on the output of the other firms. Consequently, for the i th firm to set its output level, it must not only consider the equating of factor costs and factor products at the margin, but it must also evaluate the effect of its own output decisions on its rivals' output decisions. Note that this first order condition collapses to the standard neoclassical price equals marginal cost rule when $dQ/dq_i=0$, i.e. when there is sufficient competition that firms are atomistic in their behavior.

Expanding this interaction term using the previous definition of Q ,

$$(9) \quad dQ/dq_i = dq_i/dq_i + dQ_i/dq_i \equiv 1 + \alpha_i$$

The term $\alpha_i=dQ_i/dq_i$ is the "conjectural variation" term which captures the critical interdependence inherent in oligopoly problems. The "game" being played by oligopolists is reflected in the evolution of this term when output is the choice variable.

The second order condition in equation 8 is that the slope of the marginal revenue function must be less than the slope of the marginal cost function. This condition will hold if the marginal revenue function is negatively sloped and the marginal cost curve is positively sloped, horizontal, or has a smaller negative slope than the marginal revenue function.

In order to consider the deviation of price from marginal cost under oligopoly, rearrange the first order condition (equation 7) and substitute for dQ/dq_i from equation 9:

$$(10) \quad \frac{p - dC_i/dq_i}{p} = -(q_i/Q)(Q/p)(dp/dQ)(1+\alpha_i)$$

$$(11) \quad \tau_i = s_i(1+\alpha_i)/\mu$$

where $\tau_i \equiv$ mark up over costs for the i th firm

$\alpha_i \equiv dQ/dq_i \equiv$ effect of the i th firm's output on
other firms' output

$s_i \equiv$ i th firm's market share

$\mu \equiv$ price elasticity of demand

The outcome of the firm's optimization problem depends on those factors which characterize an oligopolistic situation: (1) the industry demand elasticity, (2) market structure or concentration, and (3) beliefs about rival behavior.

Equation 11 represents the firm's price cost margin in the general case when firms may have different marginal costs of production, be of different sizes, and hold different conjectures about how their rivals will react. In such a case, the mark up over costs will vary across firms in the industry.³² The degree of deviation of price from marginal cost, or, in some sense, the degree of inefficiency, depends on the degree of competition and the nature of oligopolistic interaction.³³ With increased competition, both s_i

³² Waterson also derives a term for the gross industry profit to revenue ratio which embodies the degree of concentration in the industry. See Waterson, 1984, pp.19-20.

³³ The notion of the price-cost margin used here is roughly equivalent to the Marxian notion of the ratio of surplus value to

and α_i tend to zero as do mark ups, thereby approaching the neoclassical zero profit situation.

This model incorporates the interdependence of oligopolists in the α term which will be used to represent the game theoretic aspects of opponents' behaviour. Traditional theories of oligopoly tended to make fairly rigid assumptions about the conjectural variation term. For example, Cournot's model posits that firms do not react to each others' output changes.³⁴ Bertrand argued that with price as the only choice variable for the firm, the outcome of an oligopolistic market would be the same as that in a competitive market.³⁵ Stackleberg's model is based on the assumption that the market leader knows his rivals' reaction functions, but the rivals do not know the leader's reactions.³⁶

The game theoretic approach to oligopoly does not necessarily give a determinate solution, unlike its more traditional predecessors. However, it does provide a framework for thinking about oligopoly that more closely approximates the inherent complexity of a problem with a few players and many possible outcomes with different payoffs and different possible rules. The game theoretic element in this model is quite simplified and left in the general form. It would be possible to develop an array of games and outcomes that operate through the conjectural variation term.³⁷ Given the multitude of possible games that one could consider at the theoretical level, the

the total product of the firm. In Kalecki, the size of the mark up and the level of demand determine capitalist savings and consequently investment.

34 Cournot, 1838.

35 Bertrand, 1883.

36 Stackleberg, 1952.

37 See Waterson, 1984, pp. 37-51 and Vickers, 1985.

interaction term will be left in very general terms and the nuances of market outcomes will be analyzed as games using the empirical findings from the survey of Egyptian firms in chapter IV.³⁸

The Determinants of the Mark Up

The above discussion has treated the market structure in which firms operate as given. However, firms do not usually just passively react to a given market structure, but manoeuvre to affect that structure to an extent that the degree of competition becomes, in some sense, a choice variable.³⁹ Vickers surveys the literature on "strategic entry deterrence," which is distinct from the innocent barriers to entry, such as economies of scale, that can arise from the short run profit maximization behaviour of firms.⁴⁰ Through such strategies, firms can affect their market share, the price elasticity of demand, and, depending on the game being played, the responses of rivals to output changes. Consequently, the determinants of the mark up are themselves endogenous variables in an oligopolistic game.

Entry deterring strategies that affect costs (the incumbent's or the rival's) or demand can be used by firms to obtain more favourable outcomes in games between existing or potential rivals. Examples of strategies that operate through costs are excess capacity, research and development expenditure, raising rival's costs (such as by setting high wages in the industry), or pre-emptive patenting

38 For an example of the numerous games possible to explain a single oligopolistic situation, see Dixit and Kyle's work on the European Airbus. Dixit and Kyle, 1985.

39 For a discussion, see Galbraith, 1969.

40 Vickers, 1985. Also see Spence, 1977.

that denies rivals access to technology. In addition, expectations about future costs may affect current mark ups, especially in highly inflationary economies.⁴¹ Entry deterrence through demand manipulation can take the form of strategic advertising, brand proliferation, and promoting consumer loyalty. With imperfect information, incumbents may use an artificially low selling price as a signal to dissuade potential competitors. Firms can also use political connections to deter entry, such as by manipulating government licensing of potential competitors. The historical survey in chapter II showed how firms sought to lobby the government to deter entry from competition, particularly from foreign rivals.

Protection and the Mark Up

Protection is one of the most important types of entry deterring strategies used by governments on behalf of, and often under pressure from, domestic firms. It is particularly important to introduce the role of protection as a determinant of profitability and investment in a developing country that has adopted an import substituting industrialization strategy, although protection has also been crucial at various times in most industrial economies.

In the context of the model of mark up pricing described above, protection enters into the determination of mark ups through different channels. If Ω represents the rate of effective protection granted to an industry, then

$$(12) \quad ds/d\Omega > 0 \quad d\mu/d\Omega < 0$$

⁴¹ Kandir, 1988, pp. 36-46.

and $d\alpha/d\Omega \geq 0$ or $d\alpha/d\Omega \leq 0$ depending on the game being played.

In general, the provision of protection raises the price-cost margin that firms can charge by reducing the degree of competition on domestic markets through the firm's market share and the price elasticity of demand. Protection also drives an even greater wedge between the price cost margin on the world market and that possible on the domestic market. In effect, by granting protection, the government creates an economic rent for firms.

The consequence of protection is greater profitability in protected industries and therefore greater investment in those industries. Producers tend to focus on the lucrative domestic market where the rate of effective protection can be absorbed into the mark up as production costs approach those on the world market. There is little incentive to export except in the rare cases where there is sufficient new entry domestically that prices at home approach export prices.

The policy of granting protection to "infant industries" has been much criticized on efficiency grounds. The economic argument for protection is that the long run gains outweigh the short run efficiency loss associated with intervention. However, critics have argued that if infant industries are economically viable in the long run, then private capital markets should be willing to finance the infancy period just as they finance other investment projects that have negative capital flows initially. However, the nature of capital markets in many developing countries does not allow for that type of financing and creates the need for government intervention.

Using a game theoretic framework, Yarrow shows that the existence of market failures that drive a wedge between social and private costs and benefits can justify an interventionist protection policy.⁴² Yarrow argues that in the early stages, domestic firms' competitive position vis a vis foreign rivals is weak because of asymmetric cost conditions. Also, given the lags in the implementation of an investment after the initial entry decision, foreign rivals have considerable time to make strategic moves to improve their position at the expense of the new entrant. These moves can take a variety of forms such as advertising, investment in excess capacity or lower prices. The domestic firm cannot have much effect on its rivals' strategic moves. However, the government's participation in the game between oligopolistic firms can improve the strategic position of domestic firms and facilitate entry. A more detailed analysis of the possible outcomes in games between governments and firms is provided by Dixit and Kyle.⁴³

Yarrow shows how the provision of an entry assisting subsidy to a domestic producer results in increased domestic output and reduced output by the foreign rival at the Cournot-Nash equilibrium.⁴⁴ In the case of a production subsidy, it can be shown that there are positive welfare gains; which is distinct from a tariff which has negative allocative effects. The welfare gains accrue through the increased consumer surplus because of lower prices that result from the increased output⁴⁵ and when the increase in domestic firms'

42 Yarrow, 1985. For a further discussion of protection and oligopolistic industries, see Dixit, 1984.

43 Dixit and Kyle, 1985.

44 Yarrow, 1985, pp. 97-98.

45 This assumes that part of the increase in output is consumed domestically.

profits is greater than the total subsidy level. Although it is not possible to claim these same welfare gains in the case of tariffs, the strategic gains for domestic firms still hold. The use of tariffs instead of production subsidies, despite their efficiency costs, are often preferred for administrative reasons.

Profits and Finance

In order to take into account the gradual translation of changes in costs into changes in prices, an additional factor must be introduced into the mark up model. This price stickiness described earlier stems from the transactions costs associated with changing prices and with the desire to maintain implicit contracts and customer loyalty. These effects are manifested in the empirical importance of historic prices over time. Lagged prices are determined by past mark ups and costs. Incorporating this into equation 11, the generalized model of mark ups is then:

$$(13) \quad \tau_t = f(\alpha_t, s_t(\Omega_t), \mu_t(\Omega_t), C_{t-1}, \tau_{t-1})$$

The firm's profits are determined by the mark up rate, costs, and the level of aggregate demand in the economy:

$$(14) \quad \pi = f(\tau, Y, C)$$

where π = profits

Y = aggregate demand

C = costs

The role of profitability in investment determination at the macroeconomic level will be discussed at a later stage.⁴⁶ However, at the level of the individual firm, profits are important because they generate the internal funds that can enable investment. This conflicts with the Modigliani-Miller theorem that with perfect capital markets, firms should be indifferent between internal and external sources of financing.⁴⁷ Most capital markets in developing economies do not approach the conditions necessary for the Modigliani-Miller theorem to hold and even in industrialized economies there is considerable empirical evidence that retentions are an important determinant of investment.⁴⁸

46 Sylos-Labini has a very interesting discussion of the "optimal rate of profit" for the economy as a whole. He argues that capitalists must balance the desirability of a higher profit share with the disadvantages of squeezing the wage share to such a degree that demand falls. Sylos-Labini, 1984. However, these types of considerations are not significant at the level of the individual firm since, paraphrasing Marx, all capitalists perceive their own workers as workers and all other capitalists workers' as consumers.

47 Modigliani and Miller, 1958. The assumptions underlying the Modigliani-Miller theorem are: perfect capital markets (no transactions costs, no taxation, no limits on the supply of finance, etc.), rational behavior, no imperfections in the product market, and certainty. See Hay and Morris for a discussion of the assumptions underlying the theorem and their implications. Hay and Morris, 1979, pp. 342-5.

48 For example, in the United Kingdom, retained profits accounted for approximately 75% of the finance for new investment while new share issues accounted for only 7.3% of finance for new investment. See King, 1977, p. 209. One explanation of the importance of internal funds for investment is the effect of the tax system on the cost of capital and the choice of finance. In many countries, interest payments are deductible from corporate tax payments whereas dividends must be paid from after-tax income. Consequently, because of the more favourable tax treatment of retained earnings and the transactions costs associated with borrowing, profits become an important explanatory variable for investment. See Helliwell, 1976, p. 25 for a discussion. For other studies that find evidence of the importance of retentions, see Meyer and Kuh, 1957, Eisner, 1967, Morris, 1974, p. 260-262; and more recently, Catinet et al, 1987. There have been some studies that have found an insignificant role for retentions: Taitel, 1941; Grunfeld, 1960.

In a developing economy, the firm's choices for investment finance are debt, equity, or retentions. Share and bond issues are not usually viable options since capital markets are weak. Stock markets, when they exist, are usually not active which gives firms greater latitude to retain profits to finance new investment since there is usually little pressure from shareholders, often family, to distribute dividends. Dividends are also not important as a signal of the firm's performance since shareholders and managers are often the same individuals and/or are related to one another.⁴⁹

In addition to the firm's decision about retentions, its other major financial decision is its gearing ratio, i.e. the ratio of debt finance to the total of debt plus equity.⁵⁰ If the domestic capital market is characterized by financial "repression" or "shallowness" and interest rates are artificially low, there will be greater incentive for firms to use debt financing.⁵¹ Subsidized interest rates combined with inflation often mean that firms can obtain credit, albeit with rationing, at negative prices. In a

49 Thorne found this to be the case in Peru. He found that the firm first decided how much to retain depending on its desired investment and the remainder was distributed as dividends. Thorne, 1986, p. 84. Tybout also finds evidence that internal funds are an important source of investment finance for Colombian firms. While large firms seemed to have disproportionate access to credit, small firms were particularly constrained in achieving desired investment by the availability of internal financing. Tybout, 1983.

50 Hay and Morris derive formally the optimizing conditions for firms to determine their retention and gearing ratios. Hay and Morris, 1979.

51 These terms were coined by McKinnon, 1973 and Shaw, 1973 to describe the common policy of fixing interest rates below market levels in developing countries. Empirical evidence on the implications of such policies and of financial liberalization can be found in Jao, 1976; Abe et al, 1977; Yao, 1977; Harris, 1979; Fry, 1978; Fry, 1980; Fry, 1981; Galbis, 1979; McKinnon and Mathieson, 1981; Giovannini, 1983; Giovannini, 1985; Taylor 1986; Thorne, 1986.

repressed financial system, cheap credit becomes a mechanism whereby the government transmits a subsidy to firms.⁵²

The Capital Stock

Although the desired capital stock (K^*) depends on expected profits (π^e),

$$(15) \quad K^* = f(\pi^e)$$

the actual capital stock the firm is able to achieve will also depend on the availability of financing for new investment. In a credit market characterized by administered interest rates and poor information, the external finance that a firm is able to leverage depends heavily on past profitability. This is particularly so in rationed credit markets where banks rely on reputation, connections, and sometimes bribes to determine which firms get access to credit. Past profits are a good indicator of both the availability of internal finance and the firm's ability to obtain external financing. Consequently, the realized capital stock depends on both expected and lagged profits.

$$(16) \quad K_t = f(\pi^e, \pi_{t-1})$$

Substituting from the term for profits in equation 14:

$$(17) \quad K_t = f(\tau^e, Y^e, C^e, \tau_{t-1}, Y_{t-1}, C_{t-1})$$

The actual capital stock depends on both expected and lagged mark ups, demand, and costs. The determinants of these variables, such

⁵² The subsidy is usually not transmitted to consumers since in developing country credit markets individuals are not permitted to borrow at subsidized interest rates for consumption purposes, with the possible exception of housing mortgages.

as market shares, price elasticities, rival behavior, exchange rates, wages, interest rates, taxation, investment incentives, and the price of capital goods, have been discussed earlier (see equations 3, 4, 5, and 13). Equation 17 above represents the array of factors, both past and expected future values, that a firm has to evaluate before taking an investment decision. After substituting from equations 3, 4, 5, and 13 into equation 17, there are over forty variables, expected and lagged, that have to be evaluated by the firm, even in this relatively simple model.

Uncertainty and the Capital Stock

Needless to say, there is considerable uncertainty associated with the expected future variables, as well as with many of the lagged values in markets with imperfect information. Even in developed, fairly stable economies there is considerable uncertainty associated with the investment appraisal process. A study of investment in innovation in the United Kingdom found that in 75% of the cases, the error range of the estimated profitability of investment projects was over 50% and in 25% of the cases it was over 100%.⁵³ Morris identified a number of strategies adopted by firms in the United Kingdom for coping with the uncertainty associated with investment appraisal.⁵⁴

For firms making irreversible investment decisions or where delivery lags or adjustment costs exist, expectations about the future become

⁵³ Carter and Williams, 1958. Also see Canon, 1968, pp. 191-2 and Morris, 1974, pp. 255-262 for further evidence.

⁵⁴ Morris, 1974, pp. 265-267. These include ways of organizing information and problem solving, sequential gathering of data, and compartmentalization of decision making.

increasingly critical.⁵⁵ Where there is genuine uncertainty, as opposed to risk where knowledge of a probability distribution facilitates the formulation of expected outcomes, agents may rely on conventional wisdom whereby investors "endeavour to fall back on the judgment of the rest of the world which is perhaps better informed."⁵⁶ Because there is a feedback channel between prediction, behavior and outcomes, individual decision-makers, even those who possess considerable knowledge, are forced to concern themselves with changes in conventional opinion. The existence of disparate expectations results in the possibility of an infinite regress problem where agents have to forecast the forecasts of others ad infinitum. Attempts to formalize this process of decision making are still at an early stage.⁵⁷ Instead, a more promising avenue seems to be an analysis of the defensive strategies adopted by firms to reduce the costs of the uncertainty which they face. These strategies include multisectoral diversification, vertical integration, capital flight, manipulating the mark up, and developing links to government. These are the types of issues that will be considered in the empirical work that follows.

The survey results that follow in chapter IV may appear worlds apart from the precision implied by the above version of the firm's optimization problem and investment decision. Hopefully, these microfoundations will provide a theoretical backdrop to the

⁵⁵ Nickell derives the formal conditions for firms facing irreversible investment decisions. Since the firm wants to avoid being lumbered with unsaleable capital stock during a slump period, the firm must try to predict future vacillations in demand so as to stop investing some time before the slump begins. Nickell, 1978, chapter 4.

⁵⁶ Keynes, 1973, volume XIV, p.114.

⁵⁷ For some examples, see Lawson, 1985; Frydman and Phelps, 1983; Townsend, 1983.

considerably more complicated environment in which firms actually operate.

CHAPTER IV

EMPIRICAL EVIDENCE ON MICROFOUNDATIONS: SURVEY RESULTS

Survey Methodology

The purpose of this survey was to provide a basis for developing realistic microfoundations from which one could construct and interpret the macroeconomic phenomenon of private investment. The survey was not intended to generate statistical results because firms in Egypt are unwilling to release reliable financial data, largely because of widespread tax evasion.¹ Instead the survey sought to test the behavioural assumptions of a macroeconomic model and to provide a more qualitative understanding of the investment process.

The sample of fifty firms was drawn mainly from the membership listing of the Egyptian Businessmen's Association (EBA) as well as referrals from interviewees. An additional fifty individuals in government, banks, and universities were interviewed about specific issues. A structured questionnaire was used which is included in appendix B, although interviewees were encouraged to discuss issues of particular interest, even if tangential.

¹ It is obviously difficult to estimate the degree of tax evasion, but there are some indications available about the scale. One source estimated that only 31% of eligible tax payers in Egypt actually filed returns. Despite several attempts to improve administration, the Ministry of Finance had tax arrears of about LE150 million in 1975. Waterbury, 1983, pp. 224-227. Since civil servants are taxed at source, evasion is prevalent mainly among those with private income.

The purpose of the survey was not statistical, but qualitative, thus the emphasis was on selecting interviewees who would be the most forthcoming and informative. Consequently, the selection of sample firms was in no sense random. Statistically relevant results are to be obtained through the econometric work on investment determination presented in chapter VII since data at the macroeconomic level are relatively more reliable. For purely illustrative purposes, the results it was possible to tabulate have been reported in appendix C.

EBA is a private sector lobby group which represents formal sector medium and large scale enterprises. EBA's 275 members generally represent the most prominent businessmen in Egypt and arguably, the most powerful political lobby for the private sector. This introduces an obvious bias since smaller scale enterprises, which are particularly important from the point of view of employment generation, are neglected.² However, since the purpose is to explain capital formation at the macroeconomic level, the formal sector is likely to be more important.³

In order to explain private capital formation in the economy as a whole, it was necessary to consider the range of activities that are

2 Hansen shows that the average private non-agricultural enterprise in Egypt employs about 8 workers, not including the owner and unpaid family labour. Since the arbitrary cut-off for the formal sector in Egypt is ten or more workers, Hansen concludes that private non-agricultural employment coincides roughly with what is often called the informal sector. He estimated that this sector employs about one sixth of the labour force in Egypt. Hansen, 1985, pp. 6-7.

3 An attempt to analyze adequately investment in the informal sector would involve a range of issues and data problems that are beyond the scope of this study. There are a number of studies that attempt to address these issues: see Abdel-Fadil, 1980; Arthur D. Little, 1982, Partnership for Productivity, 1985.

included in the national accounts category of investment.⁴ The sample was chosen such that the distribution of economic activities in the sample parallels that of private investment in the economy. Textiles and food processing are the most important sectors, followed by chemicals, engineering goods, construction and construction materials, wood, paper and leather, metallurgy, and land reclamation. Services and trade were also represented, but usually as secondary activities since the investment decision in those areas involves little capital. Although the sample was restricted to the formal sector, an attempt was made to get a variety in terms of scale. Measured in terms of labour forces, a more reliable indicator of scale than registered equity, the scale of the sample enterprises ranged from 20 to 2200 workers.

Characteristics and Origins of Firms

The characteristics of firms, in terms of their origins and behaviour, tended to reflect the period in which they were established. Enterprises established pre-1974 usually started as small-scale "traditional" industries, often with historical family expertise. These establishments were not large enough to be nationalized during the 1960s, and grew gradually over the period under Nasir.

Virtually all of the firms in the sample that survived the nationalizations stated that the 1960s was a very profitable period

⁴ The Central Authority for Public Mobilization and Statistics defines gross fixed capital formation for the private sector as: agriculture, industry, petroleum, construction, transportation and communication, finance and trade, housing, and other services.

for private industry because of the high level of protection, little competition, and growing government demand.⁵ One investor who now owns major textile interests actually began his first project in the year of the nationalizations after working in an Italian garments factory that was put under sequestration. At the time he hypothesized that the nationalization of the major textile producers would actually help his project which began with a modest LE1200 of family money and no machinery. The owner of a printing firm established in 1948 that escaped nationalization because of its size stated, "It was middle class investors that survived and gained from the nationalizations." In his case, reduced competition and massive government contracts for schoolbooks meant that the Nasir period was a lucrative time.

Although there was considerable uncertainty since firms always faced the possibility of nationalization, the Nasir period also provided considerable opportunities for small and medium size enterprises. One investor describing the period stated, "A part of my family's factory was nationalized in 1963, but a smaller part remained and continued to produce. We had to continue producing, since what else could we do? Oddly enough, production was good and we made high profits during the Nasir period. However, it was a very difficult time emotionally. Nasir nationalized gradually - in 1961 the large factories and in 1963 medium sized factories like mine.

⁵ See cases 8, 11, 19, 34, 37. There is probably some sample bias here by virtue of the fact that these firms continue to exist. If they had failed during the Nasir period, they would be less likely to be in existence to respond to this survey. Nevertheless, a number of entrepreneurs were asked questions about past unsuccessful enterprises and the findings do not contradict the results reported here.

Although Nasir left small factories unnationalized, we all felt our turn would come."

The assets accumulated during the 1960s and early 1970s were then often used by these same firms for expansion during the *infitah* period. However, even during the heyday of the *infitah*, the types of investments made by these older entrepreneurs tended to be different from those of their post-1974 equivalents. Their expansion was more likely to be in vertically integrated activities, involve more backward linkages and less import dependence, and follow very conservative financial policies sometimes to the point of not taking on credit even for working capital needs.

In contrast, firms established during the *infitah* often originated in assets accumulated in other areas, especially through work in the Gulf and the government.⁶ Substantial financial assets from the oil exporting countries were obtained by Egyptians working in the professions, contracting, and trade as well as from Gulf investors seeking to diversify their portfolios.

Investors who had their origins in the government usually brought more limited financial assets (except those who had accumulated wealth via corruption), but considerable political assets which could be used to facilitate their business affairs. This shift of public officials to private enterprises was facilitated by the abolition of decree 1906 in 1976 which prevented government

⁶ For a sociological study of the origins of *infitah* entrepreneurs, particularly commercial agents, see Zaalouk, 1982. Similiar issues are discussed by Mokhtar, 1980 and Mahmoud, 1984.

employees from accepting private sector jobs until after two years of retirement. Many public officials did not wait for retirement, but conducted private business while still in office. One case in the sample was an undersecretary in a government ministry whose knowledge of the tax system and regulations governing private firms made him a useful consultant to many investors. The additional income from this consulting activity had enabled him to purchase a new Mercedes automobile which he had to leave in the garage given the implausibility of his having purchased it on his civil servant's salary.

These post-1974 entrepreneurs' experience was usually in areas other than enterprise investment, and this was reflected in the kinds of investments that they made, especially in the early part of the infitah. These investments were generally characterized by extensive multisectoral diversification, heavy reliance on credit, greater capital intensity and import dependence. Unlike pre-infithah firms which were family dominated with a historical background in a particular sector, post infitah enterprises often had a slightly wider distribution of shareholdings, albeit still dominated by a few individuals, and were more likely to be managed by individuals with no particular technical experience in the sector who relied on hired expertise.

Because post infitah investors were relative industrial neophytes and consequently somewhat more risk averse, they preferred activities which involved quicker returns. One older investor

described infitah entrepreneurs as "unprofessional, inexperienced, and all wanting to become millionaires overnight."

A more recent trend is the growing number of industrial entrepreneurs that have their origins in trade during the infitah.⁷ The low risk, high profit nature of working in trade during the infitah meant that virtually anyone with access to a telex machine, including established industrialists, set themselves up as a commercial agent. However, as the windfall came to an end, the decreased availability of foreign exchange, declining demand for high cost imports, and increase in import restrictions reduced the scope for agency work. Many commercial agents sought to diversify and had become increasingly aware of the profitability of protected industry. Not surprisingly, given their market knowledge, many began producing domestically precisely those goods that they had been importing previously.

The desirability of this shift from trade to industry is somewhat reduced by the fact that traders tend to opt for low value added packaging or assembly operations⁸ or joint venture or licensing arrangements with foreign capital.⁹ Production tends to be highly import dependent and, in some cases, is merely a way of sidestepping import restrictions and reaping the gains of protection. One trader describing a new venture stated, "Actually, we only called it industry so as to get approval under Law 43; in fact we are buying in bulk and repackaging a product which we are no longer allowed to

⁷ For example, cases 7, 10, 11, 12, 17, 20, 26, 38, 42, 44, and 47.

⁸ Such as cases 10, 20, 26, 42, and 47.

⁹ Such as cases 2, 4, 21, 33, and 38.

import." Nevertheless, this shift from trade to industry may be a transition stage as investors become more accustomed to activities that generate greater value added.

Shareholding Structure

De jure, the number of joint stock companies in Egypt has risen considerably; de facto, family dominated firms still prevail. A fairly typical example from the sample is a joint stock company in the food processing sector with 320 official shareholders. However, 42.66% of the shares were under the direct control of one individual and his family, and a further 19.31% of the shares under his indirect control through his other companies and employees. This particular individual was involved in several other enterprises, always as the effective majority shareholder, although sometimes with as little as 20% direct ownership of shares.

After family firms, the next most common shareholding type are limited partnerships, usually with between 2-5 partners. The only truly joint stock companies were firms with multinational participation and, to a lesser extent since shares are very rarely traded, firms with equity participation from banks. Firms established during the infitah period sometimes had a slightly wider distribution of shareholdings than older firms. The predominance of owner-operated family firms lends support to the hypothesis of profit maximization as the firm's objective function in chapter III.

There are a variety of explanations for this phenomenon, most of which stem from the uncertain environment, corruption, high degree of personalization and lack of credibility in the system. Because of widespread tax evasion, most firms prefer to avoid the public scrutiny of balance sheets required by truly joint stock operations in which non-family members have access to company accounts. The desire for managerial autonomy, a general distrust of hired managers, and a reluctance to relinquish assets to be managed by a stranger also contribute to the preference for family firms. The scale of enterprises is often not so large as to be beyond the wealth of a handful of individuals. The appearance of a large number of shareholders is desirable because distributing profits over an extended family's members reduces overall tax payments.

Although one cannot generally argue that firms are undercapitalized, the emphasis on family ownership means that projects that involve more capital outlay than the resources of family and friends are avoided. Several interviewees cited cases of investment projects that were not implemented because "we could not find enough shareholders we knew." In addition, expansion of existing activities was constrained by the availability of additional equity within the same family network. The combination of family ownership and tax evasion also hindered the development of a stock market which could alleviate these constraints to new investment projects. A less tangible, but equally important cost of family ownership is the limited range of individuals from which management can be selected. This constraint of resources, be they capital or

management, to that which is available within the family network may impose considerable costs on the economy as a whole.

Diversification

Almost all the firms surveyed were part of a group, either vertical or multisectoral, which served to spread risk. Multisectoral diversification is largely a risk spreading device in response to economic cycles and sectoral shifts.¹⁰ This is particularly important in economies without an active stock market where the only means by which agents can spread risk is by participating directly in a number of projects. Vertical integration can result from production advantages, uncertainty associated with vacillations in input supply, or economies of scale.¹¹ In some cases, diversification can also be justified because of some degree of complementarity between activities. For example, there may be externalities in producing goods that are related or in which a particular skill, like marketing, is important. Nevertheless, in the Egyptian case where the same firm may produce ice cream, steel and shoes, much of the diversification seems to be motivated solely by risk spreading.

Multisectoral diversification was more common than vertical, especially among infitah entrepreneurs, although many firms

¹⁰ Note that the type of multisectoral diversification described here is distinct from the product differentiation analyzed in much of the microeconomic literature. Product differentiation usually refers to the production of a range of goods in the same sector by a number of firms, each choosing some segment of that product market on which to focus.

¹¹ The motives for vertical integration are discussed by Williamson, 1971 and Waterson, 1984, pp. 92-99.

diversified both across and within sectors. Firms established prior to 1974 were more likely to integrate vertically because of historical expertise in the sector. In contrast, investors from the infitah period were more likely to diversify across different sectors since they were often managers rather than technical experts. Arguably, such extensive multisectoral diversification contributed to reduced efficiency as investors were forced to spread their management capability very thin and to enter areas in which they had no experience.

One investor had an explicit policy of investing no more than LE 5 million in any one project, while insisting on having the controlling interest in any project in which he was involved. The high degree of diversification in the sample is partly a function of the relatively high degree of wealth of the investors interviewed. Smaller entrepreneurs are more likely to hold accumulated wealth in the more conservative form of land or real estate.

Second Hand Capital Goods

Contrary to the supposition of neoclassical investment theory, there is no sense in which investment decisions were reversible through an efficient second hand capital goods market.¹² Some parts of investment costs, such as land and buildings, could be readily resold. However, the industrial base is too narrow for there to

¹² The importance of the assumption of a market for second hand capital goods to neoclassical investment theory is discussed in more detail in chapter V. The standard neoclassical assumption of efficient second hand markets for capital is most closely associated with Jorgenson. Jorgenson, 1963, pp. 247-259; and Jorgenson, 1967.

be an active second hand market for machinery domestically. Only two of the firms surveyed (one in textiles, the other in construction) reported the possibility of selling capital goods second hand, although they themselves rarely found it a worthwhile practice.¹³ The only option for firms faced with a demand slump was to depreciate existing capital, tolerate excess capacity, and refrain from new investment.

Decisions about capital goods were also irreversible in cases where firms sought to buy machinery second hand to respond to sudden demand shifts or technological opportunities. Until 1987, it was illegal to import used machines into Egypt. In addition, many banks refuse to give loans for the purchase of second hand equipment. Only one of the firms interviewed was attempting to import a piece of used machinery under the new legislation, but the vast majority said that it was not worthwhile because of complicated procedures and, in cases where firms are under the investment incentive laws, the fact that new machines can be imported duty free. In addition to the incentive structure discriminating against importing used machinery, firms under Law 43 are not permitted to resell their machines second hand precisely because they have received a customs exemption.

The usual pattern was that firms import their capital needs, retain it throughout its operating life even if they have excess capacity,

¹³ There does seem to be a limited domestic second hand market for machinery in textiles. This is because it is a relatively old and large sector in which there exists a range of producers at different scales. The pattern seems to be that large scale firms sell their used machinery to smaller scale producers.

sell it for scrap when it has been exhausted and reimport new machinery. This suboptimal replacement policy resulted from factors like the limited size of the industrial sector, the procedural complications associated with importing machinery and the absence of guarantees on second hand goods bought domestically. In addition to the effect on productive efficiency of such a replacement policy, because investments are more irreversible in the Egyptian context, there is greater risk associated with any decision to invest.

Market Structure

Market structure was overwhelmingly characterized by oligopoly, with a few cases of outright monopoly.¹⁴ The sectors that tended to be more competitive were those in which small scale workshops provided a competitive floor such as in garments, simple food processing, furniture making, and printing.¹⁵ Even in these cases, firms usually perceived only a handful of competitors at the same scale and quality of production.

Cartel behavior existed in several sectors, i.e. non-zero sum, multi-period cooperative games in the jargon of the literature. One firm that produced dairy products was the price leader in a

¹⁴ The degree of oligopoly was such that indicators like the four firm concentration ratio became irrelevant when there were only four or less firms in many lines of production.

¹⁵ Contrary to the conventional view, however, the small scale industrial sector in Egypt is not the ideal Walrasian marketplace. Although production is usually performed by small atomistic units, there are often strong oligopolistic relationships of patronage at the trader/wholesaler level. A handful of merchants may control the marketing of a certain good as well provide credit and raw materials to their clients.

voluntary cartel between the four producers in the market. In addition, a price cartel existed between the five large scale milk producers who supply the dairy processors. In another case in the food processing industry, a firm was approached by its only competitor who was in financial trouble to establish a cartel. The owner of the firm rejected the offer on the grounds of the "sanctity of competition." He eventually drove his high cost competitor out of business and became a monopolist. By not cooperating in one period, this firm was able to increase its payoff in subsequent periods.

Two firms in the plastics industry admitted to participating in cartels. An older firm stated that a price agreement existed between the public and private sector producers between 1972 and 1977 since "costs and the acceptable rate of profit were known." Another plastics firm established in 1977 faced stiff competition as several new firms entered the market. Some of the firms faced serious financial problems until a bank from whom several of the firms had loans mediated an elaborate cartel agreement. The five firms in the market meet regularly at the bank to fix prices, market shares, and monitor an agreement not to poach labour from each other so as to keep wages low. The agreement has held for the past two years since all parties, the firms and the bank, stand to gain from it.

In the aluminium industry a withdrawal of subsidized foreign exchange for the importation of aluminium ingots caused an approximate doubling of production costs. However the three firms

affected were able to pass on the rise in the input price along with their 20% mark up on to consumers. All three producers adopted the same strategy of fully passing on cost increases to consumers and maintaining their 20% mark up simultaneously, although they say there was not a formal agreement.

There were some sectors in which oligopolists were non-cooperative. For example, two cases in different sectors of the food processing industry in which there was overcapacity resulted in a situation where the game was zero-sum and therefore non-cooperative. In one of the cases where the private firm was competing with a public sector factory that had access to subsidized inputs, there was an attempt to target a higher income market. The consequences in both cases were a price war and heavy investment in advertising by all market participants.

Pricing Behaviour

Given the prevalence of oligopoly described above, it is not surprising that the overwhelming majority of firms used some form of mark up pricing. The only firms that truly could be described as price takers were the few that competed on world markets. Otherwise, most firms had some degree of market power which they could use to extract a mark up over costs. The assumption in much of the post-Keynesian literature discussed in chapter III that the mark up responds to the firm's desire to invest was not found to be valid. Firms did not tend to have that degree of flexibility to raise mark ups in response to the need for internal funds for

investment. Most firms when asked about what procedures they used to arrive at their selling price stated that what mattered were costs, how much the market can bear, and what my competitors are charging. In economic terminology, this translates fairly directly to the model of mark up behaviour hypothesized in the model in chapter III where the mark up is a function of the price elasticity of demand, the firm's market share, and rival behaviour.

The behaviour of the mark up varied considerably under different circumstances. There was no sense in which mark ups remained fixed over time or even fixed between different sales at the same time. In general, the mark up is positively correlated with cyclical movements in the economy, i.e. a rise in demand results in a rise in the mark up. Often the mark up is lower at the beginning of production so as to capture a market share. Also, as optimal capacity is reached and productivity rises, the mark up increases at any given price level. A lower mark up may be accepted in certain situations in order to avoid having a factory remain idle because of the high fixed costs involved.

Faced with a rise in input costs, firms attempt to maintain their mark up either by passing the higher prices gradually on to consumers or by reducing other production costs, and often quality, so as to maintain the same output price and mark up. The costs involved in changing prices frequently and the dangers of losing customers constrained producers from passing on all shifts in production costs instantaneously.

Because of the high degree of protection and the absence of reliable market data, firms producing an import substitute often used the import price as a reference price, at least initially until the firm gained experience about market demand. If an imported good sold at LE 1.50 (LE 1.00 freight on board plus LE 0.50 customs duty), a local producer will sell at LE 1.50, thereby absorbing the customs protection as his profit. Since the firm's market share is protected from competition by imports, it is possible to maintain this artificially high price until domestic competitors emerge. Consequently, protection was a crucial element of firms' profit rates as discussed in the model in chapter III, particularly for firms that were not producing at close to world market prices.

The mark up may vary according to the customer, especially in cases where job orders are prevalent. For example in cases where tenders for the government are awarded on criteria other than simply price and specifications (such as who paid the highest bribe to the head of the government purchasing committee), the mark up may be considerably higher than normal. Specialized orders are likely to bear a higher mark up than standard production. The nuances are almost infinite, with different mark ups charged to different parts of the government (for example, the military versus administrative arms of the state) or different regions of the country.

Mark up behaviour did not seem to depend very much on whether firms were part of a group. Investors claimed that they manage each project independently. Financial problems in one activity or a desire to invest in a new project did not tend to affect the mark up

in other investments. However, in some cases, overlapping assets, personnel, and loans between firms in a group were common making it difficult to assess the autonomy of a specific project.

In the few sectors in which there were price controls, such as pharmaceuticals, bottling, tourism, and poultry, a mark up technique was used by the government to arrive at the selling price. In general, the operative rule is that firms can not be subject to output price controls if no subsidized inputs are used.¹⁶ In such situations, there is much negotiation between the government and the private sector firms over what actual production costs are. Firms are able to increase their mark ups under output price controls by exaggerating their production costs, by producing under specifications, or through greater efficiency.

More common than direct price controls are situations in which the government has an effect on private sector prices through the prices at which the public sector sells intermediates to the private sector and/or the prices at which the public sector sells output that competes with the private sector. In some industries the government sells subsidized inputs to private producers (such as textiles, metals, matches, cement, construction, some food processing) ; whereas in others, there is input price discrimination

¹⁶ In theory, no firm under Law 43 is supposed to be price controlled since they pay world prices for inputs. Tourism and pharmaceuticals are exceptional because of regulatory reasons. In the case of some Law 43 pharmaceutical firms, the Minister of Health prevented them from raising their prices so as to avoid a politically sensitive rise in the price of certain widely used medicines. This was usually offset by higher mark ups on more specialized medicines. Private poultry firms are compelled to accept output price controls because they would be undercut if they did not use government subsidized feed.

in favour of the public sector (such as in cement, electronics assembly, refrigerators, batteries, and some food processing). In addition, public sector firms generally have access to subsidized foreign exchange through official channels. Public sector firms that receive subsidized inputs are usually then able to sell their output at a lower price than private sector competitors. The most common strategy used by private firms in such situations is to emphasize the higher quality of their output relative to the public sector.

The rates of return that private investors perceived as reasonable were between 20-50%. Since sophisticated investors evaluate their rate of return in foreign exchange (usually dollars), firms often report a very high nominal return in LE, reflecting the depreciating trend of the Egyptian pound. Since simply holding dollars abroad generated a nominal return of approximately 25% in LE prior to the exchange rate reform of 1987, most investors consider this an investment floor. The relatively high reported rates of return also reflect discounting for risk and uncertainty. Because of the absence of a dynamic capital market and the irreversibility of investment decisions, there is no tendency for returns on different investments to converge. Instead, there is a fairly wide range of returns that coexist.

Finance

The interest rate structure imposed by the Central Bank is fairly rigid, although banks can give favoured clients a share of their

mark up in the form of a fraction reduction in the interest rate they charge. In some cases, compensating balances were used to raise the effective interest rate to borrowers, data are not available, however, because of the illegality of the practice.

Throughout the peak infitah period (1974-81) the banking system was highly liquid. Because of the absence of reliable balance sheets because of widespread tax evasion, getting credit was a highly personalized matter. Instead, many banks go through an exercise of creating "reconstructed balance sheets" in cooperation with their clients to get some idea of the true financial situation of their borrowers. Since firms are associated with particular individuals or families, bank lending tends to be based on confidence in the owner of the firm rather than in the viability of the project proposed.

One financier told of a case in which a major international bank refused to approve a loan for a firm because a life insurance policy could not be obtained for its aging chairman. The bank's lack of faith in the chairman's sons who would inherit the management responsibilities superseded their evaluation of the viability of the investment proposed.

Past profitability and retentions, in addition to being a means of financing new investment, determined access to future credit. In terms of who gets credit, this system resulted in a fairly conservative lending policy on the part of the banks. In terms of

how much credit they got, however, the banks' lending policies could only be characterized as liberal.

Because of the rapid increase in the number of banks and the consequent competition for clients, the expansionary monetary policy of the time, and the uncertainty about the true financial position of firms, the tendency was for firms established during the infitah to become over indebted.¹⁷ Debt/equity, or "gearing", ratios of 4/1 or 5/1 were not unusual; the worst case in the sample was 11/1.

Pre-infitah firms were also characterized by very low reported equity, but tended to rely very little on credit. Often a firm with a very large turnover would have reported equity of only LE5000-10,000. This was partly a low profile strategy, and also a means of avoiding the more stringent reporting requirements and labour laws of the 1960s which were imposed according to the size of the firm's equity. In addition, pre-1974 company registration fees were high and were calculated as a percentage of total equity. In order to cover the firm's liquidity needs, the partners of the firm would often extend sizable loans to the company rather than increase their official equity. This also meant that partners could get their money out more easily than under the complicated procedures of reducing the official equity of the firm.

There are a number of reasons for the tendency for firms established during the infitah period to be overleveraged.¹⁸ Because real

¹⁷ Cases of firms with high debt/equity problems included 2, 9, 10, 12, 14, 20, 26, 29, 30, 31, 48, and 50.

¹⁸ Overleveraging refers to when firms have debt obligations which exceed the capacity of their equity. Normally, equity should be

interest rates on Egyptian pound loans are often negative, borrowing heavily seemed a clever financial policy, although the practice of compensating balances raises the effective interest rate somewhat. Cheap credit was, in effect, a free good provided by the government through the banks to the established private sector.

In addition, the higher the debt/equity ratio for any given investment, the greater the rate of return on paid up capital. Many of the investments made during the infitah period also did not take adequate account of the rate of inflation, so banks and firms used debt as a way of coping with rising construction costs, wages and raw materials prices. In an uncertain environment, relatively low equity also gave firms a low profile and meant that less capital was at risk if bankruptcy or nationalization were threatened.

The economic effects of the subsidized credit policy, combined with infitah incentives that granted customs exemptions on machinery imports and investment allowances, was to subsidize capital and encourage its mismanagement. The relative cheapness of imported machinery meant that production tended to be too capital intensive and that firms had suboptimal replacement policies. Although the use of capital goods was rational in response to the incentive structure, in economic terms, there seems to have been considerable misallocation of resources. In particular, the private investment that occurred did little to contribute to solving the country's growing unemployment problem. Firms established under Law 43

sufficient to provide firms with financial breathing space in the early years when the interest costs of borrowing must be repaid but the firm is not yet making profits.

tended to generate only half the jobs for each unit of capital invested when compared to the public sector.¹⁹ Although there is a problem of overstaffing in the public sector, it is an indication of the likelihood of inappropriate technological choices in the private sector.

The implications of overleveraging became apparent as many firms began to face severe cash flow problems caused by the credit squeeze of the 1980s. Quantity restrictions associated with International Monetary Fund and Central Bank credit ceilings constrained borrowers' ability to roll over old debt. Also, banks may have raised the compensating balances required of borrowers as a "backdoor" means of increasing the effective interest rate in times of tighter credit and higher inflation. The combination of a credit squeeze with the already unhealthy debt/equity ratios of many infitah firms made the practice of borrowing heavily, even at subsidized prices, seem an unwise policy.

The alternatives for heavily indebted firms were declaring bankruptcy or raising new equity. Increasing the firm's equity was the preferred strategy, especially from the point of view of the banks who have little hope of retrieving their investment under Egyptian bankruptcy laws. Recognizing the problem, the Investment Authority set a minimum debt/equity ratio for Law 43 firms of 1:1 for investments under LE 5 million and 2:1 for investments greater than LE 5 million in 1982. The heightened awareness of the importance of having a sound debt/equity ratio resulted in a

¹⁹ Ahmed et al, 1984, p. 31.

reversal of the previous trend of exaggeratedly low levels of reported equity. Instead, many firms facing liquidity problems attempted to raise their paid up capital by any means, to the point of trying to include personal property and family jewelry as part of official equity. This exaggeration of reported equity, like the underestimates in the earlier period, contributed to hindering the development of a stock market by preventing investors from having an accurate valuation of firms.

The effect of the credit ceilings varied across different firms and banks because of the way in which they were implemented. Banks were permitted to increase credit for any client by only 3% over the previous year. Consequently, the availability of credit depended on whether the previous year was a particularly "good" or "bad" one from the point of view of the firm and the bank. The ceilings also discriminated against new projects since their credit needs must be met by the bank depriving an old client of his/her 3% allocated increase.

The International Monetary Fund stand-by package also included an approximately 60% devaluation of the official exchange rate, which had severe implications for firms that had debt denominated in foreign exchange. Since the Central Bank's regulations state that debts in foreign exchange shall be repaid at the "highest prevailing official exchange rate", firms that had been able to borrow dollars at the rate of LE1.35 = \$1.00 were faced with having to pay LE2.20 for every dollar. The firms involved appealed for government assistance in the form of subsidized foreign exchange or direct buy

outs. However, the government refused partly because it would be difficult to distinguish between firms facing financial problems because of the devaluation versus those caused by mismanagement or corruption.

A case that embodies virtually all of the financial problems described above is that of a large food processing company established in 1981 under Law 43. The firm is a part of an extensive conglomerate associated with one of the wealthiest and most politically well-connected of Egyptian businessmen. The firm's debt/equity ratio of 6:1 generated interest payments of LE 21 million annually. As a result the 13 institutional and various individual investors (30% public, the remainder private) had to increase the original equity from LE 7 million to LE 30 million.

The firm attempted to increase its output price from LE 0.15 to LE 0.20 in 1983, but was prevented by the Ministry of Supply. This is despite the fact that firms under law 43 are not supposed to be subject to price controls when they do not use subsidized inputs. The firm's public sector competitors had access to subsidized energy, water, sugar, and foreign exchange. The firm later convinced the government to grant it the desired price increase, but it was coupled with an increased tax per unit which effectively absorbed 70% of the increase in revenue. Meanwhile the firm also held \$30 million of debt denominated in foreign exchange which made it vulnerable to a devaluation of the pound. An attempt was made in 1984 to secure a loan for LE50 million to be used to convert the dollar debt exposure to a LE debt; however the imposition of credit

ceilings by the Central Bank prevented this strategy. Consequently when the pound was devalued in 1987, the LE value of the firm's debt rose by 60%. By December 1987, the firm's losses of LE28.9 million had virtually eaten away its capital. An appeal was made to the Prime Minister for assistance, but the government has not been forthcoming because of allegations of mismanagement and corruption by individuals within the firm.

Foreign Exchange

Virtually all the firms surveyed relied on the officially tolerated own exchange or black market for their foreign currency needs between 1974 and 1987.²⁰ This market was largely supplied by worker's remittances and some tourism revenues. Under the own exchange system, banks would open import letters of credit for private individuals without asking about the origins of the foreign currency. Prior to 1974 and after May 1987 foreign exchange was available to private sector firms through official channels, although a black market also existed.

Although most firms stated that the black market functioned efficiently, the consensus was that the post-May 1987 foreign exchange reform was an improvement. Under the new system, the government incorporated the own exchange market into the banking

²⁰ There were only three cases of firms obtaining foreign exchange at the overvalued official rate during the infitah period. Two of these were through donor-funded programmes which are required to supply foreign exchange at the official rate. The third was a firm in the highly exceptional, highly regulated pharmaceutical sector which also relied on the black market for most of its foreign exchange needs.

system and constrained demand by limiting access only to those wanting to open import letters of credit. The exchange rate is set by a committee of the banks in conjunction with the Central Bank.

Under the new foreign exchange system, importers deposit 35% of the value of the letter of credit in order to get into the foreign exchange queue. In general, firms reported having to wait about two weeks on average until the letter of credit was actually opened and the remaining 65% of its value had to be paid. Although the queuing and rationing involved rendered it slightly more cumbersome than its predecessor, the new foreign exchange system has also reduced the uncertainty involved in dealing through the black market. Although the black market was officially tolerated, the periodic arrests of foreign exchange dealers made many in the private sector nervous.

The restriction of the official market to those opening import letters of credit has meant that there is a continuing role for the now illegal black market. Firms with debt repayment obligations, foreign companies wanting to repatriate, Egyptians wanting to travel abroad, and individuals trying to hedge foreign exchange risk cannot get access to hard currency through official channels. This has meant that the black market has continued on a much reduced scale with an approximately LE 0.05 premium over the official rate to cater to these foreign exchange needs.

Imports, Exports, and Protection

Even though import substitution industrialization has been going on in Egypt for decades, most industries remain highly import dependent. The majority of firms imported over 40% of their raw materials needs, with 27% importing over 90% of their inputs.²¹ The heavy import dependence is also evidenced by the growing importance of foreign exchange loans to the private sector. While the overall growth rate of loans and advances in LE between 1978-1981 was 42% per annum, that in foreign exchange was 83% per annum.²² Machinery was overwhelmingly imported given the limited size of the domestic capital goods industry. A small number of the lighter, more traditional industries such as textiles and food processing had extensive backward linkages in production. A few firms had an explicit policy of trying to increase the proportion of local content so as to reduce their dependence on imports. One firm stated that they avoided entering new projects that depend heavily on imported raw materials.

Many firms, especially those established during the infitah, also relied on imported intermediate inputs because of their choice of technology, rather than the unavailability of any domestic equivalent.²³ Frequently, investors stated that their imported machinery could only operate properly with imported inputs, a view often encouraged by foreign suppliers. Domestically produced

²¹ These findings concerning the heavy import dependence of infitah entrepreneurs were confirmed by the survey results of Ahmed et al, 1984 and Meyer, 1988.

²² Foda, 1985, p. 5.

²³ Cases include: 2, 4, 6, 7, 15, 26, 31, 39, 41, 46, and 47.

inputs are often said to be of lower quality and reduce the operating efficiency of imported machinery. The fact that the machinery imported is often the latest technology, rather than older technology or second hand machinery, means that the scope for adapting to local conditions is often minimal. In general, domestically produced inputs were perceived as a last resort.

Reasons for opting for lower domestic value added production stem from the bias toward capital intensity that resulted from the customs exemption on machinery imports, the appreciation of the exchange rate during the period of the windfall, and, to a lesser extent, perceptions of efficiency and quality of Egyptian industrialists most of whom were trained as engineers. In several cases, the government has attempted to pressure firms to use more local inputs by restricting imports of products which are available on the local market. This is usually resisted by private firms who claim that local production is inadequate and, in some cases, that they will have to stop production if denied the permission to import.

In addition to high capital intensity, some firms established during the infitah had installed overcapacity because their estimates of demand were based on the unusually high levels of consumption, both domestically and in regional export markets, during the petroleum-based foreign exchange windfall.²⁴ When demand fell during the early 1980s, some of these firms faced high fixed costs which

²⁴ See cases 31, 33, 38, 49, and 50.

compelled them to increase sales to the point where they were not covering unit costs, but only variable costs.

The export performance of the firms surveyed was very poor. Only three of the fifty firms exported above 20% of their output; two of those cases were situated in the free zones and were required by law to export.²⁵ The majority of firms had no exports at all and 84% had exported less than 10% of their output. This pattern is confirmed by Investment Authority data which show that between 1974-1986, Law 43 firms only exported 6% of their output value.²⁶

There are several reasons for this low level of exports: the existence of a highly protected and lucrative domestic market, the real appreciation of the pound during the foreign exchange windfall, and, to a lesser extent, policy disincentives to export such as transportation problems and a cumbersome duty drawback scheme. Some firms complained that the break with the Soviet Union and the signing of the Camp David accords with the consequent boycott by the Arabs reduced export opportunities for Egyptian products in Eastern Europe and the Middle East. A number of firms stated that they had a number of export orders, but had no incentive to fill them because of the high profits available domestically. Others cited transportation problems and the absence of economies of scale as constraints to greater exports.

²⁵ One of these free zone cases was a typical multinational using Egypt as base for cheap labour to produce garments solely for export to the European market. However, the other case in food processing had depended heavily on sales in the lucrative Egyptian market and faced serious problems when the regulations requiring export of all output were enforced.

²⁶ Interview, General Authority for Investment and Free Zones, 9 December, 1987.

The government has tried to improve export performance by establishing an Export Development Bank, an Export Promotion Centre, and by instituting modifications in the duty drawback scheme.²⁷ Perhaps the most effective incentive, often cited by the firms surveyed, is the regulation that exporters can retain 100% of their foreign exchange earnings, rather than having to turn them over to the banking system.²⁸ Initially with the abolition of the own exchange market in May 1987, the government attempted to force exporters to turn over all foreign exchange earnings to the banking system. However, opposition to this was strong and the government realized that avoiding having to wait in the foreign exchange queue for import needs could provide an important incentive to export.

The existence of a highly protected domestic market combined with a foreign exchange windfall have been the factors that have determined the pattern of imports and exports in the industrial sector. Government protection policy includes a willingness to ban imports in proportion to domestic capacity to meet national demand. Firms often seek assurance of protection before investing.²⁹ Foreign investors are particularly aware of the level of protection granted them in the Egyptian market. The viability of many industries hinges on the existence of protective tariffs and import

²⁷ World Bank, 1983.

²⁸ The exception to this rule are five traditional commodities such as cotton, oranges, onions, and garlic for which exporters can retain up to 50% of their foreign exchange earnings if they are used within six months for imported input needs.

²⁹ This is true of both public and private firms. In addition to the survey findings, Gillespie describes two cases of foreign investors involved in joint ventures with the public sector securing guarantees of protection and opposing competitive projects by Egyptian entrepreneurs in their sector. Gillespie, pp. 106-7.

restrictions.³⁰ For example, the existence of higher customs tariffs on many final goods has created room for a number of assembly and packaging industries that pay lower duties on importing the component parts. Although comparative advantage needs to be evaluated in a dynamic context, it seems unlikely that several of the "infant" industries involved will ever mature unless there are changes in the protective structure.

Crowding In? Some Micro Level Results

For firms that were not highly import dependent, the public sector was often an important source of production inputs. This tended to be somewhat sector-specific with the public sector supplying a significant share of inputs to the garments, metallurgy, engineering, construction, and agriculturally-based industries. This reflects public sector dominance of spinning and weaving, metals, cement, and subsidized feed activities. The public sector also dominates the sugar industry which is critical to firms in food processing and bottling; although since it is a low value subsidized item, it does not appear as a major share of input value. Although private firms sometimes complain about the quality or availability of public sector inputs, the price is usually highly favourable and often subsidized (such as in textiles, livestock feed, metals, cement, sugar).³¹

³⁰ See, for example, cases 7, 39, 41, 42, and 46.

³¹ Note this does not include private gains from subsidized infrastructure and energy provided to non-Law 43 private firms. Given the extensive tax evasion in Egypt, one cannot argue that these inputs are paid for by the private sector through the fiscal system.

The implications of these complex production linkages between the public and private sectors is difficult to evaluate at the general level. On the one hand, the private sector gains from the low cost, albeit variable quality and periodic rationing, of public sector production inputs. On the other hand, subsidized public sector production often constitutes competition to private producers.³² In many sectors a division of the market exists whereby public sector industry focuses on the low income market whereas private firms target higher income consumers. Although there may not be direct competition, a low public sector output price constrains the degree to which the private sector can raise its prices.

In addition to direct subsidies through cheap inputs, government spending on infrastructure increases the returns to private investment by reducing costs. The effects of such infrastructure investment will be explored further in chapter VII. Similarly, public provision of low cost goods (food, housing, services) constitutes an implicit subsidy to private sector wage bills.

The effects of the subsidy policy on expectations is also ambiguous. The question of whether administered input prices are more or less uncertain than market prices is difficult to answer in the general case, especially when they are accompanied by administered output prices. Different variables are important to expectations formation under the two regimes. Expectations about market prices

³² Cases 1, 5, 25, 37, 41, 47 are examples where the public sector provided subsidized inputs and competition on output markets to the private sector.

depend upon the underlying model of the economy hypothesized by agents. Expected administered prices, in contrast, depend largely on past experience with government pricing policy.

The net effect of an economic change on final prices under a market versus an administered price regime is ambiguous and will depend on the structural characteristics and economic history of a particular economy. In a country with a history of administered price stability, entrepreneurs are likely to associate greater uncertainty with market price outcomes up to the point where the deviation between the administered and market price is so large as to increase the likelihood of a policy-motivated jump in the administered price. The reverse is true in economies in which administered prices have been highly volatile in the past. While under market price regimes the uncertainty is associated with the final price, under administered regimes some of the uncertainty is shifted to quantities because of possible rationing.

The importance of public sector demand stimulating private activity varied by sector. It is useful to distinguish between demand for private sector final goods by government retail and distribution outlets, and demand for private sector goods and services by the government as a consumer. In the first case, the public sector is merely serving as a conduit for existing private sector demand whereas the second is a more Keynesian public sector multiplier.

In the firms surveyed, private sector producers of consumer goods sold a significant share of their output through public sector

retail outlets. Public sector demand for final goods and services produced by the private sector was particularly important in construction, trade, and transportation where the scale of government demand created highly profitable opportunities for the private sector. This reflected the enormous increase in government spending on imports and infrastructure during the foreign exchange windfall. It was not unusual for firms sampled in trade and construction to sell over 80% of their output to the government.³³

Crowding Out? Some Micro Level Results

In discussions with private investors they almost invariably emphasized the degree to which they are discriminated against in favour of the public sector.³⁴ In some areas, the public sector is given an outright monopoly over the production of certain goods. Usually the government will not grant approvals for private projects unless there is a gap between total demand and public sector production so as to avoid competition.

Discrimination in input prices (raw materials, foreign exchange, credit, energy, and services) and sometimes quantities means that private investors produce at higher costs which must be offset by

³³ This is confirmed in a survey of commercial agents by Zaalouk who found that 94% of her respondents sold mainly to the public sector. There was often much corruption and bribery associated with the public sector tendoring process. In one case, Zaalouk found that the actual commission received by a commercial agent was twenty times that officially reported. Zaalouk, 1982, p. 259. The difference between the official commission and that actually received was deposited by the foreign company in the commercial agent's bank account abroad.

³⁴ For examples of these arguments, see Egyptian Businessmen's Association Comments on the New Five Year Plan, 1987; and Messiri, 1987.

greater efficiency, marketing, and/or quality. In addition, government fixing of output prices is highly controversial, although firms seem to survive by exaggerating their production costs. Other complaints about government policy include import restrictions and lengthy import licensing procedures, procurement delays when buying from public sector companies, restrictive banking practices, preferential customs rates for public sector companies, and the absence of reliable information about markets, inputs, and technology.³⁵

One investor in food processing interviewed stated that his policy was to avoid any area the government identified as a priority since if it is considered important, the state is likely to fix input and/or output prices and to subsidize public sector output. Consequently, he had a Marie Antoinette-like preference for producing powdered whipped cream rather than government priorities like milk, cheese, poultry, or tomato sauce. His explanation was that, "I know that the government will never care enough about powdered whipped cream to fix my selling price." In his view, price regulation was worse than nationalization since having to cope with an indebted factory was worse than having no factory at all.

More general complaints revolved around the perceived imbalance in the political debate about economic policy. The older official representatives of enterprises, the Federation of Egyptian Industries and the Chambers of Commerce, are dominated by the public sector. The Minister of Industry is accountable for the

³⁵ Partnership for Productivity, 1985, volume 2, pp. 8-9 and pp. 24-26. Foda, 1982, p. 8.

performance of public sector industries, and therefore cannot play an evenhanded role in making industrial policy. In addition, administrative obstacles, frequent changes in government regulations, and the absence of coherent policy objectives on the long run role of the private sector in the economy contribute to reducing the confidence of the private sector.

Uncertainty

It is very difficult to analyze the effect of uncertainty on investment decision-making directly.³⁶ When asked to identify the factors that determine their perception of the investment climate, investors often find it difficult to specify their decision-making process. One entrepreneur summarized his approach to expectations formation as, "a process that depends on the psychology of the individual. My expectations depend on a range of things from what I read in the newspaper, to what I have for breakfast, to the complaints of the peasants on the land that I farm. The process is arbitrary and instinctive; there is no fixed formula for formulating expectations." One financier identified the price of dollars on the black market, the volume of remittances, and the rate of change of laws and institutions as important. However he noted that most

³⁶ A possible indicator of uncertainty are the price-earnings ratios of the companies listed on the Cairo and Alexandria stock exchanges. These ratios reflect the market's discounting for the effects of uncertainty about the continuity of earnings, the lack of liquidity, and the devaluation of the Egyptian pound. Foda argues that "If you have a company that has an earnings growth of 15 to 20 percent for 2-3 years, it might have multiples of 17 to 18 in the American market compared to a multiple of 5 in Egypt." Foda, 1987, p.15. However, given the extremely low turnover and unrepresentative nature of the Egyptian stock market, price-earnings ratios are not a very reliable indicator.

other investors did not use such tangible indicators (he being a London School of Economics-trained economist). Instead of asking direct questions about expectations formation, the approach taken was to focus on the defense mechanisms used by firms to cope with an uncertain environment. This will give an indication of the sources of uncertainty and the degree to which uncertainty can be hedged.

The most common defense mechanisms used by firms were various ways of hedging foreign exchange risk, not surprisingly given the variability of the exchange rate and the foreign exchange dependence of most firms. These included holding foreign exchange (domestically and abroad) and avoiding debt exposure in hard currency given the depreciating trend of the Egyptian pound. A firm faced with a debt in hard currency can take out a loan in Egyptian pounds at a low real interest rate which it then uses to buy foreign exchange on the black market. This foreign exchange then goes to immediately pay off the foreign exchange debt or to hold dollars, thereby transforming a high risk, high cost debt in dollars to a low risk, diminishing cost debt in pounds.

The cost of this policy of hedging foreign exchange risk falls mainly on the Central Bank, although the holding of foreign exchange abroad is a drain of resources to the economy as a whole. Because agents prefer to hold foreign exchange rather than Egyptian pounds as a store of value, even domestically because of the negative real interest rate on pound holdings, the authorities have reduced control over the money supply. Since private agents also avoid

debt exposure in foreign exchange, the Central Bank is effectively subsidizing the foreign exchange hedging of private agents through cheap credit in Egyptian pounds. The resulting system in which agents save in foreign exchange and borrow in LE is at the expense of the Central Bank which bears the cost of foreign exchange hedging and loses considerable leverage over the monetary regime as a result of the "dollarization" of the economy.

Most firms held stocks of input needs for periods ranging from a month to two years as a means of hedging vacillations in input supply. The strategy of holding large stocks of imported input needs is equivalent to holding foreign exchange. In addition, stocking imported inputs also hedges world inflation and future permission to import. Such a strategy was particularly important given the high degree of import dependence among many firms. The cost of this survival strategy is obviously idle resources (often foreign exchange resources since most inputs that are stored are imported) which could have been used for productive purposes in a less uncertain environment.

The next most common strategy was diversification. The high degree of vertical and multisectoral diversification observed in the sample was described previously. Diversification also takes the form of never having too much investment exposure in one project and expecting to retrieve equity invested within 2-3 years. The result is a reluctance to embark on projects which involve large investment outlay and long lead times. Vertical integration often

took the form of greater self-reliance to cope with uncertainty vis a vis domestic suppliers.

Other strategies for coping with uncertainty cited by firms were lagging implementation responses to investment opportunities. Markup pricing and oligopolistic markets also provided a mechanism for passing on changing input prices to consumers, although sometimes this process had to be phased gradually. Also, most investors also held assets in the form of traditional inflation hedges like land and real estate. Extra-legal tactics were also used such as avoiding legal establishment,³⁷ underinvoicing of imports and overinvoicing of exports as a means of avoiding high customs duties and sending capital abroad, relying on black markets for inputs in short supply, and circumventing labour legislation.³⁸

Firms found it most difficult to hedge the perceived arbitrariness of government policy. At the level of the individual firm, this type of uncertainty is addressed by cultivating government contacts through bribes, kickbacks, hiring ex-public officials as consultants and by avoiding sectors in which the government is likely to get involved. "If I can find a government employee who is willing to take a bribe, I am relieved," explains one investor. "It is the ones that are incorruptible and the changing rules of the game that are the real problems."

³⁷ This is particularly common for very small firms. Some firms would claim having less than ten employees or less than LE8000 in capital to avoid industrial regulations. Partnership for Productivity, 1985, pp. 33-34; Arthur D. Little, 1982, pp. V15-V16.

³⁸ Some firms use undocumented child labour or subcontract with outside individuals or pay workers on a daily basis so as to avoid making social insurance payments. Partnership for Productivity, 1985, pp. 33-34; Arthur D. Little, 1982, pp. V15-V16.

The additional costs of doing business caused by the need for bribery are usually passed on fully to the consumer. An additional implicit cost can result when well connected firms that have a greater ability to secure favours from the government are not necessarily the most efficient producers. The added uncertainty associated with corruption also has a negative effect on investment decision-making and may dissuade individuals who are not well-connected from investing altogether.

At the level of the private sector as a whole, the development of a number of lobby groups has been an effective strategy for coping with an uncertain policy environment. A number of private sector interest groups emerged with the *infatih*, many of which had overlapping membership. There is considerable rivalry within and between different groups such as the frequent conflict between importers and producers over protection. Between groups, the conflict tends to be between pro-laissez-faire, purely private sector *infatih* organizations like the Egyptian Businessmen's Association, the American Chamber of Commerce, the United States-Egyptian Joint Business Council, and the Banker's Association against the older, public sector-dominated Chambers of Commerce and Federation of Egyptian Industries.³⁹

It is widely agreed that the Egyptian Businessmen's Association (EBA), because of its well-connected membership, financial strength, and organizational structure is the most powerful of these lobby

³⁹ See Al-Ahram, 1987, pp. 383-384 for a description of this conflict.

groups.⁴⁰ Although the criteria for EBA membership include a minimum of ten years working as a director of a business in Egypt, a number of the members, such as ex-ministers and members of parliament, are recruited largely for political links.

EBA's thirteen action committees in areas such as industry, trade, taxes, customs, and banks meet regularly with responsible ministers to raise issues of concern and to make policy recommendations. There are three representatives from EBA on the Board of Directors of the Investment Authority and ten of the fourteen private sector representatives to a prime ministerial committee on the private sector were from EBA. In some cases, draft versions of legislation are sent to EBA for comment. This influence is not institutionalized, however, and depends a great deal on the views and personalities of the government officials involved. There also is a great deal of sensitivity evidenced by EBA's insistence on avoiding the term "lobbying" in favour of "constructive dialogue."⁴¹

The increased influence of the private sector is in part a function of its growing economic importance. However, evidence of its political power can be seen in a number of incidents. Private sector lobbying had a major effect on law 77 which served as an amendment to law 43/1974. This amendment granted more advantageous terms for repatriating profits in foreign exchange, reduced emphasis on exports and greater toleration of import substituting projects, increased tax and duty exemption rates, greater flexibility in

⁴⁰ See Al-Ahram, 1987, pp. 380-389; Zaalouk, 1982, pp. 271-320; Kandil, 1985 and 1986.

⁴¹ Interview with Director of EBA, October 1987.

foreign exchange dealings, facilities for divestment, and expanded investment opportunities.⁴²

Another example is the import rationalization committees introduced by the then Minister of Economy Mustafa Said in January 1985 in an attempt to amalgamate the commercial and own exchange markets and to establish a system of priorities for the allocation of increasingly scarce foreign exchange resources in the wake of the windfall. The private sector lobby consisting of importers, bankers, and currency dealers and speculators who opposed the decree on the grounds that the system would discriminate in favour of the public sector in allocating foreign exchange. By April 1985, the decree was abolished, Mustafa Said had resigned under a cloud of corruption allegations, and the own exchange system was reinstated.

An example with a different outcome is that of the prime ministerial committee established in 1985 in response to lobbying to provide a forum for private sector views on government policy in areas like subsidies, administrative obstacles, taxes, and customs. Critics of the committee from the left and the unions argued that it gave private investors a disproportionately strong political voice.⁴³ Eventually, the committee was abolished.

Survey Conclusions

The results of this survey give an indication of the array of factors that affect firms' decisions about investment and

⁴² Carr, 1979, pp. 46-50.

⁴³ See Kandil, 1985 and 1986.

operations. No theoretical model, much less an econometric one, could hope to capture all of the issues described above. It will be necessary to be selective and explore those issues that seem the most important and empirically viable.

There are a number of areas in which some of the standard approaches to investment modelling will have to be modified in order to be consistent with these survey findings. The historical experience of nationalization and the different origins of firms fundamentally affected the attitudes of private investors and their response to government policy. The cautious nature of private entrepreneurs was further reinforced by the irreversibility of investment decisions in an economy where a second hand market for capital goods was virtually non-existent. Expectations about the future become even more crucial when technology is putty-clay. However, the formulation of expectations becomes particularly problematic when investors have experienced a highly volatile policy environment.

The previous discussion of the range of mechanisms whereby investors attempted to hedge uncertainty gave an indication of the extent to which firms perceived the need to take precautions. Conventional macroeconomic theories of investment do not take into account how these factors affect decisions about capital formation, as will become apparent in the survey of the literature in chapter V. It is difficult to quantify and evaluate the effects of uncertainty at the aggregate level. The microeconomic results presented here provide an indication of the scale of the macroeconomic costs of firms' hedging strategies. The macroeconomic model of investment

developed for Egypt in chapter VI attempts to address the question of the effect of uncertainty by allowing for a gradual adjustment of expectations about the desired long run capital stock as agents respond to new information. The econometric testing in chapter VII allows for the effect of uncertainty through lagged behaviour in response to changes in the determinants of investment.

The fact that most markets in Egypt are not competitive in the neoclassical sense means that a theory of investment determination must take into account the implications of oligopoly. The model of mark up pricing in chapter III provides a framework for analyzing the consequences of oligopoly for investment. This model will be extended to the macroeconomic level in chapter VI and tested econometrically in chapter VII.

The minimal importance attached to the interest rate in firms' investment decision making requires a further modification of conventional theory. In a repressed financial system where the interest rate does not clear the market for credit, it is necessary to find some other indicator of the cost of capital to the firm. In the Egyptian case, credit was rationed according to a number of criteria such as reputation and collateral. The interest rate was an important factor in determining the price of borrowing for firms that had access to the financial system. However, the interest rate bore no particular relationship to the price of investment goods, an empirical question that will be considered in chapter VII.

A factor that was crucial to firms' assessment of investment costs was the exchange rate. The survey gave an indication of the degree to which investment was dependent on imports. Again, the microfoundations developed in chapter III allow for an explicit effect of the exchange rate on investment and production costs. The exchange rate will be included in the empirical estimates of investment costs in chapter VII. The effect of the real exchange rate, the price of tradables relative to nontradables, will be considered in chapter VIII in the light of the survey evidence, particularly on firms' technological choices.

Protection was found to be a crucial factor for the viability of many of the investment projects in the survey. It is difficult to assess the implications of protection in econometric work because of the absence of meaningful overall indicators of the protective structure. However, an attempt will be made to evaluate the consequences of the protective structure for the sectoral distribution of private investment in chapter VIII.

The survey results also gave an indication of the complexity of the relationship between the private and public sectors. In addition to the more conventional channels such as government deficit financing considered in the crowding out versus crowding in debate, private investment is affected by its direct production linkages and competition with public sector industry, by Central Bank credit policy, by the way in which the government chooses to use its revenues, and by the trade regime. The channels through which such government policies affect private investment are described in the

theoretical model in chapter VI. The empirical consequences of an array of government policies will be explored in chapters VII and VIII.

PART THREE: MACROECONOMICS - THEORY AND EVIDENCE

CHAPTER V

MACROECONOMIC THEORIES OF INVESTMENT

This chapter surveys the theoretical and empirical approaches to investment at the macroeconomic level. The alternative models - accelerator, flexible accelerator, neoclassical, "q", Kaleckian, Keynesian, structuralist and more eclectic models will be outlined briefly. What distinguishes these models is the determinants they choose and the assumptions they make about the context in which the investment decision is made.¹ A brief survey of some of the empirical literature on investment for both industrial and developing economies is included. This will provide the background for a model of investment determination for the Egyptian economy that will be described in chapter VI.

The Accelerator

The earliest model of aggregate investment behavior was the accelerator.² In its simplest form, the accelerator model posits that investment responds instantaneously as a constant proportion of changes in output. The "crude" or "naive" accelerator can be represented as:

¹ For more detailed surveys of the literature on investment, see Meyer and Kuh, 1957; Helliwell, 1976; Nickell, 1978; Hay and Morris, 1979; and Precious, 1987.

² The modern version of the accelerator principle stems from Samuelson's 1939 article, but the origins of the idea go back to the work of Aftalion, 1909; Bickerdike, 1914; and Clark, 1917.

$$(1) \quad I_t = K_t - K_{t-1} = a(Y_t - Y_{t-1})$$

or

$$(2) \quad I_t = \Delta K_t = a\Delta Y_t$$

where K = capital stock

Y = output

a = constant

Δ = change between period t and $t-1$.

For the crude accelerator to be valid, it is necessary to assume constant returns to scale. However, to justify the constant factor of proportionality between investment and output, it is necessary to make a further assumption to explain why relative factor prices do not matter. The most common justification is that production is characterized by fixed technological coefficients, i.e. a right-angled Leontieff production function. Technology is considered to be "clay-clay", implying that there is no factor substitution either ex ante or ex post. Alternatively, it is possible to argue that although relative factor prices do matter, they remain constant so that the unique relationship between investment and output is maintained.³ Both of these suppositions are not very plausible, especially when considering the evolution of investment over long time periods characterized by considerable changes in technology and input costs. These restrictive assumptions remain a major weakness of the crude accelerator model.

³ Under the special case where there are constant relative prices, cost minimization, and constant returns to scale, the neoclassical and accelerator models can be reconciled.

Econometric studies of the accelerator found that a more general version of the model performed considerably better. The so-called "flexible accelerator" hypothesizes that investment is a function of a distributed lag of output changes:

$$(3) I_t = K_t - K_{t-1} = a\sigma\Delta Y_t + a\sigma(1-\sigma)\Delta Y_{t-1} + a\sigma(1-\sigma)^2\Delta Y_{t-2} + \dots$$

or

$$(4) I_t = \Delta K_t = a\sigma \sum_{i=0}^{\infty} (1-\sigma)^i \Delta Y_{t-i}$$

The gradual process by which net investment responds to output changes can be explained either by factors that affect the adjustment process, such as delivery lags, or by an adaptive expectations process. However, the flexible accelerator depends on the same restrictive assumptions about technology as the crude accelerator. While the process of adjusting to the desired capital stock is more gradual, in the long run, the elasticity of the capital stock with respect to output changes is expected to be unity.⁴

4 For examples of empirical work using the accelerator and flexible accelerator models, see Eisner, 1960; Meyer and Glauber, 1963; deLeeuw, 1962; Brown, Solow, Ando, and Karenken, 1963; and Eisner, 1967. The improved fits of accelerator models owes much to the work on lags in the dynamic adjustment process by Goodwin, 1951; Chenery, 1958; and Koyck, 1954. For evidence on the debate as to the relative importance of the accelerator versus profits variables, see Kuh, 1963.

Neoclassical Investment Theory

The first challenge to the accelerator model came from Jorgenson's 1963 paper in which he developed a neoclassical model of investment behavior.⁵ Drawing on the work of Fisher,⁶ Jorgenson developed a model under the standard neoclassical assumptions of perfect functioning of all markets including those for credit, second hand capital goods, and information. Jorgenson also assumed a decreasing returns to scale production function along which capital and labour could be instantaneously and costlessly substituted. Such "putty-putty" technology allows for continuous factor substitution both ex ante and ex post.

The investment decision emerges out of the firm's maximization of its net present value as the means through which the firm supplies itself with capital services.⁷ Using the same abbreviations as those defined in chapter III, the firm's optimization problem in the neoclassical model can be expressed as the maximization of net present value defined as⁸:

5 See Jorgenson, 1963. For later elaborations, see Jorgenson, 1967 and Jorgenson and Siebert, 1968.

6 Fisher, 1930.

7 Given the difficulties with measuring a flow of capital services, neoclassical theory posits that the rate of change in the flow of capital services is proportional to the rate of acquisition of the stock of investment goods, less the rate of replacement of previously acquired investment goods. This assumption was challenged earlier by Robinson, 1953-54 and Solow, 1955-56.

8 This version of the neoclassical model is not identical to that which appears in Jorgenson but is being used because other models of investment can be readily derived from it. This version is an adaptation of that used by Bean, 1986.

$$(5) \text{ Max } \sum_{t=s}^{\infty} [f(K_{t-1}, L_t) - w_t L_t - v_t I_t] / (1+r)^{t-s}$$

subject to the accounting identity:

$$(6) \quad K_t \leq I_t + (1-\delta)K_{t-1}$$

where K_t is given and

v = purchase price of a unit of capital

δ = depreciation rate

The first order conditions for a maximum are:

$$(7) \quad f_L(K_{t-1}, L_t) = w_t$$

$$(8) \quad f_K(K_t, L_{t+1}) / (1+r)^{t-s+1} = \mu_t - (1-\delta)\mu_{t+1}$$

$$(9) \quad v_t / (1+r)^{t-s} = \mu_t$$

These conditions reflect the standard neoclassical result that an input will be used to the level at which its marginal product equals its price. The above equation (9) defines the shadow value of a unit of capital at time t . Combining equations (8) and (9),

$$(10) \quad f_K(K_t, L_{t+1}) = v_t [r + \delta - (1-\delta)(v_{t+1} - v_t) / v_t]$$

In continuous time this becomes:

$$(11) \quad f_k(K_t, L_{t+1}) = v_t[r + \delta - \underline{v}_t/v_t]$$

where an underlined variable represents the rate of change.

This relates the marginal product of capital to the "user cost of capital" which reflects the interest rate, depreciation rate, and capital gains.⁹ The user cost of capital defines the implicit rental value of capital services. The investment function that results is:

$$(12) \quad I_t = K_t^* - (1-\delta)K_{t-1}$$

where K_t^* is the level of investment that satisfies equation (11). In Jorgenson's neoclassical world, firms will invest or disinvest whenever there is a divergence between the marginal product of capital and the user cost of capital. The firm responds instantaneously to changes in relative prices so as to maintain this optimizing condition.

⁹ Keynes' original definition of the user cost of capital embodied the notion of the intensity of the use of capital goods. This notion has been lost in the contemporary definition of the user cost and has been replaced by the more readily quantifiable fixed depreciation rate over time. See Tobin, 1967, p. 156 for a discussion. Some authors have argued that since the rate of depreciation is a choice variable for the firm, economists should analyze total, rather than net, investment and treat depreciation as an endogenous variable. See Eisner, 1972; Helliwell and Glorioux, 1970.

In order to derive an investment function, Jorgenson has to make an additional assumption that interest rates move continuously over time, contrary to their observed behaviour. This is because with optimally adjusted firms and discrete changes in interest rates, there is the implausible possibility of infinitely positive or negative levels of capital stock. By making this assumption, Jorgenson can hypothesize a smooth inverse relationship between investment and interest rates.

The criticisms of Jorgenson's model focus on the assumptions that are made and the way in which the model was tested empirically. The focus here will be on the theoretical weaknesses.¹⁰ The neoclassical assumption of perfect markets is surrounded by its usual controversy. However, Jorgenson's assumption of instantaneous and costless adjustment of the capital stock and a perfect market for second hand capital goods is particularly difficult to believe. The implausibility of such an assumption in the Egyptian case was discussed in chapter IV. In addition, the assumption of putty-putty technology implies, despite Jorgenson's derivation from an intertemporal framework, that the investment process is basically static and that expectations do not matter since the capital stock the firm has at time t is independent of that at time $(t-1)$. This "myopic" character of investment decision making in Jorgenson's model results from the fact that the firm only

¹⁰ Precious provides a detailed and interesting discussion of the weaknesses in the empirical testing of the Jorgenson model. See Precious, 1987, pp. 13-15.

needs information about the present to satisfy the optimizing condition in equation (11).¹¹

Putty-Clay Models

The major feature that distinguishes the accelerator and neoclassical models of investment is the underlying assumption about technology. However, there is an alternative that lies between the fluidity of neoclassical "putty-putty" and the rigidity of accelerator "clay-clay." The more realistic assumption of "putty-clay" implies that firms' decisions about technology allow for factor substitution ex ante, but not ex post. These models capture the irreversible character of investment decisions where capital is often highly specialized.¹²

The implications of putty-clay technology for investment are that, in addition to demand, relative prices do matter to the firm both at the time the investment outlay is made and in the future since the firm is locked into its technological choice ex post. Because of the differences in ex ante and ex post factor substitutability, expectations about the future play a crucial role in investment decisions in putty-clay models. These more realistic features of putty-clay models have made them more attractive for empirical work. Also, because putty-clay models include a role for both demand and

¹¹ For a further discussion of this point, see Precious, 1987, pp. 8-15.

¹² For a detailed analysis of the implications of the irreversibility of investment decisions, see Nickell, 1978 and Precious, 1987, pp. 116-156.

relative prices, they have provided evidence on the relative importance of each.¹³

Adjustment Costs and the "Q" Theory of Investment

Adjustment costs were introduced into investment models as a way of explaining the absence of instantaneous adjustment when firms faced a divergence between the marginal product of capital and its cost.¹⁴ By introducing a wedge between the demand and supply price of a capital good in the neoclassical model, it became possible to explain the gradual process by which firms responded to changes in the incentive structure. This was especially important if neoclassical theory was to avoid the theoretical problem of having infinite levels of capital resulting from discrete changes in the rate of interest. In addition, expectations begin to matter since firms can reduce their adjustment costs by anticipated future changes. Hence the adjustment costs model posits that investment is an increasing function of the expected ratio of the demand price to the supply price of a capital good.

Conventionally, the costs of adjustment are modelled as an increasing function of the absolute value of investment, i.e. quicker adjustment imposes greater costs on the firm. Mathematically, this means that the second derivative of the cost

¹³ See Behrman, 1972 for an example of an empirical comparison of the performance of putty-putty and putty-clay models.

¹⁴ The adjustment cost literature has its origins in the work of Eisner and Strotz, 1963; Lucas, 1967; Gould, 1968; and Treadway, 1969.

function is positive or that the cost function is convex.¹⁵ Consider the neoclassical maximization problem from equation 5 with the additional assumption that firms incur adjustment costs per unit of capital defined by:

$$(13) \quad (\Phi/2)(I_t/K_{t-1})$$

The firm's optimization problem becomes:

$$(14) \quad \text{Max } \sum_{t=s}^{\infty} [f(K_{t-1}, L_t) - w_t L_t - v_t I_t - (\Phi I_t / 2 K_{t-1}) I_t] / (1+r)^{t-s}$$

subject to the accounting identity:

$$(15) \quad K_t \leq I_t + (1-\delta)K_{t-1}$$

with K_{t-1} given.

The first order conditions for a maximum are:

$$(16) \quad f_L(K_{t-1}, L_t) = w_t$$

$$(17) \quad [f_K(K_t, L_{t+1}) + (\Phi I_{t+1}^2 / 2 K_t^2)] / (1+r)^{t-s+1} = \mu_t - (1-\delta)\mu_{t+1}$$

¹⁵ This assumption is controversial. Nickell has pointed out that the assumption of strict convexity of adjustment costs implies that the firm never attains its desired level of capital stock. For a discussion, see Nickell, 1978, pp. 257-259. Also, Tobin has criticized the arbitrary nature of the assumption of strict convexity. See Tobin, 1966. Also see Precious, 1987, pp. 34-54 for a discussion.

$$(18) \quad (v_t + \Phi I_t / K_{t-1}) / (1+r)^{t-s} = \mu_t$$

Rearranging equation (18), one obtains the investment function:

$$(19) \quad I_t / K_{t-1} = (\mu_t - v_t) / \Phi$$

This shows how the rate of growth of capital is linearly related to the difference between the shadow value of capital (μ) and its purchase price (v). The smaller is the adjustment factor (Φ), the faster is the realization of the desired level of capital stock. The model collapses to Jorgenson's neoclassical version in the special case where there is costless, instantaneous adjustment of actual to desired levels of capital ($\Phi=0$).

To define the investment function in terms of observables, assume the production function $f(K,L)$ is constant returns to scale:

$$(20) \quad f(K_{t-1}, L_t) = f_L(K_{t-1}, L_t)L_s + f_K(K_{t-1}, L_t)K_{t-1}$$

Then the market value of the firm, defined as the present discounted value of profits is:

$$(21) \quad MV_s = \sum_{t=s+1}^{\infty} [f(K_{t-1}, L_t) - w_t L_t - v_t I_t - (\Phi I_t^2 / 2K_{t-1})] / (1+r)^{t-s}$$

Substituting from equations (16) and (20):

$$(22) \quad MV_s = \sum_{t=s+1}^{\infty} [K_{t-1} f_k(K_{t-1}, L_t) - v_t I_t - (\Phi I_t^2 / 2K_{t-1})] / (1+r)^{t-s}$$

Using equation (17):

$$(23) \quad MV_s = \sum_{t=s+1}^{\infty} [K_{t-1} (\mu_{t-1} - (1-\delta)\mu_t) - (v_t I_t - \Phi I_t^2 / 2K_{t-1})] / (1+r)^{t-s}$$

By equation (18):

$$(24) \quad MV_s = \sum_{t=s+1}^{\infty} [K_{t-1} (\mu_{t-1} - (1-\delta)\mu_t) - \mu_t I_t]$$

By the identity (15):

$$(25) \quad MV_s = \sum_{t=s+1}^{\infty} [K_{t-1} (\mu_{t-1} - (1-\delta)\mu_t) - \mu_t (K_t - (1-\delta)K_{t-1})]$$

$$(26) \quad MV_S = \sum_{t=s+1}^{\infty} [K_{t-1}\mu_{t-1} - K_t\mu_t]$$

and therefore,

$$(27) \quad MV_S = K_S\mu_S$$

providing that the transversality condition is satisfied:

$$(28) \quad K_t\mu_t \text{ tends to } 0 \text{ as } t \text{ tends to } \infty$$

Equation (27) states that the market value of the firm at time t is the product of its capital stock and the current shadow price of a unit of capital. Rearranging, it becomes possible to solve for the previously unobservable (μ) as the stock market valuation of a unit of capital:

$$(29) \quad \mu_S = MV_S/K_S$$

Consequently, the investment function, using equation (19) becomes:

$$(30) \quad I_t/K_t = (v_t/\Phi)q_t - 1 \text{ where } q_t = MV_t/v_tK_t$$

This describes investment as a function of the ratio of the market value of the capital stock to its replacement cost, more commonly known as Tobin's "q."¹⁶ The above derivation shows how the "q"

¹⁶ Tobin, 1971; Tobin and Brainard, 1977.

model of investment is equivalent to the neoclassical model with convex costs of adjustment. The "q" theory hypothesizes that net new investment will occur when the market valuation of capital exceeds its replacement cost ($q > 1$) at the margin.¹⁷ With a low market valuation of capital ($q < 1$), there is a decline in new investment as firms rely on old equipment instead. An attractive feature of the "q" model is that expectations are incorporated into the model through the use of stock market valuations of capital.

It is also possible partly to reconcile the "q" model with Keynes' marginal efficiency of capital schedule. Specifically, the "q" ratio can be alternatively defined as the ratio of the marginal efficiency of capital and the interest rate used to discount future earnings streams.¹⁸ Although the "q" model, or the neoclassical model with adjustment costs, captures the gradualism of investment responses to changes in the returns to and price of capital goods that Keynes described, there is an additional dimension to the Keynesian model that remains to be discussed below.

Keynesian Investment Theory and the Supply of Capital Goods

An important part of Keynes' explanation of the gradual adjustment of the capital stock to desired levels had to do with the inelastic supply schedule of the capital goods producing industry. Along

¹⁷ Some authors have argued that marginal and average "q" ratios are likely to move together since there is inertia in the economy. However, the existence of fiscal incentives for new investment can make the marginal "q" ratio greater than the average.

¹⁸ See Tobin and Brainard, 1977, p. 55. The definition of "q" given in equation (30) is more widely used since it is based on observables.

with factors like adjustment costs and the absence of efficient second hand markets for capital goods, the nature of the capital goods supply industry is an important determinant of the downward sloping marginal efficiency of capital schedule. To see how this is manifested in Keynes' approach to investment, consider the definition of the marginal efficiency of capital (ϵ) as a rate of discount such that¹⁹:

$$(31) \quad \sum_{i=0}^n R_{t+i}/(1+\epsilon)^i = SP_t$$

where R_{t+i} =expected net returns at time $t+i$

ϵ =marginal efficiency of capital

SP_t =supply price of the asset at time t

n =life of the asset

This reflects Keynes' definition of the marginal efficiency of capital as that rate of discount that would make the present value of the returns to an asset just equal to the price that would induce a manufacturer to produce an additional unit of that asset. The demand price at time t is given by:

$$(32) \quad \sum_{i=0}^n R_{t+i}/(1+r)^i = DP_t$$

where DP_t = demand price at time t

r_t = interest rate

¹⁹ The following derivation draws from Precious, 1987. Refer to pages 23-33 in Precious for a more detailed discussion.

Rather than drawing the common conclusion that investment in the Keynesian model simply occurs until the marginal efficiency of capital is equal to the interest rate, $\epsilon=r$, Precious points out the importance of looking beyond the equilibrium condition.²⁰ Consider the equilibrium condition in terms of the determinants of the demand and supply prices:

$$(33) \quad DP(g_i, r_t) = SP(g_i)$$

where g_i = quantity of new investment goods of type i
purchased by the firm

Keynes argued that the prospective yield of a capital asset will fall as its supply is increased:

$$(34) \quad dDP/dg_i < 0 \text{ and } dDP/dr_t < 0$$

and he argued that the supply function is upward sloping because of production constraints in the capital goods producing industry:

$$(35) \quad dSP/dg_i > 0.$$

The above equilibrium condition can be solved to relate the rate of interest to the rate of investment:

$$(36) \quad r_t = f(g_i)$$

²⁰ Precious, 1987, pp. 24-25.

This formulation of Keynes' model shows how the relationship between the rate of interest and the rate of investment emerges out of the interaction of demand and supply in the capital goods producing industry. Because the supply function for capital goods is upward sloping, the response of investment to a fall in the rate of interest is gradual.²¹ These supply constraints cause the divergence of the market value of the capital stock from its replacement cost ($q \neq 1$).

The importance of the Keynesian emphasis on constraints in the capital goods supply industry diminishes when the economy is open to trade. For many types of capital goods, the supply of imports is highly elastic. However, it is important to distinguish between traded capital goods, for which the supply curve is virtually horizontal, and nontraded capital goods which are inelastic in supply. Such nontraded capital goods may take the form of land and buildings or machinery that is not readily transportable. In addition, in an economy where foreign exchange is rationed, the supply of traded capital goods may also be inelastic. The empirical implications of this distinction between traded and non-traded capital goods will be analyzed in chapters VII and VIII.

Kalecki and Profits Models

Kalecki emphasized the importance of analyzing differential savings rates out of profits and wages in order to explain the determinants

²¹ Later versions of the Keynesian investment model can be found in Witte, 1963 and Haavelmo, 1960. Precious identifies and analyzes an interesting inconsistency in Witte's work. Precious, 1987, pp. 29-33.

of investment. In the neoclassical model, investment is a direct function of available savings:

$$(37) \quad I = f(sY)$$

where s = marginal propensity to save

Y = total income.

Kalecki argued that it is important to distinguish between income from profits versus that from wages:

$$(38) \quad Y = \pi + w.$$

where π = profits income

w = wage income

Because of differential savings rates between workers and capitalists:

$$(39) \quad S_T = s_\pi \pi + s_w w$$

where S_T = total savings

s_π = marginal propensity to save out of profits

s_w = marginal propensity to save out of wages.

In the simplest form of the model, Kalecki assumes a closed economy, a balanced government budget, and, most importantly, that workers consume all of their earnings and capitalists generate the only

savings in the system ($s_w=0$).²² Gross profits consist of gross investment/savings and capitalist consumption. Capitalist consumption is defined as:

$$(40) \quad C_k = A + \theta\pi$$

where C_k = capitalist consumption

A = accumulation

θ = share of capitalist income that is consumed.

Consequently, savings in the economy is defined as:

$$(41) \quad S = \pi - C_k = (1-\theta)\pi - A.$$

Knowing that ex post, savings equals investment, then

$$(42) \quad I = (1-\theta)\pi - A$$

and

$$(43) \quad \pi = \frac{I + A}{(1-\theta)}.$$

Therefore, profits are a positive function of investment and the level of investment depends solely on the capitalists' decision concerning consumption and savings. Once an investment decision is

²² Kalecki relaxes these assumptions to allow for an open economy, budgetary imbalance, and a positive savings propensity among workers that is less than that of capitalists. The conclusions are the same except the magnitudes are affected by leakages owing to the trade imbalance, government deficits or surpluses, and worker's savings.

made, it automatically generates the savings necessary to finance it and profits in the following period to finance higher capitalist consumption or further investment. In effect, Kalecki breaks the link between factor prices and factor rewards that underpins the neoclassical justification for profit as the reward for a scarce factor of production.²³

Later work by Wood develops a theory of firm investment behavior^u that builds on Kalecki's idea that the profits a firm intends to earn depend on the investment it plans to undertake. The resulting theory reflects how firms evaluate the returns to investment in light of the profits that must be generated in order to internally finance capacity expansion.²⁴ For the capitalist sector as a whole, Sylos-Labini has argued that capitalists must balance the desirability of a higher profit share with the disadvantages of squeezing the wage share to such a degree that demand falls.²⁵

Underlying Kalecki's results are a variety of assumptions about the way in which financial markets operate. In the model above, his results depend on the assumption that interest rates respond sluggishly to changes in profitability.²⁶ Once the interest rate

²³ Implicit in Kalecki's formulation is the question whether capitalists deserve a reward for postponed consumption. This question has its origins in nineteenth century capital theory's concern with why the rate of interest was positive. For the origins of the neoclassical view, see Fisher, 1930. For a discussion of Kalecki in light of the neoclassical view, see Dougherty, 1980.

²⁴ Wood, 1975.

²⁵ Sylos-Labini, 1984. However, these types of considerations are not significant at the level of the individual firm since, paraphrasing Marx, all capitalists perceive their own workers as workers and all other capitalists' workers as consumers.

²⁶ See Dougherty, 1980 for a discussion.

is made responsive, the model resembles Keynes' marginal efficiency of capital schedule or Tobin's "q" where investment depends on the difference between profitability and the cost of capital. The model also implies that, in general, workers do not become capitalists since the financing of investment must come from capitalist savings and, implicitly, the banking system will not provide an uncaptialized worker with credit. These constraints on the capital market and the resulting importance of internal financing are the key to profits becoming a crucial determinant of investment.

Structuralist Models of Investment Behavior

The focus on the structural constraints to development has its origins in the early work of Prebisch and the economists associated with him at the Economic Commission for Latin America during the 1950s and 1960s.²⁷ These writers argued that the use of conventional economic analysis was not valid in situations characterized by a dichotomy of structures. Such a dichotomy existed between the countries of the "centre" (the industrialized economies) and those of the "periphery" (the developing economies) which were characterized by large income differentials, fragmented markets, persistent disequilibrium in the balance of payments resulting from different elasticities for imports and exports, and deteriorating terms of trade. Although drawing from the Keynesian tradition of market pessimism, structuralists often focused on

²⁷ Although the origins of structuralist thinking go back much further and permeate a number of disciplines, the 1950s and 1960s are generally considered the period of classical structuralist thinking in economics.

supply, rather than demand, constraints as the causes of poor economic performance.

An important theme in structuralist thinking is that economic models must be tailored to the institutional characteristics of an economy. Consequently, presenting a general structuralist model is somewhat anathema to the spirit of the approach. A model specific to Egypt will be developed in chapter VI. For the moment, consider a modified version of a model developed by Taylor for a "typical" developing economy. Taylor assumes that prices equilibrate in some markets (flexprice) whereas output does in other markets (fixprice).²⁸ Mark up pricing prevails in markets characterized by imperfect competition. Wages are determined as a result of class conflict and savings behaviour follows that in Kalecki. Cash flow constraints mean that firms have to borrow to finance working capital; consequently interest payments enter firms' prime costs.²⁹ Inelastic demand for noncompetitive imports also makes the exchange rate an important element in firms' cost calculations.³⁰

28 The model that follows is drawn from a larger version presented in Taylor, 1987.

29 This link between interest rates and prime costs is the basis of the classical structuralist result that a monetary contraction can be stagflationary, the so-called "Cavallo effect." A reduction in the money supply results in a rise in the interest rate. This has an inflationary effect by raising the cost of production for firms. The fall in output results from upward movement along the demand schedule and the shift in assets from loans to firms toward deposits.

30 Imports consist of consumption goods which depend on demand functions, capital goods which are proportional to the level of investment, and intermediate inputs which vary with the level of output. The inelastic nature of demand for imports in developing economies undermines the theoretically beneficial effects of devaluation. This is because the "Marshall-Lerner" conditions that export elasticities must be greater than import elasticities do not hold in the short or even medium run. Devaluation raises the costs of production for firms which results in higher prices and falling output in the short run. In theory, production functions will

With oligopolistic markets, mark up pricing is used. The mark up is calculated over the prime cost of labour and imported intermediates. Per unit prime costs are defined as:

$$(44) \quad B = bw + aeP_0^*$$

where B = per unit prime cost

b = labour-output ratio

w = money wage

a = input-output coefficient for intermediates

e = exchange rate

P_0^* = world price of imported intermediates.

The overall price level is defined as:

$$(45) \quad P = (1+v)(1+\tau)(1+rj)B$$

where P = overall price level

v = rate of indirect taxation on final goods prices

τ = mark up rate over prime costs, including interest

r = nominal interest rate for firms

j = period over which prime inputs must be

financed as working capital

Because changes in costs tend to be spread over time, the above equations (44) and (45) can be written in growth rate form. Let

adjust in the long run so as to reduce the dependency on imports and obtain the conventional export gains associated with devaluation.

underlined variables refer to the rate of growth. Price inflation in the economy can then be defined as the outcome of variables that change over time such that:

$$(46) \quad \underline{P} = (\tau/(1+\tau))\underline{I} + (1-\phi)\underline{w} + \phi\underline{e}$$

Such a formulation for price inflation implies that the tax rate and interest rate are jump variables that affect the price level but not the growth rate of inflation.

To allow for imported capital goods in production, Taylor distinguishes capital that is produced domestically from that which is imported:

$$(47) \quad P_k = \theta P + (1-\theta)eP_i^*$$

where P_k = aggregate price of capital goods

P = domestic price of capital goods

e = exchange rate

P_i^* = world price of imported capital goods

Total profits are defined by:

$$(48) \quad \pi_T = \tau(1+rj)BY$$

where π_T = total profits

The profit rate (π) is:

$$(49) \quad \pi = \tau(1+rj)BY/P_k K$$

such that the profit rate is proportional to capacity use.

The factor of proportionality between the profit rate and capacity use ($u=Y/K$) is determined by the rate of indirect taxation, the mark up rate, and the real exchange rate:

$$(50) \quad \pi = \beta(v, \tau, q)u$$

where v = indirect taxation

τ = mark up rate

$q = e/p$ = real exchange rate

The partial derivatives of this relationship have the usual signs:

$$(51) \quad d\beta/dv < 0 \quad d\beta/d\tau > 0 \quad d\beta/dq < 0$$

Taylor assumes that most investment is financed by borrowing from banks or the public. The overall investment function is then:

$$(52) \quad I = [g_0(\tau) + h(\pi - (r - \underline{p}))]K$$

which, with substitution from equation (50) above becomes:

$$(53) \quad I = [g_0(\tau) + h\beta(v, \tau, q)u - h(r - \underline{p})]K$$

The first term of the above equation reflects the direct effect of the mark up, the second the rate of profitability, and the third the real interest rate.

This investment function is similar to more conventional models in its inclusion of an accelerator-like term and a real interest rate variable. However, it has several features that are characteristically structuralist such as the explicit role for mark ups, exchange rates, and interest rates as an element in prime costs. The relationship between the mark up and wage and price inflation is an important determinant of the effect of fiscal policy on growth, as evidenced by many recent stabilization efforts.³¹

Empirical Evidence

Rather than attempt to summarize the vast empirical literature on the determinants of investment, some of the major findings will be discussed to highlight the trends, weaknesses, and continuing controversies in the field. The evidence on alternative models in developed economies will be discussed only briefly since there are a number of detailed empirical surveys in the literature.³² More attention will be paid to empirical studies of investment in developing countries.

³¹ See Taylor, 1985, pp. 385-392 for an analysis of the orthodox versus the radical effects of fiscal policy in the context of mark ups and inflation. For a detailed discussion of the relationship between mark ups and inflation, see Kandir, 1987.

³² For more detailed empirical surveys, see von Furstenburg and Makiel, 1977; Rowley and Trivedi, 1975; and Nickell, 1978; Brunker, 1985; Precious, 1987.

The empirical work by Jorgenson and others on data from the United States claimed to find support for the neoclassical model.³³ For example, in their study of tax policy, Hall and Jorgenson argued that the manipulation of price variables was highly effective in changing the level, timing, and composition of investment expenditures.³⁴ However, a number of authors have criticized the way in which Jorgenson tested his model. Specifically, he used a composite term for prices and output, thereby making it impossible to distinguish between the relative effects of the neoclassical and accelerator variables on investment. Also, despite the fact that neoclassical theory implies that the firm is always optimally adjusted, he uses an ad hoc delivery lag in his regressions. There are also problems with his estimation technique resulting from autocorrelation and an endogeneity problem.³⁵

Jorgenson compared alternative models in the empirical literature in 1971 and concluded that neoclassical theory performed best, followed by the accelerator and the liquidity/profits approaches.³⁶ However, Elliot expanded Jorgenson's data set and found that the appropriate ranking of the various theories was the reverse of Jorgenson's. In a further discrediting of the neoclassical model, Clark used an expanded version of Hall and Jorgenson's data set to conclude that the simple accelerator outperformed neoclassical and "q" models.³⁷ Although Clark did not claim that prices were irrelevant to the investment decision, he argued that price effects

33 Jorgenson, 1971; Hall and Jorgenson, 1967.

34 Hall and Jorgenson, 1967. See Summers, 1981 for similar findings on the centrality of prices in investment determination.

35 See Precious, 1987, pp. 13-15 for a detailed discussion.

36 Jorgenson, 1971.

37 Clark, 1979.

are negligible in the short run relative to demand. Because of this, the response of investment to price incentives such as tax breaks may be slower and weaker than that indicated by other authors. Chirinko and Eisner's study of the efficacy of tax incentives in the context of investment functions from six major quarterly macroeconomic models for the United States found that the investment response varied considerably across models and hinged on certain fundamental and controversial assumptions.³⁸ They concluded that "one can get almost any answer one wants by making sure that the chosen model has specifications appropriate to one's purpose."³⁹

Although "q" models have been more widely used recently because of their theoretical attractiveness, their empirical performance has been fairly poor. Econometric results have been improved somewhat by including lagged values of "q," but only recently has any theoretical justification for this been given.⁴⁰ However, even with lagged values, "q" models tend to have low explanatory power. For example, Ciccolo's regressions of investment on a distributed lag of "q" values explained only 40% of the quarterly variation of the ratio of gross investment to the capital stock from 1953-73 in the United States.⁴¹

38 Chirinko and Eisner, 1983.

39 Chirinko and Eisner, 1983, p. 139.

40 In theory, only current "q" should matter to the firm's investment decision. Schiantarelli and Georgoutsos have argued that with imperfect competition, it is possible to justify using lagged "q." Schiantarelli and Georgoutsos, 1987.

41 Ciccolo, 1975.

A number of authors found a significant role for profits or internal funds in investment determination.⁴² However, authors like Eisner have argued that the accelerator tends to have greater explanatory power than profits and that when profits do have a significant role, it is as a proxy for the accelerator.⁴³ However, some evidence in favour of profits was found by Brown, Solow, Ando, and Karenken who estimated investment functions using U.S. data.⁴⁴ They obtained better results when profits were included as a right hand side variable and the accelerator was excluded. However, they, like Diamond, argued that both profits and the accelerator may have a role and that neither approach is mutually exclusive.⁴⁵ In related work, Fazzari and Mott also found a strong independent role for internal liquidity in their estimates of Kaleckian and Keynesian investment functions on U.S. data from 1970-82.⁴⁶

In general, true neoclassical models that only include price variables have had poor explanatory power. The debate about the efficacy of tax incentives in affecting investment behavior in a neoclassical framework remains controversial.⁴⁷ Models that include both prices and demand, in the putty-clay tradition, have tended to outperform both accelerator and neoclassical models.⁴⁸

42 Meyer and Kuh, 1957; Kuh, 1963, Meyer and Glauber, 1964; Anderson, 1964.

43 See Eisner, 1960.

44 Brown, Solow, Ando, and Karenken, 1963.

45 Diamond, 1962.

46 Fazzari and Mott, 1984.

47 For further evidence on the debate about tax incentives, see Helliwell, 1968; Feldstein, 1982; Hay and Morris, 1979, pp. 404-408; Hulten, 1984; Bosworth, 1985; McIntyre and Tipps, 1985. For a survey of the empirical experiences of developing countries with fiscal incentives, see Ahmed et al, 1985.

48 Eisner and Nadiri, 1968, 1970; Bischoff, 1971; Hausman, 1973. Abel, 1981, discusses the observational equivalence of a putty-putty production function with adjustment costs and a putty-clay

Output tends to have a considerably stronger effect than prices leading some authors to conclude that although prices may matter, their effect is difficult to isolate.⁴⁹ The empirical evidence on the profits versus the accelerator debate tends to find a significant independent role for internal funds as a result of credit market imperfections. Because of these unresolved controversies, some of the more recent work on investment has adopted a more eclectic approach. For example, Catinet et al use a model that includes the accelerator, relative prices, and profits as explanatory variables for investment in five European economies.⁵⁰ They find that the influence of demand is always significant, profits generally so, and that the influence of relative prices is much weaker.⁵¹

There have been relatively fewer attempts to estimate investment functions in developing economies. Most have drawn from a variety of theoretical traditions and have tried, to varying degrees, to consider the implications of various features of developing economies. In general, the flexible accelerator has been combined with either neoclassical price variables or with profits and/or various ad hoc, often country-specific, determinants. Few studies of developing economies have attempted to use "q" models since stock

production function. He suggests that in order to make an empirical distinction, it is necessary to analyze the pattern of the response to interest rate changes.

49 Hay and Morris provide a summary of this debate. Hay and Morris, 1979, pp. 389-404.

50 The authors estimate investment functions for Germany, France, the U.K., U.S., Italy, and the Netherlands. Catinet et al, 1987.

51 They also found differences in the timing of the effects: profits tend to influence investment only after a relatively long period (5-10 quarters) whereas demand and relative prices had a more rapid impact (3-7 quarters). Catinet et al, pp. 38-40.

market valuations of assets are usually not available or else are not meaningful.⁵²

Behrman's study of sectoral investment in Chile used a broadly neoclassical framework to evaluate vintage models, specifically, putty-putty versus putty-clay assumptions about technology.⁵³ His work is particularly interesting because it is one of the few to estimate sector-specific investment functions. The results indicate that overall the putty-putty model was more consistent with Chilean investment behaviour, but was the least appropriate for the two "modern" sectors of mining and manufacturing. Investment functions tended to differ across sectors, both in terms of the determinants and the lag structure.

Pinell-Siles takes a combination of the accelerator, neoclassical, and q approaches in attempting to explain the decline in the gross rate of private industrial investment from 17.3% in 1960 to 9.4% in 1976 in India. He found that much of the decline could be explained by the relatively low growth in sales and was exacerbated by a rise in effective corporate tax rates. This rise in the effective tax burden was caused by inadequate accounting depreciation provisions that failed to adjust taxable income for inflation. Even in years when the nominal tax rate on corporate income fell, such as between 1966-70, real rates actually rose because accounting provisions for depreciation failed to provide an accurate reflection of the replacement cost of capital in the

⁵² For example, in many ldc stock markets, shares are not truly traded so that quoted prices do not reflect the market valuation and expectations of future profitability.

⁵³ Behrman, 1972.

context of fairly high inflation rates.⁵⁴ Although Pinell-Siles' study has few theoretical innovations, his analysis of the Indian tax system provided a more meaningful interpretation of the econometric results. He concluded that the provision of fiscal incentives would be an important factor in revitalizing private investment in India.

Bilsborrow's work on Colombia uses elements of the flexible accelerator and profits models in a study that emphasizes the role of the internal financial structure of firms. Using time series for an aggregation of Colombian firms, he found that the availability of foreign exchange was the most important variable in explaining the annual variations in investment. The impact of foreign exchange availability was transmitted through the ability to implement investment plans, rather than affecting the decision to invest.⁵⁵ The internal flow of funds was twice as important as the accelerator in explaining annual investment. The accelerator remained significant, however, even under excess capacity, implying that underutilization had become institutionalized. The importance of cash flow effects reflected the uncertainty, informational constraints and weak capital markets faced by Colombian entrepreneurs. Bilsborrow's results for the balance sheet risk variable, defined as the ratio of current assets to current liabilities, while not statistically conclusive, indicated that the

⁵⁴ Pinell-Siles, 1979, pp. 13-14.

⁵⁵ This is evidenced by the fact that the foreign exchange variable had more explanatory power in the Colombian case as a liquidity variable (with no lag) than as an expectational variable (with a one year lag). Bilsborrow, 1977, p. 714.

internal financial position of the firm should be included as an explanatory variable in studies of investment determination.

These earlier studies by Behrman, Bilsborrow and Pinell-Siles were followed by a number of more ambitious multi-country analyses that highlighted the role of government policy in private investment determination in developing economies. Several of these studies were concerned specifically with the issue of crowding in versus crowding out. The theoretical framework adopted was sometimes ad hoc or some combination of neoclassical and accelerator models with additional variables to capture the effect of government policy.

Fry estimated investment functions for sixty-one developing countries using variables for the accelerator, relative prices, the exchange rate, and quantities of credit.⁵⁶ His estimates found significant effects on the investment ratio from the growth rate of GDP, the ratio of foreign exchange receipts to GDP, the ratio of domestic credit to GDP, the purchasing power of exports, the ratio of actual to expected prices, and the lagged investment ratio. With the inclusion of country dummies, his regressions explained 67% of the variance in investment rates between countries and over time.

Tun Wai and Wong estimated private investment functions for five countries using government investment, the change in bank credit to the private sector, and the inflow of foreign capital to the private sector as explanatory variables.⁵⁷ The econometric results

⁵⁶ Fry, 1980.

⁵⁷ Tun Wai and Wong, 1982. Although not published until 1982, this paper actually preceded that of Sundarajan and Thakur.

indicate that government investment was the most important explanatory variable for Greece, Korea, and Malaysia, whereas bank credit was critical in Thailand and foreign capital inflow in Mexico. Retained earnings were included in the regressions for Greece and Korea, the only countries for which data was available, but had an insignificant coefficient.

Sundararajan and Thakur's model of private investment behaviour for India and Korea is part of a growth model intended to measure the effects of public investment.⁵⁸ They used a combined neoclassical and flexible accelerator model with additional terms for the public sector capital stock and real savings available to the private sector (total savings minus public investment in real terms). They found significant coefficients on all the variables for India and Korea except the public sector capital stock. When the long run multipliers for public investment were calculated, the effects for India and Korea were strikingly different. For India, the effect of public investment on private capital formation was weak because of an initial strong crowding out effect that was not offset for many periods. These negative effects were blamed on the high incremental capital-output ratio in the public sector. In Korea, they found that the effect of public capital formation on private investment was unambiguously positive in the short and long run.

Blejer and Khan actually derived a model of investment in the context of the firm's optimization problem based on the flexible accelerator where government policy affects the speed of adjustment

⁵⁸ Sundararajan and Thakur, 1980.

of private investment to desired levels through a partial adjustment mechanism. Their model is subject to the criticisms of the standard flexible accelerator described above as well as the problem of consistent undershooting characteristic of partial adjustment models.⁵⁹ However, Blejer and Khan's innovation is in defining a role for government policy in an optimizing framework for investment.

Blejer and Khan hypothesized that the factors that affect the speed of adjustment to desired levels of capital are the stage of the business cycle, the availability of financing, and the level of public sector investment. They argued that it is important to distinguish between public investment in infrastructure, which is more likely to crowd in private investment, from that in other areas. However, the empirical testing of this distinction is not convincing because they use implausible proxies for infrastructure investment.⁶⁰ Their empirical results from twenty-four developing

⁵⁹ The standard partial adjustment model implies that agents incur costs for any kind of change, even a desirable one. Consequently, in a growth situation, the model results in consistent undershooting of desired capital stock. It is possible to address this deficiency by using a generalized version of the partial adjustment model, the error correction model, that will be described in chapter VI.

⁶⁰ Blejer and Khan used two different proxies for infrastructure investment: (1) a proxy based on the premise that infrastructure investments have a long gestation period and therefore the trend level of total public investment can represent infrastructure; and (2) a proxy that posits that because of its long run nature, infrastructure investment is more likely to be anticipated. There are a number of reasons why these proxies are implausible. Infrastructure investment is usually very "lumpy"; consequently the measure based on the trend level of investment may be reflecting other types of investment spending that are fairly stable over time. Similarly, expenditure on infrastructure is often unexpected since it can, by its nature, be postponed if neglect or deterioration is tolerable. Also, because public investment in infrastructure is often associated with borrowed resources from banks or donors, there

countries found an important positive effect on private investment from the degree of capacity utilization and the availability of credit. They also claim evidence in support of their position that government infrastructure investment crowds in private investment whereas other public investment crowds out private activity.

A later study of the effect of public policy on private investment in Turkey by Chhibber and van Wijnbergen followed Blejer and Khan's methodology, but used actual data on government infrastructure spending.⁶¹ They also calculated real effective interest rates that took explicit account of compensating balances. Their econometric results show significant coefficients for output, the real effective cost of borrowing, and private sector credit as a share of GNP. The other two explanatory variables tried, an index of capacity utilization and the share of infrastructure in total public investment, did not have significant coefficients. This is contrary to Blejer and Khan's findings about the positive effect of public infrastructure investment on private capital formation. They concluded that the effect of the government on private investment is complex and must be analyzed in light of a range of relevant policies including exchange rates and institutional factors such as export promotion programmes. The high rate of public investment in Turkey resulted in some inflation and a raising of real interest rates; however it also insured that the economy's adjustment effort was growth-oriented.

is likely to be even greater uncertainty in formulating expectations about future outlays.

⁶¹ Chhibber and van Wijnbergen, 1988.

Summary of the Empirical Literature

This brief survey of the empirical evidence on investment determination indicates a few trends in the literature. In the early empirical literature, the theoretical models were distinct and the econometric analysis was oriented toward proving which approach, particularly the neoclassical versus the accelerator and the accelerator versus profits models, was superior. Even for advanced economies, the empirical evidence generated conflicting results, often from the same data set over different time periods, and thus did little to clarify the theoretical controversies. Little attention was paid to the estimation techniques used and the likely multicollinearity and spurious correlations that might result from using econometric analysis on aggregate time series.⁶²

As a consequence, the lines between models began to blur and more eclectic approaches came into vogue. These more eclectic models tended to incorporate features of the flexible accelerator, neoclassical, putty-clay, and profits approaches in the econometric analysis, although this was often not very rigorously based in microeconomic or macroeconomic theory. Many studies simply produced a list of variables that were statistically correlated, often not very strongly, with investment, rather than providing an actual understanding of the decision-making process as perceived by entrepreneurs.

⁶² These are issues that will be taken up further in chapter VII.

The effect of government policy on investment determination in developing economies has begun to be analyzed only relatively recently, although most developing countries have adopted some form of investment promotion legislation that implies certain assumptions about the determinants of private capital formation.⁶³ There are a number of limitations in much of the empirical work, particularly on the issue of crowding out and crowding in in developing countries. The models are often ad hoc⁶⁴ or based on implausible assumptions like fixed factor coefficients.⁶⁵ The transmission mechanisms for public policy are poorly specified with little or no attempt to analyze the microfoundations of firm decision making. The absence of microfoundations has also made it difficult to interpret the forces, economic, institutional, or political, that underlie the econometric results. The almost exclusive focus on public investment neglects the other channels for government policy to affect private decisions. The implications of uncertainty and the effect of the government on investors' expectations in developing economies remain poorly understood. More generally, the use of multi-country studies has meant that the empirical results are often unenlightening as to what actually happened.⁶⁶

63 Lent noted that investment promotion legislation was enacted after 1950 in all but ten of the eighty-five developing countries listed in a United Nations report on investment. Lent, 1967. For studies of the use of incentives for investment promotion, also see Kahabka, 1962; Heller and Kaufman, 1963; Chen-Young, 1967; Prest, 1969 in Agarwala and Singh, 1969; Lent, in Bird and Oldham, 1975.

64 Such as in Fry, 1980 or Tun Wai and Wong, 1982.

65 Such as in Sundararajan and Thakur, 1980 or Blejer and Khan, 1984.

66 For example, Tun Wai and Wong's conclusion of crowding out in Mexico as a result of the increasing share of bank credit to the government would be enhanced by an analysis of the exchange rate regime and enormous capital flight that occurred during the period considered.

In the following chapter, an eclectic macroeconomic model of investment will be developed for Egypt based on the microfoundations in part two. The model will highlight a range of possible effects of government policy and will include an explicit expectations framework. In addition, an attempt will be made to address some of the deficiencies of the existing empirical literature described in this chapter.

CHAPTER VI

A MACROECONOMIC MODEL OF INVESTMENT BEHAVIOR FOR EGYPT

This chapter will describe a macroeconomic model of investment behavior that attempts to reflect the conditions in the Egyptian economy. The model will draw on both the microfoundations discussed in chapters III and IV and the survey of the macroeconomic literature in chapter V. At the macroeconomic level, the model has features of the putty-clay, Keynesian, Kaleckian, and structuralist approaches. However, these macroeconomic features have actually emerged from the microfoundations in chapters III and IV.

An Error Correction Approach

The process by which firms move from actual to desired levels of capital stock is hypothesized to follow an error correction mechanism. There are a number of advantages to this approach. Firstly, error correction models have proven to be useful at describing a variety of long run macroeconomic relationships.¹ Secondly, unlike the more common partial adjustment model, the error correction approach implies that firms incur no costs for changes that are planned. The partial adjustment model, in contrast, results in consistent undershooting if the economy is growing since firms incur a cost for any change, even a desirable one. Thirdly, the recent literature on cointegration provides a theoretical

¹ See Davidson, Hendry, Srba, and Yeo, 1978; Currie, 1981; Salmon, 1982; Henry and Minford, 1988.

rationale for the empirical success of error correction models.² Specifically, the error correction levels term captures the long run equilibrium relationship between variables while the differenced terms capture the dynamics. Granger established that error correction models produce cointegrating sets of variables.³ Series are said to cointegrate if some linear combination produces a stationary, or "white noise," error.

The error correction framework implies that agents adjust their behaviour as new information becomes available. For example, faced with a growing target capital stock, agents will correct for expectational errors in the last period until they reconcile their actual and desired levels. The alternative of a forward-looking rational expectations style model was judged to be inappropriate to Egypt where reliable and timely data are scarce and there is no futures or stock markets to assist agents in prediction.⁴

An error correction model provides a more realistic representation of how rational, but fallible, agents make decisions under uncertainty. Obviously, this does not capture all of the different types of uncertainty faced by firms that were described in chapter III. However, at the aggregate level, an error correction model does capture at least some aspects of uncertainty as they are manifested in changing expectations about the desired capital stock.

² Engle and Granger, 1987; Jenkinson, 1986; Dolado and Jenkinson, 1987; Giovanetti, 1987; Henry and Minford, 1988.

³ Granger, 1983.

⁴ For a discussion of some of the preconditions for a rational expectations equilibrium to emerge, see Friedman, B., 1979.

To derive an error correction model, consider the following quadratic cost or loss function:⁵

$$(1) \quad C \equiv c(I_t - I_t^*)^2 + (I_t - I_{t-1})^2$$

The firm's intertemporal optimization problem is to minimize the costs associated with adjusting to the desired capital stock over an infinite horizon. This is expressed as the minimization of costs associated with desired investment:

$$(2) \quad \text{Min } E \sum_{t=0}^{\infty} [c(I_t - I_t^*)^2 + (I_t - I_{t-1})^2].$$

The first term represents the costs incurred as a result of being out of equilibrium because of unanticipated changes. The coefficient c measures agents' conservatism or degree of risk aversity in terms of their attitude to change. If $c=0$, all changes impose a cost and the model reduces to the standard partial adjustment formulation. If $c=1$, then agents anticipate desirable changes and incur no cost in responding to them. The second term represents the cost to the firm of changing the capital stock.

Differentiating the above, an equation of the error correction form is obtained:

$$(3) \quad \Delta I_t = a_0 \Delta I_t^* + a_1 (I_{t-1} - I_{t-1}^*) + a_2 \Delta I_{t-1}$$

⁵ For other derivations of error correction models, see Nickell, S., 1985; Hendry, D.F. and T. von Ungern Sternberg, in Deaton, 1980.

This formulation implies that investment responds both to changes last period as in the partial adjustment model as well as to changes in the target, I_t^* . The levels term, $(I_{t-1} - I_{t-1}^*)$, captures the divergence from the long run equilibrium relationship caused by the costs of adjustment. This formulation also implies that if agents discount the future, the error $(I_t - I_{t-1}^*)$ will not necessarily tend asymptotically to zero. This is because the adjustment costs imposed outweigh the gains of catching up with a growing target if agents are discounting.⁶

Depreciation

In order to derive an investment function, it is necessary to define the relationship between gross investment and the stock of capital. Conventionally,

$$(4) \quad I_t = K_t + (1-\delta)K_{t-1}$$

where $\delta \equiv$ depreciation factor

The relationship between the desired level of investment and the desired capital stock is determined by the long run equilibrium relation:

$$(5) \quad I_t^* = K_t^* + (1-\delta)K_{t-1}^*$$

By applying the lag operator to equation 5 such that $LK_t = K_{t-1}$,

⁶ For a discussion, see Nickell, 1985, p. 121.

$$(6) \quad I_t^* = [1-(1-\delta)L]K_t^*$$

and in differenced form,

$$(7) \quad \Delta I_t^* = [1-(1-\delta)L]\Delta K_t^*$$

The Investment Function

To derive an investment function, it is necessary to introduce the determinants of the optimal capital stock into the error correction model. Substituting equations (6) and (7) in lagged form into equation (3):

$$(8) \quad \Delta I_t = a_0[1-(1-\delta)L]\Delta K_t^* + a_1\{I_{t-1} - [1-(1-\delta)L]K_{t-1}^*\} + a_2\Delta I_{t-1}$$

The stochastic process generating the optimal target, K^* , was defined in chapter 3 as a function of expected profits:

$$(9) \quad K_t^* = fb(\pi^e) = fb(\tau^e, \gamma^e, c^e)$$

where τ^e = expected mark up

γ^e = expected output

c^e = expected costs

Substituting equation (9) into (8), one obtains the dynamic reduced form for investment:

$$(10) \Delta I_t = a_0 b[1-(1-\delta)L] \Delta \pi_t^e(\tau^e, Y^e, C^e) +$$

$$a_1 \{I_{t-1} - b[1-(1-\delta)L] \pi_{t-1}^e(\tau_{t-1}^e, Y_{t-1}^e, C_{t-1}^e)\} + a_2 \Delta I_{t-1}$$

The above formulation is particularly advantageous because it does not require data on net investment nor on the stock of capital. It also makes it unnecessary to address the difficulties in measuring the capital stock, which stem largely from the problem of how to estimate the value of old capital goods for which no active second hand market exists.⁷

If expectations are realized, then $\pi_t^e = \pi_t$, and equation (9) takes the form:

$$(11) \Delta I_t = a_0 b[1-(1-\delta)L] \Delta \pi_t(\tau, Y, C) +$$

$$a_1 \{I_{t-1} - b[1-(1-\delta)L] \pi_{t-1}(\tau_{t-1}, Y_{t-1}, C_{t-1})\} + a_2 \Delta I_{t-1}$$

Or in simpler form,

$$(12) \Delta I_t = \beta_0 \Delta \tau_t + \beta_1 \Delta Y_t + \beta_2 \Delta C_t + a_1 (I_{t-1} - \beta_3 \tau_{t-1} - \beta_4 Y_{t-1} - \beta_5 C_{t-1}) \\ + a_2 \Delta I_{t-1}$$

⁷ A number of authors have discussed this issue. See Robinson, 1959; Fisher, 1971; Anderson, 1981; and Bean, 1981.

where

$$\beta_0 = a_0 b_0 [1 - (1 - \delta)L]$$

$$\beta_1 = a_0 b_1 [1 - (1 - \delta)L]$$

$$\beta_2 = a_0 b_2 [1 - (1 - \delta)L]$$

$$\beta_3 = b_3 [1 - (1 - \delta)L]$$

$$\beta_4 = b_4 [1 - (1 - \delta)L]$$

$$\beta_5 = b_5 [1 - (1 - \delta)L]$$

This is the relationship that will be tested econometrically in chapter VII.

Investment and Government Policy

The view that government policy should be used to alter private investment decisions implies that the pattern of capital formation that emerges as a product of the market mechanism is not perceived as optimal. In the words of Keynes, "there is no clear evidence from experience that the investment policy which is socially advantageous coincides with that which is most profitable."⁸ In order to develop effective policies, it is essential to have an understanding of the determinants of private investment in the economy. The success of government policies in changing the level or distribution of private investment must be evaluated in terms of whether the welfare gains at the margin are greater than the opportunity costs involved.

⁸ Keynes, 1949, p. 157.

In the context of the model described previously, the role of government policy operates through its effects on demand, costs, and markups. Private markups can be altered by government protection through tariffs and quotas. Recall the model of markup determination in chapter 3:

$$\tau_i = f(\alpha_i, \mu_i(\Omega_i), s_i(\Omega_i))$$

where τ_i = markup of the i th firm
 $\alpha_i = dQ/dq_i$ = rival behavior
 μ_i = price elasticity of demand
 s_i = market share
 Ω_i = rate of effective protection.

Tariffs operate through the price elasticity of demand and quotas through the firm's market share to increase the markup. Consequently, an increase in protection would be associated with higher profits and greater investment, as was found in the survey results in chapter III. Similarly, a domestic licensing system which restricts new entrants also serves to increase markups. The theoretical justification for such policies is often an "infant industries" argument that protection provides a cushion for firms in the early stages of industrialization until they can produce at world market prices. In practice, the protection is rarely removed and, with increased efficiency, the firm is able to absorb a greater share of its protection as profit. In effect, the granting of such protection operates as an economic rent provided to private firms by the government.

Government policy can affect the costs associated with investment through a number of channels. Recall from equations 3, 4 and 5 in chapter III that costs were defined as:

$$C_D = wL + (1-\Phi)P_m^D M^D + \Phi e P_m^W M^W$$

$$C_I = [(1-\theta)P_k^D + \theta e P_k^W][(\delta+r-z)(1-i)/(1-u)]I$$

where C_D = direct costs

C_I = indirect costs

w = wages

L = labour

Φ = share of imported materials

P_m^D = price of domestic materials

M^D = quantity of domestic materials

e = exchange rate

P_m^W = price of world materials

M^W = quantity of world materials

θ = share of imported capital goods

P_k^D = price of domestic capital goods

P_k^W = price of world capital goods

δ = depreciation rate

r = interest rate

i = value of investment incentives

u = rate of corporate taxation

I = investment.

One of the most common channels for government policy to affect private sector costs is through the rate of corporate taxation, u , and the value of investment incentives, i .⁹ Policies such as tax holidays and accelerated depreciation are frequently used to alter private decisions by changing the expected future tax liability associated with investment. Similarly, investment allowances or grants are a one-off reduction in the cost of capital that, if perceived as temporary, would encourage firms to place investment orders as soon as possible to take advantage of the reduction in the cost of capital.¹⁰ Accelerated depreciation allows firms to postpone some tax liabilities into the future thereby gaining from the compounded interest earned in the interim. A tax holiday is equivalent to a permanent reduction in the rate of taxation of profits over the life of an investment project. Since the basis of the tax relief differs, such policies have different incentive effects. Accelerated depreciation provides greater incentives to larger investments that are capital-intensive. Tax holidays, while neutral in terms of technological choices, generate greater returns

9 For a survey of the literature on fiscal measures and capital accumulation, see Ackley and Dini, 1959, Chase, 1962, Kahabka, 1962, Lent, 1962, Lutz, 1962, Bird, 1963, Heller and Kaufman, 1963, Musgrave, 1963, Ture, 1963, Chen-Young, 1967, Ture 1967, Helliwell, 1968, Prest, in Agarwala and Singh, ed., 1969. Further discussion is available in Hall and Jorgenson, 1967, Oldham, 1975, Summers, 1981, Summers, in Meyer, ed., 1981; Feldstein, 1982, Bosworth, 1983; OECD, 1983, Hulten, 1984, McIntyre, 1985, and Moses, 1985.

10 If investment grants are only offered for a fixed time period, then firms will order all of their capital at the last moment. Note that unlike an investment incentive that operates through the interest rate where the long run rate is what matters, it is possible to affect long run investment decisions with a short run change in costs through investment allowances. See Nickell, 1974 for a discussion.

to projects which generate considerable returns within the period of tax exemption.

In developing economies where tax administration is often weak, other types of cost-reducing policies often take on greater importance. The interest rate (r) is often used as a mechanism for investment promotion.¹¹ The rationale is that low, often negative, interest rates will result in higher levels of private investment and can be used to target capital formation toward certain sectors, regions, or social groups. In addition, governments often set interest rates at artificially low levels to reduce the costs associated with financing the fiscal deficit and/or to control inflation.

The implications of such an administered interest rate policy have been much debated in the extensive literature on financial "repression" or "shallowness."¹² In general, the consequences are an inability to mobilize savings through the formal banking system and a misallocation of investment resources.¹³ Credit is allocated according to criteria other than which project has the highest

¹¹ For evidence on the widespread use of administered interest rates in developing countries, see Galbis, 1979; Fisher, 1981; and Lanyo and Saracoglu, 1983. For an analysis of the impact of the temporary use of interest rate incentives to investment during a slump, see Nickell, 1974.

¹² McKinnon, 1973; Shaw, 1973; Jao, 1976; Abe et al, 1977; Yao, 1977; Fry, 1978; Harris, 1979; Fry, 1980; Khatkhate, 1980; Roe, 1982; Giovannini, 1983; Giovannini, 1985; Thorne, 1986.

¹³ The empirical evidence on the effects of administered interest rates and the potential gains from financial liberalization are inconclusive. Giovannini has provided evidence that savings rates are not responsive to changes in interest rates. Giovannini, 1983 and 1985. In addition, the assumption that higher interest rates will not reduce investment because of the relaxing of the credit constraint in a rationed market is also debatable.

returns. Rationing becomes particularly important in credit markets with administered prices and imperfect information as lenders try to discriminate between borrowers characterized by different degrees of risk.¹⁴ For example, in Egypt, because of tax evasion, banks often make loan decisions without access to the firm's true balance sheets.¹⁵ The reliance of financial institutions on signals, such as reputation or collateral, means that the capacity to borrow often has little to do with the project proposed. Under such circumstances, both the quantity of credit available to the private sector becomes an important determinant of investment at the aggregate level. The artificially low interest rate becomes another channel for the government to pass on a subsidy to that part of the private sector which has access to the formal financial system.

Costs to private investors can also be affected by the government's exchange rate policy. In some countries, investors are given preferential access to an overvalued exchange rate, thereby reducing the cost of imported inputs (P_K^W and P_M^W). This was true, to some extent, in Egypt prior to 1974, but thereafter the black market exchange rate was the relevant one for the private sector. In economies where there is a large public sector or where the government sets output prices, the costs associated with domestic capital goods (P_K^D) and intermediates (P_M^D) can be affected by the

14 For an analysis of rationing under imperfect information, see Stiglitz and Weiss, 1981; Akerlof, 1970; and Goodhart, 1975. For evidence from developing countries that the volume of credit available is a more important variable for investment than the rate of interest, see Leff and Sato, 1980; Fry, 1980; Wai and Wong, 1982; and Shafik and Chhibber, 1988.

15 This was discussed in chapter III.

state. This was certainly important in Egypt where public sector production of inputs such as steel, cement, and energy were often sold to the private sector at subsidized prices.¹⁶ In addition, subsidies to consumers are transmitted to private sector producers through lower wage costs. An additional channel for government to affect private costs is through the regulatory system which, if cumbersome, increases the time associated with implementing an investment project.¹⁷ If corruption is prevalent, the cost increases to the private sector operate through the bribes necessary or the political capital expended in order to obtain permits, approvals, or government services. This can work to the advantage of well-connected firms that obtain favoured treatment at the expense of their competitors.

The effect of government policy on private investment through demand has been much debated on the literature on "crowding out" versus "crowding in." The potential gains from an expansionary fiscal policy are derived from the magnitude of government spending multipliers that are hypothesized to be greater than those for the private sector. The academic debate has focused on the effects on private activity of alternative means of financing the fiscal deficit. The neutrality of fiscal policy was originally argued by Ricardo and more recently by Barro under fairly implausible assumptions.¹⁸ Monetarists have conventionally argued that the

¹⁶ See the survey results in chapter 4 for a more detailed discussion.

¹⁷ In Egypt during the mid 1970s, the procedures for establishing a new enterprise under the new investment laws required over 180 different permits and forms. Carr, 1979.

¹⁸ Barro has shown that government debt is neutral under the following conditions: (a) agents have perfect foresight, (b) private agents can lend and borrow on the same terms as the government, (c)

crowding out of private investment through higher interest rates caused by a bond-financed fiscal expansion offsets any of the short run output gains.¹⁹ "Fiscalists" have asserted that a bond-financed fiscal expansion can be more expansionary than a money financed expansion in the long run if the elasticity of demand for money is not zero.²⁰ Even under extreme classical assumptions, it has been shown that fiscal policy can have a real impact on the economy, albeit at the cost of inflation.²¹ Ultimately, the theoretical debate can only be settled by empirical evidence about the signs and magnitudes of public policy multipliers.

In discussing crowding out and crowding in it is important to distinguish between different transmission mechanisms and differing effects over the short and long run.²² Direct effects of government policy can operate through demand, such as the output gains that result from a tax cut in a Keynesian framework of underutilized capacity. In developing countries, public expenditure often constitutes a considerable share of effective demand for the indigenous private sector. In addition, there is potential complementarity between public investment and private capital formation where the provision of infrastructure and public

intergenerational transfers undermine government redistribution schemes, and (d) all taxes are lump sum. Barro, 1979. For a critique of Barro's position, see Buiter, 1980 and Buiter and Tobin, in von Furstenburg, 1979.

19 Friedman, M., 1970; Friedman, M., 1972.

20 Blinder and Solow, 1973 and Buiter, 1977.

21 Sargent and Wallace, 1981.

22 See Buiter, 1977 and Buiter, 1985 for a useful taxonomy and discussion. Buiter shows how the short run impact effect of government policy can be very different than the long run steady state effect when expectations are considered. A further taxonomy with particular emphasis on the effects of inflation and debt financing is provided by Oks, 1987, pp. 134-141.

goods increases the opportunities for the private sector, raises the productivity of capital, and raises the level of overall resource availability through growth in output and savings. An additional direct channel that is often not considered is the way in which government policy can crowd in private activity through the creation of economic rents that favour private investment. Similarly, government policy can crowd out private activity directly where supply constraints are operative. In developing economies where rationing is common, the public sector prerogative on access to inputs can be an important mechanism for crowding out.

Indirect channels for government policy operate through endogenous price variables such as interest rates, the exchange rate, and the rate of inflation. Where these prices are rigid, crowding out is manifested through rationing of credit, foreign exchange, and goods or factors of production in favour of the public sector. Crowding in is also possible through indirect channels where bonds are closer substitutes for money than they are for capital. The resulting portfolio effects as agents switch into capital reinforces the expansionary effect of a fiscal stimulus.²³ In a developing economy where assets are usually limited to money or capital, this channel for crowding in is not very relevant.

In general, whether government policy is affecting private sector markups, costs, or demand, the outcome depends crucially on timing and expectations.²⁴ If firms perceive a government policy change

²³ This crowding in effect only results in a three asset model with bonds, money and capital. See B. Friedman, 1978.

²⁴ The role of expectations and timing in investment determination is discussed by Nickell, 1974.

that raises profitability as temporary, they are likely to bring forward investments to maximize their expected returns. For example, a customs exemption for the first five years of an investment project encourages firms to bring forward their import needs. This may be a partial explanation for the observed capital intensity and over capacity in many firms established under Law 43 in Egypt that were discussed in chapter IV. Similarly, a period of import liberalization might be associated with hoarding if firms anticipate future restrictions on importation. An example would be the strategy of many Egyptian firms of stocking large supplies of imported inputs discussed in chapter IV. If the government announces an incentive that will be introduced at some future date, firms will postpone investments until that date causing a fall in current investment.

There is also a strong inertial element in government policies such that policies that were originally intended to be temporary, such as protection or subsidized interest rates, become permanent. The government is often unable to resist opposition from the private sector to reversals of these incentives. In Egypt, for example, firms have grown accustomed to tax holidays and have lobbied hard to extend the time limit. When unsuccessful, there have been cases of firms liquidating their activities and reestablishing themselves legally so as to qualify for another tax holiday. This inertia is sometimes justified on the grounds of policy stability since firms in Egypt frequently complain about the uncertainty associated with government policy. This is an important dimension of that intangible, but crucial, factor, business "confidence." These

effects of government policy are reflected econometrically through the error correction term and through the importance of lagged values in investment determination.

There is also potential asymmetry in the effect of government policy since it is usually easier to depress the level of investment than to raise it. Nickell showed that if the government implements any policies that are disincentives to investment, it will always result in firms stopping investment for a certain period.²⁵ For example, a rise in investment costs is likely to be associated with a fall in capital formation, but, as many countries have experienced, a reduction in investment costs may have little effect on private decision making. This may in part stem from offsetting effects where there is no investment response to a reduction in costs when it coincides with a demand slump and/or a squeeze on markups. These types of interaction make an analysis of the long run equilibrium relationship between the determinants of investment crucial. Econometrically, this type of interaction between investment determinants can be addressed by considering cointegration, an issue that will be considered in chapter VII.

²⁵ Nickell, 1974, pp. 253-4.

CHAPTER VII

ECONOMETRIC TESTING OF THE MACROECONOMICS OF INVESTMENT BEHAVIOR IN EGYPT

Methodology

The analysis that follows represents an attempt to combine three strands in the economic literature. The first is the vast but inconclusive theoretical debate on the determinants of investment that was summarized in chapter V. The second is the growing literature on investment in developing countries that attempts to take into explicit account the effect of government policy on private activity which were also discussed in chapter V. The third is the recent work on using cointegration and error correction models to represent equilibrium in economic time series, the theory of which was described in chapter VI.¹ These three strands will be combined to evaluate alternative models of the investment process in Egypt.

Initially, a range of standard models in the investment literature will be tested on Egyptian data. The implications of spurious correlations and the need to "de-trend" the data will be analyzed. The resulting implications for standard models of investment will be presented and compared to error correction approaches. Two different techniques for estimating the error correction model described in chapter VI will be used to evaluate the long run

¹ See Hendry, 1986; Granger, 1986; Hall, 1986; Jenkinson, 1986; Dolado and Jenkinson, 1987; Engle and Granger, 1987.

equilibrium relationship between investment and its determinants. The first will be a two stage technique proposed by Engle and Granger that involves exploring the levels relationship prior to estimating a dynamic equation.² The second technique is to use a "data-based" approach to econometric modelling that begins from an unrestricted dynamic equation.³ Both of these approaches will consider the role of government policy explicitly in the regressions.

The Data

The sample chosen for analysis, 1960-1986, was, to some extent, determined by data availability. The sample encompasses two different periods in Egypt's economic history, especially in terms of the relationship between the public and private sectors. Prior to 1974, Egypt followed an essentially statist policy, whereas after 1974 the government sought to encourage the private sector. Whether the underlying determinants of investment were stable under these two subperiods will be explored econometrically.

The data, like that in most developing countries, is limited in terms of both quantity and quality. Quarterly observations are not available for the vast majority of economic variables and methods for their estimation are sometimes shrouded in mystery.⁴

² Engle and Granger, 1987.

³ Hendry and Anderson, 1977; Davidson, Hendry, Srba and Yeo, 1978; Hendry and Mizon, 1978; Hendry and Richard, 1983; and Bean, 1981.

⁴ When asked about the availability of certain national accounts data, an official at the national statistical authority, the Central Agency for Public Mobilization and Statistics, replied, "We don't have the data, but we can fabricate it for you if you like." Interview, November 1987. For a useful description of data sources

Consequently, a number of different sources were used and cross referenced whenever possible. All of these caveats are intended only to add a touch of scepticism to what might otherwise appear as a misleadingly scientific econometric analysis. Nevertheless, while the precise magnitudes of the variables are debatable, the general trends are confirmed by the historical experience described in chapter II as well as the survey findings in chapter III.

The definitions, derivations, and sources of the variables used in the equations that follow are available in the data appendix to this chapter. A few comments concerning their definitions are made below, but the detailed derivations are provided in appendix E. All data are annual, expressed in real 1980 prices and are in logarithms.⁵ In the discussion that follows, a "D" before a variable name represents a differenced variable where the lag operator, $(1-L)$ is used. The first lag of a variable is represented by (-1) and the second lag by (-2) . The following acronyms are used:

and causes of discrepancies, see Mabro and Radwan, 1976, pp. 242-65. For a more recent discussion of the idiosyncrasies of Egyptian economic data, see Hansen, 1988.

⁵ It is conventional in the econometric literature on investment to express all variables in real prices since the investment process is perceived as a "real" phenomenon. This view was challenged by Anderson who argued for the use of nominal prices since signals are transmitted in nominal terms and it is not possible to accurately represent the process by which agents translate these signals into a real expenditure framework. However, Bean has pointed out that using a nominal framework implies that all price movements are unanticipated, whereas only divergences of actual from expected prices should matter. In a developing economy accustomed to a fairly steady rate of inflation as in Egypt, economic agents are likely to anticipate inflationary trends. Consequently, Anderson's nominal framework seems inappropriate and all variables have been expressed in real terms. For a discussion, see Anderson, 1981, p. 89 and Bean, 1981, p. 104. For a discussion of why nominal prices may matter in a hyperinflation economy, see Oks' analysis of Argentina. Oks, 1987.

PRIVI = private investment
 GDP = GDP at factor costs (non-oil)
 R = real interest rate
 R/W = real interest rate/average wage
 MARKUP = markup
 ICOSTS = relative price of investment goods
 PROFIT = profits (non oil gdp-wages-indirect taxes)
 PRVCRD = private credit
 PVCRDY = private credit/GDP
 GOVEX = aggregate government expenditure
 GOVI = government investment
 GVIINF = government investment in infrastructure
 DBFGD = domestic bank financing of the government deficit
 NIGVEX = non-investment government expenditure
 WPI = wholesale price index
 CPI = consumer price index

The choice of deflators is complicated in the Egyptian case given the existence of widespread subsidies alongside "hidden indexation" in considerable parallel markets.⁶ There are three indices available from official sources: the GDP deflator, disaggregated consumer price indices and wholesale price indices. In general in

6 For example, rents are fixed in perpetuity, but "key money", an initial one-off downpayment required to rent a dwelling, rises in response to growing demand for housing. Energy prices are also fixed below the world market price (sometimes as low as 1/5 depending on movements in world prices) except for private firms established under the new investment incentive legislation of 1974. In addition, there are black markets for a number of crucial goods that are officially price controlled, such as construction materials and certain food items.

the work that follows, variables have been deflated by fairly obvious indices - for example, GDP by the GDP deflator, interest rates by the WPI and savings by the CPI.⁷

In addition, an investment deflator was constructed using a weighted average of the investment components of the wholesale price index (domestic machinery, imported machinery, construction, and transport equipment) with variable weights based on actual shares of these inputs in total investment costs. Because the machinery component of the official WPI only includes domestically produced capital goods (which only constitute about 20% of total machinery inputs), a separate weight was given to the price of imported capital goods. This was constructed by using a price index for machinery exports of the major industrial countries multiplied by the black market exchange rate in Egypt. Thus, the exchange rate enters as an explicit determinant of investment costs in order to reflect its importance in determining the price of imports, a crucial factor for firms as discussed in the survey results in chapter IV. The resulting investment deflator was used to put private and public capital formation in real terms.

In order to test the theoretical microfoundations in chapter III and the macroeconomic model in chapter VI, empirical proxies were needed to represent profits which are a function of demand, costs and the markup. The demand proxy used is the non-oil gross domestic product. Revenues from petroleum were removed to avoid double counting since they accrued to the government and did not act

⁷ For details about the deflators used, see appendix E.

directly as a source of private demand. Instead, the effect of oil rents operated through the government budget rather than directly through the accelerator.

The effect of remittances of migrant labour on demand is ambiguous. Remittances are repatriated to Egypt either in the form of financial assets or, possibly more importantly, in kind as imports of goods. Financial remittances held in foreign exchange accounts in Egypt are invested by the banks in the Eurocurrency market and imply no net inflow of foreign exchange to Egypt, although interest income from abroad does accrue to the migrant investor and a commission is earned by the bank. Financial remittances held in LE, however, have the effect of increasing domestic credit and the country's net foreign exchange reserves. In contrast, remittances repatriated in the form of goods have a dampening effect on domestic demand since they substitute for domestic production. Consequently, GDP, rather than GNP which includes some estimate for remittances, is used here as the preferred proxy for demand.⁸

Two different representations of the cost of capital goods have been considered. Recall from chapter III on the microfoundations of investment that the cost of capital was defined as:

$$v = [(1-\theta)P_k^D + \theta e P_k^W] [(r-p+\delta-z)(1-i)/(1-u)]$$

⁸ Although the government tries to estimate the value of remittances, including those in kind, it is generally believed that the official statistics are underestimates.

Some of the terms in this theoretical representation of the cost of capital will not be considered in the empirical work for Egypt. As with most empirical analyses of investment, the effect of the rate of appreciation of capital goods (z) is neglected because of the absence of data and the fact that without an active second hand market for machinery, this capital gain cannot be readily realized. The survey results in chapter IV indicated the degree to which firms' investments were irreversible. The effect of taxation (u) and investment incentives (i) will not be included, again for lack of data as well their relative unimportance because of widespread tax evasion and the introduction of tax holidays under the infitah legislation. Data on the rate of depreciation of the capital stock are not available and the practice of using a constant rate as a proxy will have no effect on the econometric results. Although the view that depreciation is an economic variable that depends on the firm's scrapping and maintenance decisions is more attractive, it is empirically intractable in most countries.⁹

The elements of the cost of capital that will be evaluated directly will be the cost of credit, $(r-p)$ and the relative price of capital goods, $[(1-\theta)P_K^D + \theta e P_K^W]$. The cost of credit is proxied by the WPI-deflated discount rate (R) and by the relative cost of factors which is represented by the ratio of the real interest rate to the average wage in the economy (R/W). The cost of capital term does not take into account the implications of compensating balances for the

⁹ This view is presented in the work of Denison, 1974; Solow, 1963; Eisner, 1972; and Nickell, 1978. The empirical intractability stems in part from the absence of reliable data on the capital stock. For a discussion of the difficulties in measurements of the capital stock, see Robinson, 1959 and Dougherty, 1980.

effective cost of borrowing. Compensating balances are a means by which banks circumvent low administered interest rates by forcing borrowers to place deposits in non-interest bearing accounts as guarantees for loans.¹⁰ Since the practice of requiring compensating balances is not legal, there are no data available to evaluate the impact on borrowing costs.¹¹ In the absence of data in the Egyptian case, it was necessary to assume that the degree to which compensating balances respond to higher inflation is constant and therefore will have no effect on the coefficient estimates.

The relative price of capital goods is represented by the variable ICOSTS which is based on the ratio of the investment deflator to the GDP deflator. Treating the cost of investment goods separately from the cost of borrowing is desirable because it isolates the effect of neoclassical price factors from Keynesian considerations about the interaction of demand and supply in the capital goods market. In effect, the ICOSTS variable operationalizes Keynes' marginal efficiency of capital for an economy where, because of credit market imperfections, it is distinct from the interest rate. For traded capital goods, supply is highly elastic and therefore the

¹⁰ For example, a three month loan of LE 100 may require a LE20 compensating balance that earns no interest and raises what, on the surface, looks like a subsidized interest rate. Compensating balances also provide a means of distinguishing between loans that are associated with different degrees of risk, since older, safer borrowers can be charged less than others. It is also possible that compensating balances rise in periods of high inflation as banks try to maintain their margins.

¹¹ Chhibber and van Wijnbergen use a technique based on the relationship between commercial bank deposits for transactions purposes and commercial bank loans for transactions uses to access the importance of compensating balances in Turkey. The excess of deposits over uses reflects the importance of compensating balances. See Chhibber and van Wijnbergen, 1988 for a description of a technique originally proposed by Ersel and Sak, 1987.

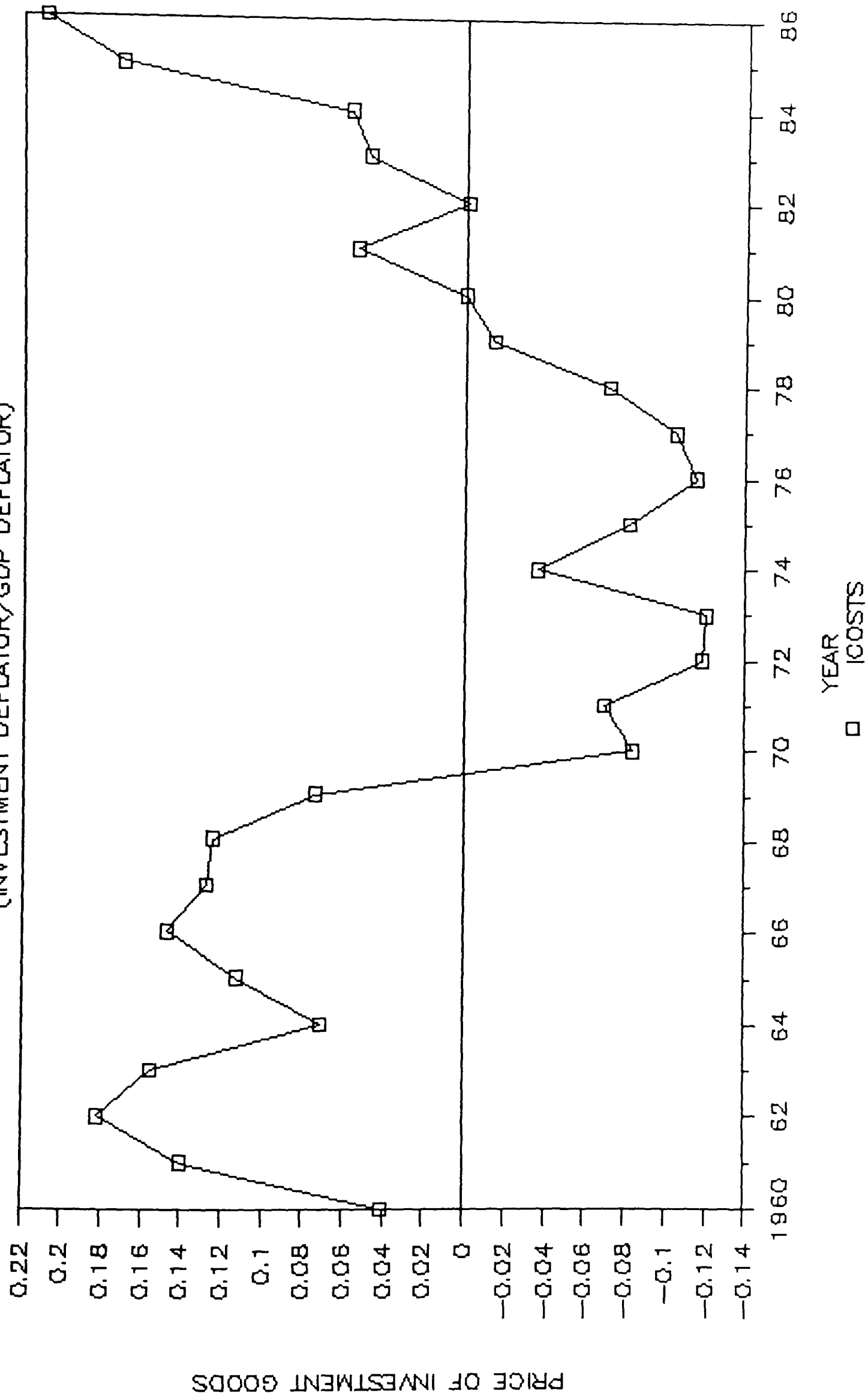
price to firms depends solely on the world price and the exchange rate. However, for nontraded capital goods, supply is more inelastic and one would expect considerable price rises in construction and land, for example, in the case of an investment boom.¹² The use of variable weights in the investment deflator also captures the effect of relative prices on changing shares of tradable and nontradable capital goods. It is hypothesized that ICOSTS is a more realistic representation of the cost of capital to the firm in a financially repressed developing economy than the neoclassical interest rate variable.

The movement of the relative cost of investment goods is depicted in figure VII-1. The downward trend in the price of investment goods after the 1967 war reflects some of the early attempts of the government to encourage private investment. Investment incentives, such as subsidies to buildings materials and machinery, and the real appreciation of the exchange rate during the oil windfall had the effect of reducing the relative cost of investment goods. This is consistent with the survey findings in chapter IV where firms, especially those established during the *infitah*, were found to be characterized by greater capital intensity. After 1980, the price of investment goods rose sharply reflecting the increasing price of both imported investment goods subject to a depreciating exchange rate and non-traded investment goods responding to growth in demand. This pattern in the movement of investment costs had important

¹² This will be explored further in chapter VIII.

Figure VII-1

RELATIVE PRICE OF INVESTMENT GOODS (INVESTMENT DEFLATOR/GDP DEFLATOR)



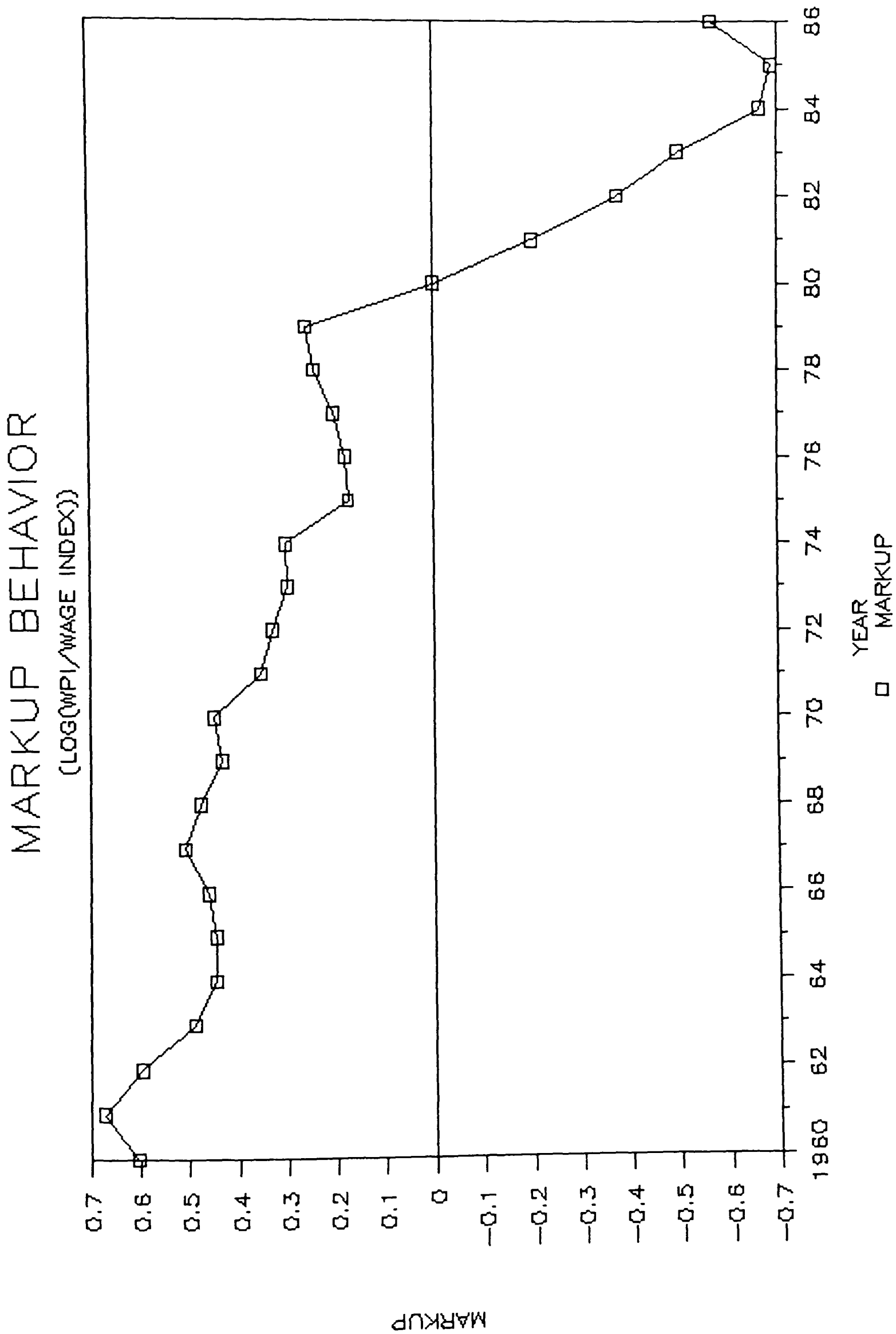
for firms' decisions about the relative shares of capital and labour factors, as will be discussed in chapter VIII.¹³

The proxy used for markups is the ratio of the wholesale price index to an index of wages in the economy. Although this proxy does not capture the complexity of mark up determination described in chapters III and IV, it does provide a crude indicator of the evolution of the profit share at the aggregate level. Figure VII-2 depicts the movement of markups over the period. Markups were relatively high during the 1960s, a pattern that coincides with the survey findings in chapter IV that, for firms that survived the nationalizations, the 1960s were a highly profitable period. Specifically, the absence of competition, subsidies to inputs, relatively low wages and considerable unsatisfied demand meant that firms were able to charge a high markup over their costs. Part of this markup can also be considered a risk premium given the highly uncertain environment in which firms were operating. The trend of markups is generally downward with an upturn during the oil boom of the late 1970s. After 1980, there is a squeeze on markups as a result of rising wages. This does not imply that markups were negative after 1980, but only that they were lower than during earlier periods.

An important factor that it has not been possible to capture econometrically is the effect of protection. The importance of securing protection, often before an investment is made, was discussed in chapter IV. However, because rates of effective

¹³ Evidence about firms' technological choices in favour of greater capital intensity was also presented in chapter IV.

Figure VII-2



protection are industry-specific, and often firm-specific, it is virtually impossible to construct a meaningful indicator of the overall protective regime and its effect on markups. Instead, the implications of protection will be considered at the sectoral level in chapter VIII.

The justification for introducing government policy variables in the econometrics is that they may affect costs, markups or demand independently of the empirical proxies used here. The channels through which government policies affect the determinants of investment were discussed at a theoretical level in chapter VI. For example, government investment in infrastructure may reduce the costs faced by firms, although it may not be reflected in the ICOSTS variable. Similarly, government borrowing on the domestic credit market may reduce credit availability to the private sector in a rationed market although it will have no effect on administered interest rates. The effect of public policy will be evaluated through both government expenditure variables and through the implications of the financing of the government deficit.

Government spending variables- aggregate government expenditure (GOVEX), government investment (GOVI), non-investment government expenditure ($\text{NIGVEX} = \text{GOVEX} - \text{GOVI}$), and public investment in infrastructure (GVIINF)- will serve as indicators of crowding out versus crowding in. The potential effects of GOVEX and/or NIGVEX may be through direct crowding in resulting from government demand for private output or positive factors that result from certain types of government expenditure, such as implicit subsidies to

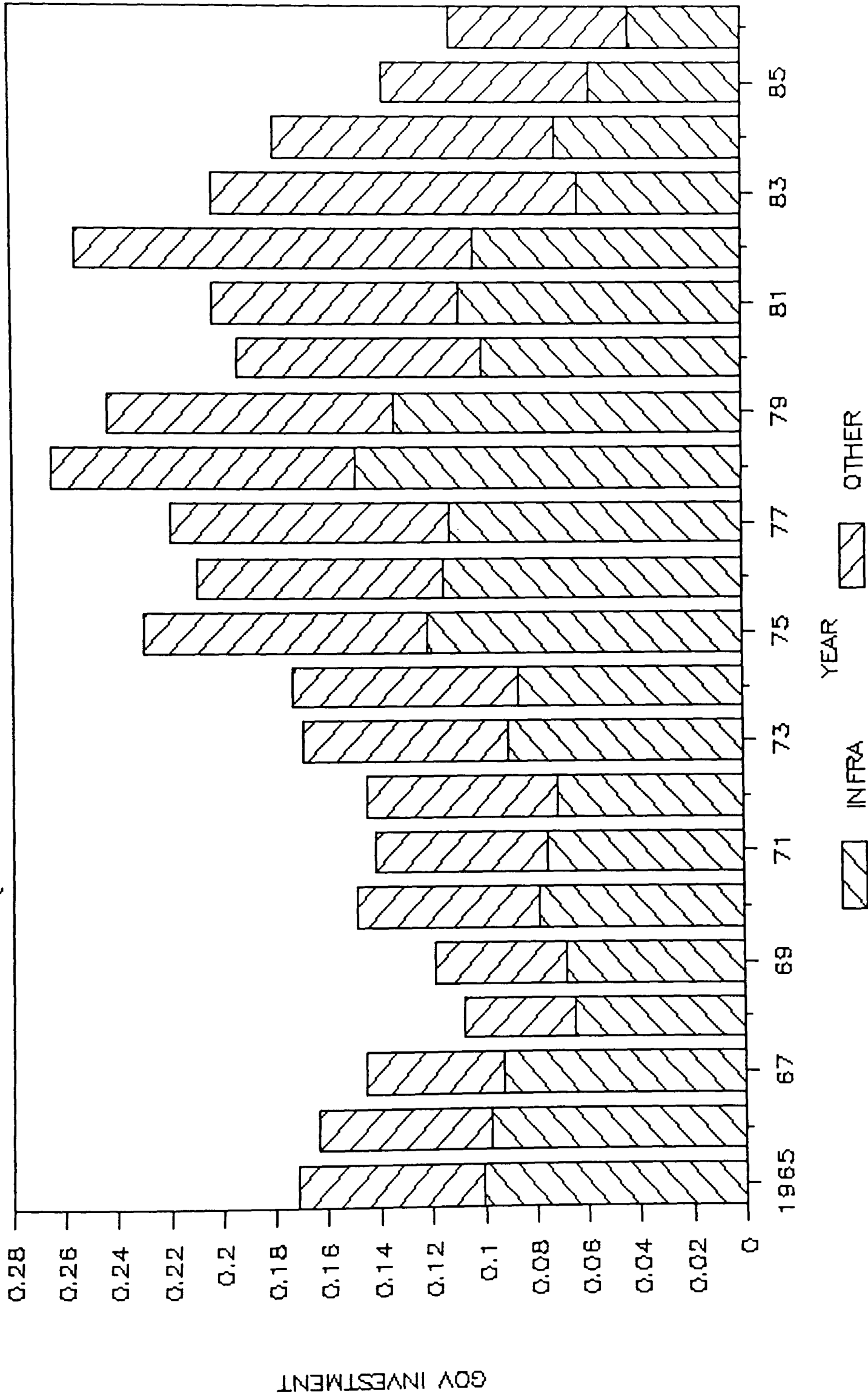
private credit. Direct crowding out may occur when government expenditure consumes resources that are in limited supply and needed by the private sector.

The variable for government investment in infrastructure is the sum of public investment in agriculture, irrigation, electricity, transport, construction and utilities.¹⁴ The evolution of government investment expenditure in infrastructure (INFRA) and in other areas is depicted in figure VII-3. There is a general decline in public investment in the wake of the 1967 war with a recovery during the windfall period of 1975-80. Aggregate investment and that in infrastructure grew as a share of GDP during the oil boom of the 1970s. The squeeze on public investment did not occur until the early 1980s and seems to have fallen disproportionately on infrastructure and industry.

In order to evaluate the potential rationing effect of government administered interest rates, quantity variables for credit will be considered in addition to the more conventional real interest rate term. The quantity of credit to the private sector, both the level (PVCRD) and as a share of GDP (PVCRDY), will be considered. The quantity of credit is likely to be important in a credit market where interest rates are subsidized, balance sheets are unreliable, and reputation is an important determinant of access to bank credit.

¹⁴ Non-infrastructure public investment was also tried as an explanatory variable but found to be insignificant. Non-infrastructure investment was defined as the residual from total investment which consisted of government investment in industry, petroleum, trade and finance, housing, and services. This in part reflects the very long lags associated with public investment in areas such as health and education services.

Figure VII-3
COMPOSITION OF GOVERNMENT INVESTMENT
(IN REAL TERMS AS A SHARE OF GDP)



In addition, the quantity of credit captures the effect of financial remittances held in LE, which may be an important factor in investment determination.

The most widely discussed mechanism for crowding out, the government deficit, will also be considered. The conventional view is that deficit financing bids up interest rates which reduces private capital formation. However, in a rationed credit market with administered prices, the effect of deficit financing will be on the quantity of credit rather than on the price. The evolution of the deficit is depicted in figure VII-4. The high levels of domestic bank financing over much of the 1972-86 period reflected both the size of the deficits and the expansionary credit policies of the time.

Some Standard Models of Investment: Empirical Testing

The standard models of investment behaviour described in chapter V are tested empirically and reported in table VII-5.¹⁵ The regressions were run in levels, as is common in much of the literature. Estimates are based on ordinary least squares except where current GDP enters in which case instrumental variables were used to avoid simultaneity problems. The models presented in the table VII-5 are stylized versions of those in the literature and are meant to be illustrative.

¹⁵ It was not possible to test the "q" model of investment because of the absence of an active stock market in Egypt.

Figure VII-4

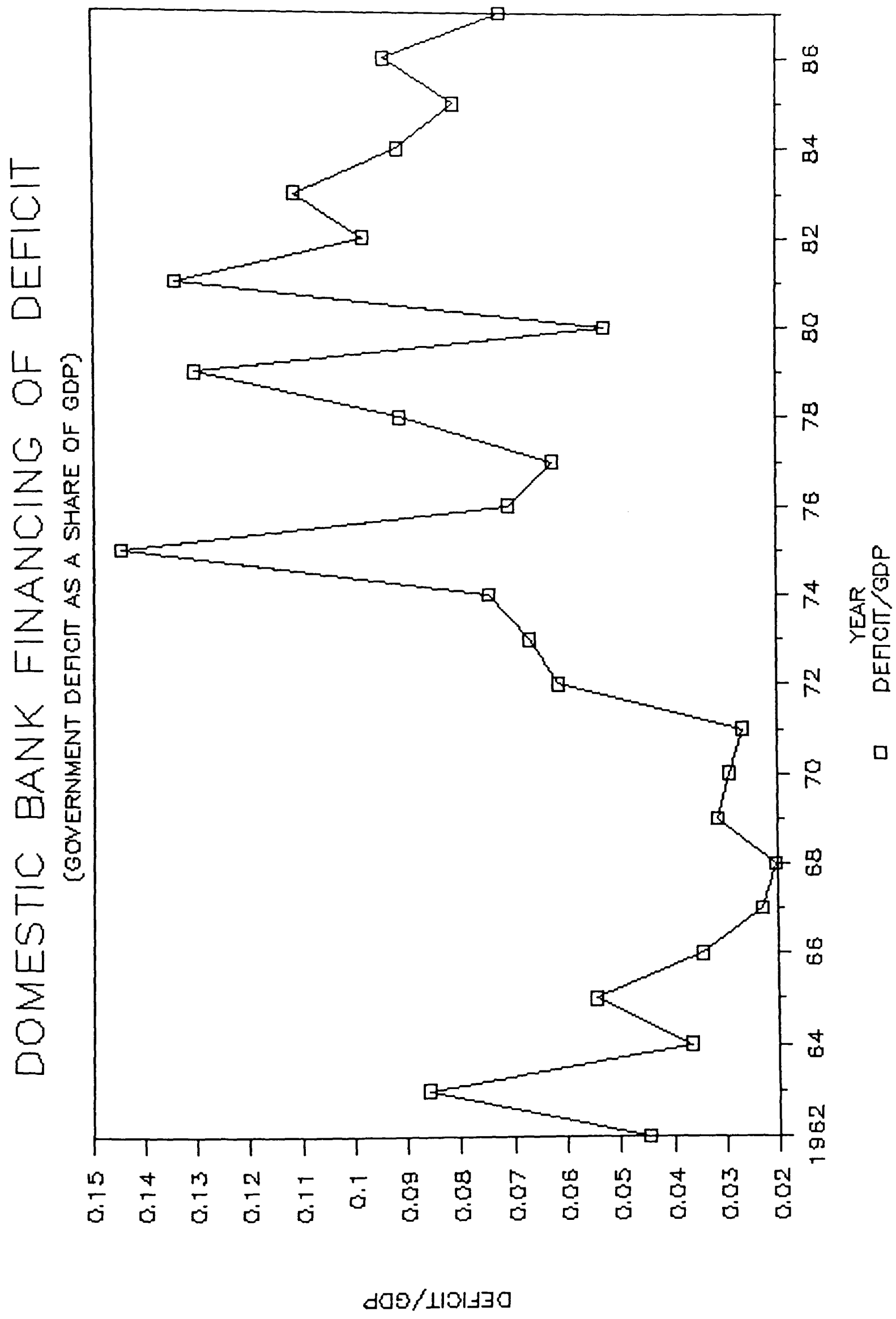


TABLE VII-5: STANDARD INVESTMENT MODELS IN LEVELS
 (DEPENDENT VARIABLE IS THE LOGARITHM OF REAL PRIVATE INVESTMENT)

	CRUDE ACCEL	FLEXIBLE ACCEL	NEO- CLASSICAL	NEO- CLASSICAL	PUTTY CLAY	PUTTY CLAY	PARTIAL ADJUST	PART ADJ PUTTY-CLAY	KALECKI	KALECKI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	-21.47 (11.38)**	-21.03 (7.56)**	5.53 (24.98)**	2.07 (3.72)**	-20.28 (9.89)**	-28.54 (5.99)**	-0.85 (0.22)	-0.75 (0.26)	-35.94 (3.45)**	-41.05 (3.09)**
GDP	2.96 (14.32)**						0.15 (0.30)			
GDP(-1)		1.96 (1.38)			2.84 (12.59)**	3.76 (6.44)**		0.14 (0.37)		
GDP(-2)		0.94 (0.47)								
GDP(-3)		0.03 (0.02)								
R			-8.09 (1.54)		-2.74 (1.40)			-0.48 (0.44)		
R/W				-9.45 (5.75)**		-0.50 (0.30)				
PROFIT									4.97 (3.96)**	3.89 (2.42)**
PROFIT(-1)										2.14 (1.19)
PROFIT(-2)										-0.43 (0.23)
PRIVI(-1)							0.92 (5.64)**	0.92 (7.43)**		
R2	0.89	0.86	0.09	0.63	0.88	0.89	0.97	0.97	0.48	0.61
R2(ADJ)	0.89	0.83	0.05	0.62	0.87	0.88	0.96	0.96	0.45	0.52
DW	0.68	0.35	0.24	1.23	0.61	0.95	1.70	1.79	0.66	0.60
F	198.97	39.36	2.37	33.04	88.27	72.45	332.84	215.72	15.68	6.86

NOTES: -FIGURES IN PARENTHESES ARE T STATISTICS.
 -ONE ASTERISK IMPLIES SIGNIFICANCE AT THE 10% LEVEL. TWO ASTERISKS IMPLY SIGNIFICANCE AT THE 5% LEVEL.

On the surface, the results reflect favourably on the standard models in the theoretical literature. The crude accelerator (equation 1) performs well with a significant coefficient on GDP and a good overall fit. The flexible accelerator (equation 2) performs less well with the inclusion of lags of GDP resulting in insignificant coefficients. The neoclassical model also performs poorly when only the real interest rate is included (equation 3), but is considerably improved by the inclusion of wages in the relative price of factors variable (equation 4). The overall fit of the neoclassical model is poor, a fairly typical result, implying that relative prices cannot tell the entire investment story.

The putty-clay equations (equations 5 and 6) are adequate, but much of the explanatory power appears to come from the accelerator term rather than the costs variables, R and R/W . The partial adjustment versions (equations 7 and 8) have very favourable test statistics for overall fit but all of the explanatory power comes from the lagged private investment term. The Kalecki model (equations 9 and 10) confirms the importance of profits in investment determination when differential savings rates and imperfect credit markets make internal financing important.

It would be easy to conclude from the results in table VII-5 that some combination of the putty-clay, profits, and partial adjustment models would produce a well-fitting investment function. However, a number of factors indicate that such a conclusion would be unjustified. Specifically, the significance of the constant term in virtually all of the regressions indicates the existence of a

trend in the data which may explain the fairly high $R^2(\text{adj})$ observed. In addition, the importance of lagged private investment, to the exclusion of all other explanatory variables, and the low Durbin-Watson statistics may be an indication of omitted variables. The evidence seems to point to the existence of spurious correlation.

Granger and Newbold recommended differencing data when spurious correlations were suspected.¹⁶ By differencing, stationarity of the time series is more likely and more meaningful parameter estimates can be obtained. The effect of simply differencing all of the variables in table VII-5 are reported in table VII-6. The results are considerably worse than the levels regressions with none of the models representing an adequate explanation of the data. Virtually all of the models have insignificant coefficients and poor overall fit.

The results in tables VII-5 and VII-6 point to the likely misspecification that can result from using regression analysis on non-stationary time series. What was interpreted as causality in a number of empirical studies of investment may simply have been a correlation between trended variables. This may be a partial explanation of the contradictory results, often from the same data, prevalent in the investment literature described in chapter V. However, simple differencing of the time series as in table VII-6 is both ad hoc and results in the loss of information about the equilibrium relationship between the levels. In order to address

¹⁶ Granger and Newbold, 1974.

TABLE VII-6: STANDARD INVESTMENT MODELS IN DIFFERENCES
 (DEPENDENT VARIABLE IS THE DIFFERENCE OF THE LOGARITHM OF REAL PRIVATE INVESTMENT)

	CRUDE ACCEL	FLEXIBLE ACCEL	NEO- CLASSICAL	NEO- CLASSICAL	PUTTY CLAY	PUTTY CLAY	PARTIAL ADJUST	PART ADJ PUTTY-CLAY	KALECKI	KALECKI
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	0.07 (0.49)	0.14 (1.66)	0.13 (3.27)**	0.16 (3.21)**	0.13 (2.22)**	0.14 (2.16)**	0.40 (0.29)	0.10 (1.53)	0.14 (2.37)**	0.12 (2.73)**
DGDP	1.12 (0.36)						-7.72 (0.21)			
DGDP(-1)		0.12 (0.16)			0.05 (0.07)	0.14 (0.16)		0.11 (0.16)		
DGDP(-2)		0.42 (0.57)								
DGDP(-3)		-0.79 (1.05)								
DR			1.14 (1.42)		1.14 (1.32)			1.22 (1.38)		
DR/W				1.14 (1.37)		1.12 (1.28)				
DPROFIT									0.17 (0.29)	0.59 (0.88)
DPROFIT(-1)										0.84 (1.15)
DPROFIT(-2)										0.71 (1.06)
DPRIVI(-1)							0.67 (0.25)	0.16 (0.76)		
R2	0.01	0.08	0.08	0.09	0.08	0.09	0.02	0.11	0.01	0.13
R2(ADJ)	-0.03	-0.07	0.04	0.04	0.00	-0.02	-0.07	-0.02	-0.06	-0.09
DW	1.99	1.75	1.68	1.40	1.65	1.36	1.95	1.90	1.60	1.34
F		0.54	2.02	1.89	0.98	0.84		0.83	0.09	0.60

NOTES: -FIGURES IN PARENTHESES ARE T STATISTICS.
 -ONE ASTERISK IMPLIES SIGNIFICANCE AT THE 10% LEVEL. TWO ASTERISKS IMPLY SIGNIFICANCE AT THE 5% LEVEL.
 -NOTE THAT NO F STATISTIC IS REPORTED FOR REGRESSIONS ESTIMATED WITH INSTRUMENTAL VARIABLES (EQUATIONS 1 AND 7).

this issue more rigorously, the broader question of testing for stationarity needs to be considered.

Testing for Stationarity: Properties of Time Series

The recent literature on cointegration responds to the problem of spurious regressions that often results from trended time series without losing important long run information as when simple differencing is done.¹⁷ The intuition behind cointegration is that if the interaction between a set of stationary, or random, variables results in a "white noise" error, there is nothing left to be explained econometrically. Series are said to be cointegrated if some linear combination of the variables achieves a stationarity error term, i.e. are $I(0)$. Cointegrated time series can be represented econometrically by an error correction mechanism; and equally, all data generated by an error correction model must be cointegrated.¹⁸ The combination of cointegration and error correction makes it possible to reflect long run equilibrium relationships along with time series dynamics.¹⁹ As discussed in chapter VI, the error correction model also provides a realistic representation of the process by which agents adapt their expectations about the desired equilibrium capital stock in response to a changing and uncertain environment.²⁰

¹⁷ For a discussion, see Hendry, 1986.

¹⁸ This result was proved by Granger, 1981 and 1983.

¹⁹ For a survey of the literature, see a special issue of the Oxford Bulletin of Economics and Statistics with articles by Hendry, 1986; Granger, 1986; Hall, 1986; Jenkinson, 1986; as well as the work by Dolado and Jenkinson, 1987; and Engle and Granger, 1987.

²⁰ Obviously, this representation of uncertainty only partly reflects the consequences of an unpredictable environment for firms which were explored in greater detail in chapter IV. However, given the limits of working at an aggregate level, the error

The first step is the analysis of the properties of time series to determine whether differencing is necessary to achieve stationarity. Dickey-Fuller (DF), Augmented Dickey-Fuller (ADF), and the Cointegrating Regression Durbin-Watson (CRDW) test proposed by Sargan and Bhargava were used to test whether variables were stationary ($I(0)$) or needed to be first differenced ($I(1)$) or second differenced ($I(2)$) to induce stationarity.²¹ The Dickey-Fuller test where the null hypothesis is a unit root ($I(1)$) takes the form:

$$\Delta X_t = \beta X_{t-1} + \sum_{j=1} \alpha_j \Delta X_{t-j} + e_t \quad \text{where } H_0: I(1).$$

Where the null hypothesis is $I(2)$, the test statistics is:

$$\Delta \Delta X_t = \beta \Delta X_{t-1} + \sum_{j=1} \alpha_j \Delta \Delta X_{t-j} + e_t \quad \text{where } H_0: I(2).$$

The test statistics is the standard "t" test on the lagged dependent variable (β). Because the test is sensitive to whether a drift (c) and/or a time trend (t) are included, it was repeated in different forms for each variable. The Augmented Dickey-Fuller test includes second and third lags of the left hand side variable to capture any additional dynamics. The critical values for the ADF test are the same as those for the DF test.²²

correction model provides an empirically tractable as well as plausible representation of the effect of changing expectations for the aggregate investment process.

²¹ Dickey and Fuller, 1979; Dickey and Fuller, 1981; and Sargan and Bhargava, 1983.

²² Engle and Granger, 1987, p. 269.

The Cointegrating Regression Durbin-Watson test is the standard Durbin-Watson statistic that results from regressing the difference of the variable on a constant when the null is $I(1)$ and the second difference on a constant when the null is $I(2)$. The need to try an array of test statistics reflects the low power of the alternative tests of stationarity.

The results of the DF, ADF and CRDW tests are presented in table VII-7. The DF and ADF tests are reported separately for regressions with only the lagged dependent variable and with the addition of a constant term (C) and with a time trend (T). The results indicate that the majority of the time series are $I(1)$. The real interest rate (R) is $I(0)$, but the relative price of factors (R/W) is $I(1)$. Government investment in infrastructure and domestic bank financing of the government deficit are clearly $I(1)$. However, the results conflict for the variables GOVEX, GOVI, and NIGOVEX. The DF and ADF tests indicate that these government spending variables are $I(1)$ whereas the CRDW tests imply that they are $I(0)$. For the moment, these variables, GOVEX, GOVI, and NIGOVEX, will be included in both estimation techniques bearing in mind their ambiguous time series properties.

The fact that the majority of the time series have unit roots is analytically convenient since stationarity is achieved by first differencing. The levels of the series can be used to express the long run equilibrium relationship by which agents are adjusting their actual to desired capital stock. Because their target

TABLE VII-7: TESTING FOR UNIT ROOTS: DICKEY-FULLER (DF), AUGMENTED DICKEY-FULLER (ADF) AND COINTEGRATING REGRESSION DURBIN-WATSON TESTS (CRDW)

VARIABLE	DF H0:I(1)	DF H0:I(2)	ADF H0:I(1)	ADF H0:I(2)	DF W/ C H0:I(1)	DF W/ C H0:I(2)	ADF W/ C H0:I(1)
PRIVI	2.85	-3.48	1.88	-2.81	-0.75	-4.30	-0.46
GDP	3.39	-3.54	2.32	-3.13	0.13	-4.81	0.82
R1	-3.83	-6.99	-3.51	-6.49	-3.75	-6.85	-3.51
R/W	0.31	-5.87	0.31	-5.30	-1.61	-6.18	-1.47
MARKUP	-0.69	-2.53	-0.80	-1.99	0.53	-2.95	0.77
ICOSTS	-0.79	-4.67	-0.78	-3.77	-0.96	-4.58	-0.85
PVCRD	2.74	-4.20	1.51	-3.54	1.22	-5.21	0.88
PVCRDY	-1.01	-5.34	-1.02	-4.79	-0.02	-5.48	0.16
GVIINF	0.19	-3.36	0.53	-2.92	-1.04	-3.26	-2.41
DBFGD	0.65	-7.65	0.36	-5.43	-1.10	-7.73	-1.11
GOVEX	2.39	-2.65	1.10	-2.04	-0.21	-2.88	-0.66
GOVI	1.53	-2.90	0.66	-2.19	-1.53	-2.80	-0.95
NIGOVEX	0.86	-4.44	0.98	-3.93	-0.71	-4.59	-0.16
CRITICAL VALUES	t=2.61				t=3.20		
	ADF W/ C H0:I(2)	DF W/ C&T H0:I(1)	DF W/ C&T H0:I(2)	ADF W/ C&T H0:I(1)	ADF W/ C&T H0:I(2)	CRDW H0:I(1)	CRDW H0:I(2)
PRIVI	-3.30	-1.75	-4.21	-1.74	-3.21	0.04	1.76
GDP	-4.44	-1.55	-4.79	-1.86	-4.89	0.05	2.00
R	-6.30	-4.00	-6.69	-3.46	-6.15	1.46	2.68
R/W	-5.29	-3.58	-5.91	-3.08	-5.39	0.49	2.59
MARKUP	-2.23	-1.32	-2.64	-1.34	-1.98	0.06	1.10
ICOSTS	-3.65	-0.60	-5.03	-0.44	-5.15	0.32	1.70
PVCRD	-4.47	-1.00	-6.24	-1.59	-5.46	0.06	2.16
PVCRDY	-5.01	-1.54	-6.11	-1.76	-5.42	0.22	2.25
GVIINF	-2.93	-0.80	-3.22	-0.71	-3.95	0.17	1.57
DBFGD	-5.84	-2.82	-8.04	-4.11	-5.67	0.33	2.87
GOVEX	-2.37	-1.58	-2.73	-2.54	-1.95	1.33	2.47
GOVI	-2.02	-0.88	-2.83	-1.20	-1.94	1.09	2.29
NIGVEX	-3.92	-1.44	-4.61	-0.74	-4.35	1.98	2.71
CRITICAL VALUES	t=2.85				CRDW=1.07		

NOTE: W/ C IS WITH A DRIFT TERM; W/ C+T IS WITH BOTH A DRIFT TERM AND A TIME TREND.

capital stock is changing over time, agents correct for their expectational errors in the levels terms.

Two different methods for estimating an error correction model with cointegrating series will be used below. The first will be a two step procedure advocated by Engle and Granger which tests for cointegration at the levels stage before considering the dynamic properties.²³ The validity of the second stage dynamic results depends on having an appropriate specification at the levels stage.

Because of the limitations of the Engle-Granger procedure and the weak power of cointegration tests, the model will also be estimated using a full dynamic version. Starting from the most general unrestricted dynamic equation possible, the model will be reparameterized until the most parsimonious version is obtained.²⁴ Some authors have argued that general dynamic modelling is superior to the Engle-Granger two stage procedure.²⁵ Rather than a desire to dive into the methodological debates between econometricians, the purpose of using two different estimation techniques here is to

²³ Engle and Granger, 1987.

²⁴ This data-based, general to specific approach to econometric modelling makes it unnecessary to impose a structure on the lag distribution, a topic that preoccupied many of the early writers on investment. See Cagan, 1956; Nerlove, 1958; Solow, 1960; de Leeuw, 1962; Eisner and Strotz, 1963; Almon, 1965; Lucas, 1967; Hall and Jorgenson, 1967; Gould, 1968; Treadway, 1969; Feldstein and Fleming, 1971; and Helliwell, 1976 for a survey.

²⁵ Jenkinson, 1987; Banerjee et al, 1987. The major problem with the Engle-Granger procedure is that the validity of the dynamic differenced results hinges crucially on the appropriateness of the first stage levels results, i.e. the equilibrium long run relationship hypothesized. With unrestricted dynamic modelling, the choice of explanatory variables is based on empirical significance. The limitation of unrestricted dynamic modelling is on the number of explanatory variables that can be included without losing degrees of freedom.

provide confirmation of the results. Hopefully, by arriving at a similar model via two different routes, the validity of the argument will be strengthened.

Cointegration testing is still at an early stage, so the results must be treated as tentative, especially given the relatively small sample size. The small number of observations limits the degree to which alternative lag structures can be explored without causing problems with degrees of freedom. It will be several decades before most developing economies have sufficient reliable data to be able to estimate these types of models with confidence. In the interim, however, economic policy must be made and it seems unwise to do it without the benefit of better econometric techniques.

Engle and Granger's Two-Step Estimator

The first stage of the Engle and Granger procedure involves exploring the levels or equilibrium part of the error correction model to establish whether the variables cointegrate. Evidence of cointegration includes an R^2 that is close to unity at the levels stage, significant coefficients²⁶, a significantly non-zero Cointegrating Regression Durbin-Watson statistic, and significant Dickey-Fuller and Augmented Dickey-Fuller tests on the residuals from the levels regression. With cointegrating variables, the

²⁶ Note that because of autocorrelation of the residuals, the "t" statistics from the levels regression are biased upwards and therefore it is not possible to assess the true significance of the coefficient estimates. However, it is possible to accept the insignificance of coefficients at the levels stage since if a variable is insignificant when "t" statistics are upwardly bias, it will certainly be insignificant for the true value of the "t" statistics.

coefficient estimates from this levels regression can be interpreted as the long run multipliers. The second stage involves running regressions using stationary time series (in this case, first differences) and including the lagged residuals from the levels regressions as an explanatory variable. This lagged residual term, $RES(-1)$, is intended to capture the error correction process as agents adjust for expectational errors in the previous period.

The first stage cointegrating levels regressions for investment are presented in table VII-8. Equation 1 represents the simplest version of the model presented in chapter VI with no explicit government policy variables. All of the variables are significant and appropriately signed and the cointegration statistics are promising. Equations 2 and 3 consider the effects of government infrastructure investment and the quantity of private credit individually and find significant coefficients for both as well as positive indications of cointegration. Equation 4 includes domestic bank financing of the government deficit (DBFGD) which is insignificant. This is consistent with the survey findings in chapter 4 that credit markets were very liquid throughout much of the period, except after the imposition of credit ceilings by the Central Bank in response to the International Monetary Fund in 1987. Firms never complained about a shortage of credit prior to the imposition of ceilings, implying that government borrowing did not crowd out the private sector through the financial system. The rationing that existed in the credit market was a result of imperfect information, not an inadequate supply of funds.

TABLE VII-8: COINTEGRATING VECTORS FOR INVESTMENT (LEVELS REGRESSIONS),

(DEPENDENT VARIABLE IS THE LOGARITHM OF REAL PRIVATE INVESTMENT)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
C	-32.54 (6.90)	-23.62 (3.36)	-29.88 (7.11)	-31.52 (5.45)	-20.59 (3.65)	-19.42 (3.59)	-9.05 (2.35)	-40.28 (5.76)	-32.66 (4.08)	-27.79 (3.22)
GDP	4.16 (8.18)	2.79 (3.03)	4.02 (9.05)	4.01 (5.96)	2.47 (2.80)	2.70 (3.88)	1.26 (2.97)	5.02 (6.56)	4.29 (5.07)	2.97 (2.62)
ICOSTS	-1.89 (3.54)	-1.14 (1.57)	-2.62 (4.96)	-1.88 (3.12)	-2.41 (4.48)	-1.94 (3.29)	-1.58 (2.43)	-2.19 (3.03)	-2.37 (3.41)	-1.79 (2.40)
MARKUP	1.23 (2.53)	0.51 (0.78)	1.72 (3.77)	1.20 (2.24)	1.53 (3.28)	1.33 (2.45)		2.20 (2.19)	1.96 (2.03)	1.20 (1.17)
R/W								1.14 (0.75)	-0.01 (0.003)	3.29 (1.99)
GVIINF		0.54 (1.79)				0.36 (1.53)	0.71 (3.39)			1.06 (2.50)
PVCRDY			0.93 (2.90)		1.17 (3.21)	1.35 (3.73)	1.00 (2.63)		0.76 (1.70)	
DBFGD				0.06 (0.39)						
GOVEX					0.63 (1.62)					
R2	0.95	0.94	0.97	0.94	0.97	0.97	0.95	0.94	0.95	0.94
R2(ADJ)	0.95	0.92	0.96	0.93	0.96	0.96	0.94	0.92	0.93	0.92
CRDW	1.53	1.40	1.47	1.46	1.45	1.80	1.24	1.27	1.23	1.25
F	151.90	64.96	152.71	82.91	103.61	94.17	89.75	65.52	58.78	35.98
DF	-3.95	-3.73	-4.06	-3.64	-3.97	-5.09	-3.85	-3.00	-3.02	-3.15
ADF(2)	-2.86	-2.08	-3.54	-2.84	-3.58	-4.17	-3.08	-2.33	-2.24	-2.06

The other government spending variables, GOVEX, GOVI, and NIGVEX, were also tried in all possible combinations and always appeared with an insignificant sign and generated no improvement in the cointegration statistics.²⁷ The only time that a government spending variable came close to being significant is GOVEX in equation 5 when it was combined with the private credit variable. In this case, aggregate government expenditure had a positive sign. Given that "t" statistics are biased upwards when positive autocorrelation exists, insignificant coefficients at the levels stage imply that these variables should be omitted. These results indicate that there is no evidence of crowding out of private investment by public expenditure at the aggregate level. In the case of government investment in infrastructure and possibly for aggregate government expenditure, there may be evidence of crowding in.

The combined effects of government investment in infrastructure and rationing in credit markets are considered in equation 6. The resulting levels equation has the best cointegration statistics as evidenced by the highly significant DF, ADF, and CRDW tests. Equation 7 illustrates the importance of the markup variable by indicating the poor performance of an equation that does not include markups. The preferability of expressing the costs of capital as a function of the cost of investment goods (ICOSTS) and quantities of credit (PVCRDY) over the more conventional factor price variable,

²⁷ This insignificance of GOVEX, GOVI, and NIGVEX also occurred when the variables were expressed in differences. The results are not reported here because, strictly speaking, if there is no long run relationship at the levels stage, one would not expect to find significant effects in the dynamics. This was consistently so for these variables.

R/W, is evidenced by equations 8 and 9. Factor costs are insignificant when they are included with ICOSTS in equation 8 and with PVCRDY in equation 9. The only case where the more conventional neoclassical representation of the cost of capital is significant is in equation 10 where it appears with a positive sign. This is not surprising in a rationed credit market where a rise in the real interest rate generates a larger quantity of credit available to investors. Consequently, the significance of R/W in equation 10 seems to be merely serving as a proxy for the quantity of credit variable, PVCRDY.

The preferred specifications from these levels results are equations 3 and 5 which include the quantity of private credit and government investment in infrastructure. The cointegration tests are favourable implying that the error is "white noise." As in the only other known application of the Engle and Granger procedure to investment by Henry and Minford for the United Kingdom, a fairly complex specification was necessary to find evidence of cointegration for investment.²⁸ This suggests that previous studies that relied on fairly simple models of the determinants of investment may have been misspecified. In a developing economy where markets are fragmented and institutional factors are crucial, the arguments for a more complex specification is even stronger. This is in contrast to other macroeconomic aggregates, such as consumption, where a relatively small number of explanatory variables are needed to explain the long run equilibrium relationship. These preferred specifications will be used for the

²⁸ Henry and Minford, 1988.

second stage of the Engle and Granger procedure to explore the dynamics of the investment process.

The differenced dynamic equations for investment are reported in table VII-9. The residuals from the levels regressions are included in lagged form, $(RES(-1))$, to capture the process by which agents adjust to prediction errors in the last period. Ideally, it would be possible to include several lags of each differenced variable and to reparameterize according to significance. However, in order to preserve degrees of freedom, only one lagged difference was included.

The results of running an unrestricted version of equation 3 from table VII-8 are reported in equation 1 of table VII-9. Reparameterizations are reported in equations 2, 3, and 4. A similar exercise that includes government investment in infrastructure is repeated in equation 5 with reparameterizations reported in equations 6, 7, and 8 of table VII-9. The reparameterizations allow the alternative lag structures to be defined by the data. In general, the variables have significant and appropriate signs and the diagnostic statistics are good.

These results of the second stage of the Engle-Granger procedure provide strong evidence of the appropriateness of an error correction framework. The lagged residuals from the levels regressions, $(RES(-1))$, which represent the equilibrium error term, are always significant, implying that an error correction mechanism exists whereby agents adjust their expectations to unanticipated

TABLE VII-9: DYNAMIC EQUATIONS FOR INVESTMENT (DIFFERENCE REGRESSIONS), 1960-86

(DEPENDENT VARIABLE IS THE DIFFERENCE OF THE LOGARITHM OF REAL PRIVATE INVESTMENT)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C	0.08 (1.41)	0.09 (1.89)*	0.08 (1.42)	0.04 (0.61)	0.05 (0.49)	0.06 (1.16)	0.01 (0.08)	-0.05 (0.86)
DGDP	1.97 (2.44)**	1.39 (2.19)**	1.34 (2.03)**	1.55 (1.77)*	1.90 (1.37)	1.61 (2.14)**	1.88 (2.64)**	2.65 (3.26)**
DGDP(-1)	-0.72 (0.88)				-0.84 (0.96)			
DICOSTS	-2.00 (2.44)**	-1.45 (1.96)*	-1.44 (1.92)*	-1.88 (2.08)**	-1.75 (1.29)	-2.11 (2.65)**	-2.20 (2.97)**	-2.68 (3.07)**
DICOSTS(-1)	0.79 (1.10)				1.32 (1.58)	1.17 (1.79)*	0.87 (1.39)	
DMARKUP	0.64 (1.12)		1.30 (2.69)**	0.9 (1.64)	0.25 (0.32)			1.01 (0.61)
DMARKUP(-1)	0.86 (1.59)	1.36 (2.93)**			0.91 (1.44)	1.11 (2.37)**	1.05 (2.41)**	
DGVIINF					0.21 (0.89)			0.11 (0.61)
DGVIINF(-1)					0.18 (0.47)	0.43 (1.82)*	0.20 (0.77)	
DPVCRDY	1.15 (3.78)**	1.16 (3.95)**	1.11 (3.84)**	0.80 (2.78)**	1.35 (4.05)**	1.10 (3.62)**	1.27 (4.26)**	1.27 (4.81)**
DPVCRDY(-1)	0.44 (1.42)	0.62 (2.54)**	0.56 (2.00)**		0.27 (0.73)			
DPRIVI(-1)	0.19 (0.86)		0.11 (0.53)	0.37 (1.76)*	0.22 (0.66)		0.33 (1.72)*	0.50 (3.11)**
RES(-1)	-0.61 (2.58)**	-0.39 (2.23)**	-0.43 (2.19)**	-0.63 (2.60)**	-0.72 (1.09)	-0.52 (1.81)*	-0.85 (2.60)**	-1.33 (4.82)**
R2	0.64	0.56	0.56	0.42	0.86	0.73	0.78	0.76
R2(ADJ)	0.39	0.41	0.38	0.22	0.62	0.57	0.63	0.62
SE	0.17	0.17	0.17	0.19	0.14	0.15	0.14	0.15
DW	1.73	1.74	1.86	1.89	2.10	1.56	1.91	1.66
F	2.53	3.77	3.14	2.16	3.61	4.54	5.00	5.43
DF	-5.14	-4.65	-5.03	-4.65	-4.78	-3.46	-4.22	-3.63
ADF(2)	-4.21	-3.88	-4.19	-4.30	-4.06	-2.43	-3.39	-3.16
CHOW		0.31		1.21		5.10	10.78	

NOTES: -NUMBERS IN PARENTHESES ARE T STATISTICS. ONE ASTERISK IMPLIES SIGNIFICANCE AT THE 10% LEVEL. TWO ASTERISKS IMPLY SIGNIFICANCE AT THE 5% LEVEL.

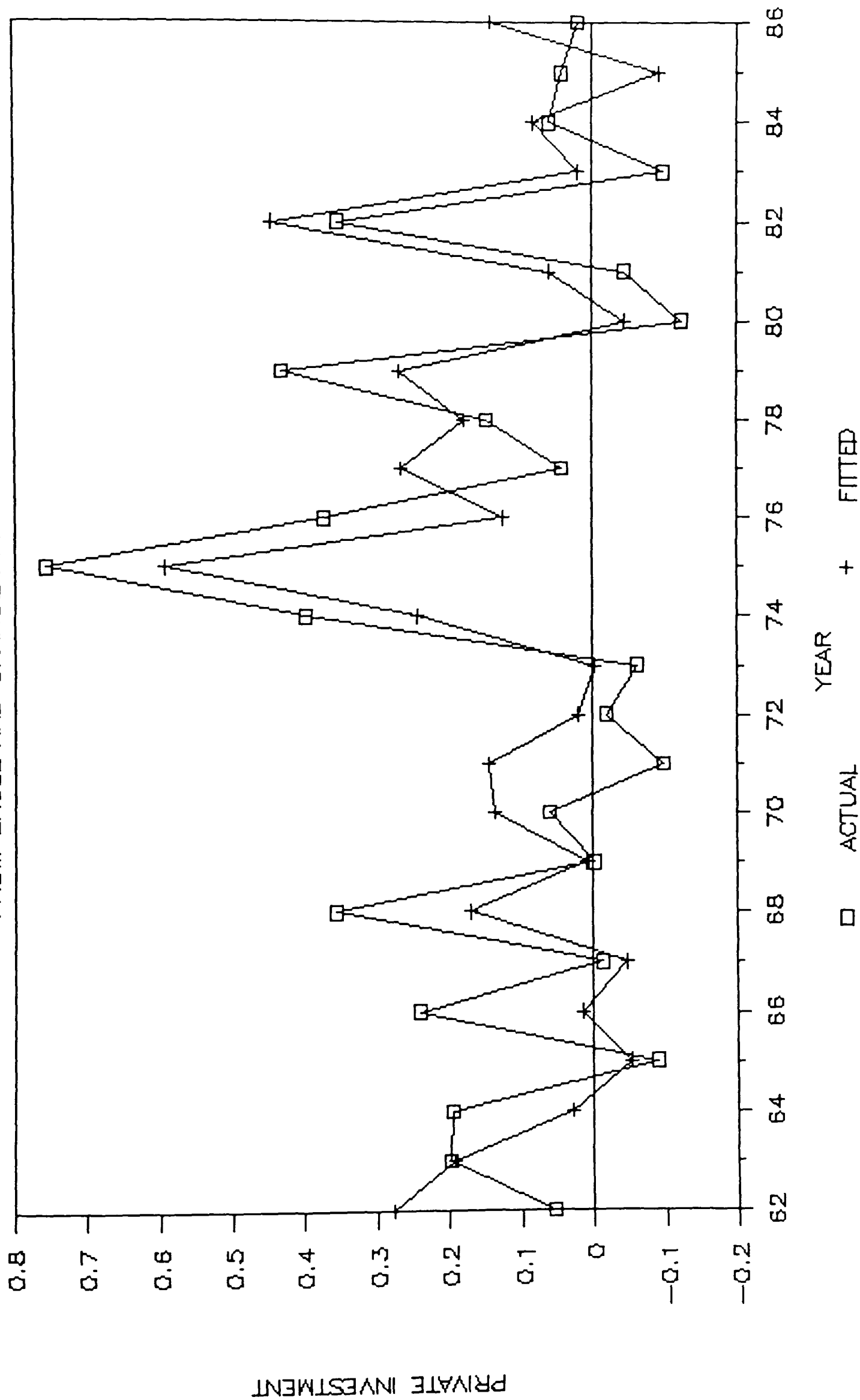
changes. This implies that the equations have a long run or equilibrium solution in the level of investment. The lagged private investment term is significant in equations 4, 7, and 8. Given the limited scope for exploring further lagged effects, it is likely that the coefficient on lagged private investment is capturing the effects of further lags of the right hand side variables that cannot be included separately in the regressions.

The overall fit of the equation is evidenced by the plot of the actual evolution of private investment and that predicted by equation 2 of figure VII-9 that appears in figure VII-10. The fitted values for private investment are very close to the actuals over the 1960-86 period. This is particularly remarkable given the array of shocks during this period- two wars, two oil shocks, and a fundamental change in economic policy orientation. Chow tests for parameter stability were constructed for the best regressions in table VII-9, equations 2, 4, 6 and 7, to test for a structural break with the introduction of the infitah reforms in 1974. The results of the Chow tests, reported in table VII-9, show considerable parameter stability for equations 2 and 4 given the shocks experienced during the period. This implies that the coefficient estimates for equations 2 and 4 in table VII-9 were not significantly different in the 1962-74 period from those in the 1975-86 period. These Chow test results are encouraging since they indicate that the underlying determinants of investment in the economy, or "deep parameters," have been adequately captured. These results from the Engle-Granger procedure will be compared with those from general dynamic modelling below.

Figure VII-10

ESTIMATED PRIVATE INVESTMENT

FROM ENGLE AND GRANGER PROCEDURE



General Dynamic Modelling

The results of the unrestricted dynamic equations are reported in table VII-11. Again, because of the limited number of observations, it is not possible to include several lags of all of the variables.²⁹ Instead, one lagged difference of each variable was included along with a lagged error correction term that reflects the relationship in the levels:

$$ecm = (y_t - \sum x_t)$$

where y_t is the left hand side variable and x_t are the right hand side variables. Although not ideal, the lagged difference includes information from two years in the past, which coincides with the survey findings that the average lag between the conception and implementation of an investment was two years. Consequently, although being able to include more lags would be desirable, given the constraint, the present approach is certainly adequate.

The results in equation 1 of table VII-11 and the resulting reparameterization in equation 2 confirm the importance of government infrastructure investment and the quantity of credit. Equations 3 and 4 consider the effects of aggregate government expenditure and find a significant positive coefficient. The results which include non-investment government expenditure (NIGVEX)

²⁹ This may be an advantage of the Engle-Granger procedure when dealing with small samples. Engle and Granger suggest estimating the simplest error correction model initially and then considering the effects of lags. Such an approach does preserve degrees of freedom, although the validity of the results hinge on having the correct specification at the first stage. Engle and Granger, 1987.

TABLE VII-11: UNRESTRICTED DYNAMIC EQUATIONS

(DEPENDENT VARIABLE IS THE LOGARITHM OF REAL PRIVATE INVESTMENT)

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
C	-1.32 (0.73)	-2.10 (2.26)**	-3.02 (2.10)**	-2.60 (2.21)**	-0.49 (1.42)	-0.42 (1.94)*	-0.96 (0.92)	-0.12 (0.67)	-0.10 (0.75)
DGDP	1.02 (1.12)	1.06 (2.15)**	2.17 (2.14)**	1.84 (2.83)**	1.56 (1.40)	1.52 (2.25)**	1.03 (0.99)	1.41 (1.63)	0.83 (1.43)
DGDP(-1)	-0.71 (0.65)		-0.33 (0.42)		0.33 (0.35)		0.08 (0.09)	0.47 (0.53)	
DICOSTS	-0.29 (0.32)		-1.32 (1.76)*	-0.84 (1.25)	0.20 (0.17)		-0.77 (0.69)	-0.68 (0.74)	
DICOSTS(-1)	1.44 (1.69)	1.00 (1.92)*	0.39 (0.53)		2.02 (1.60)	2.08 (2.35)**	0.63 (0.63)	0.43 (0.53)	
DMARKUP	-0.06 (0.08)		0.84 (1.45)		-0.07 (0.10)		0.45 (0.68)	0.44 (0.68)	
DMARKUP(-1)	0.96 (1.38)	0.88 (1.95)*	1.41 (2.55)**	1.81 (3.94)**	1.13 (1.71)	1.11 (2.30)**	0.90 (1.36)	0.87 (1.36)	0.93 (1.86)*
DGVIINF	0.36 (1.57)	0.34 (2.16)**							
DGVIINF(-1)	0.41 (1.52)	0.33 (1.84)*							
DPVCRDY	1.12 (3.64)**	1.05 (4.30)**	1.20 (4.12)**	1.26 (4.45)**	1.30 (3.48)**	1.31 (4.93)**	1.00 (2.57)**	1.07 (3.08)**	1.10 (3.67)**
DPRVCRDY(-1)	0.66 (1.87)*	0.74 (3.50)**	0.89 (3.02)**	0.77 (3.35)**	0.82 (1.66)	0.77 (2.84)**	0.65 (1.58)	0.87 (2.16)**	0.81 (2.97)**
DGOVEX			0.44 (0.92)						
DGOVEX(-1)			0.93 (1.98)*	0.68 (2.06)**					
DNIGVEX					-0.08 (0.14)				
DNIGVEX(-1)					-0.64 (1.02)	-0.57 (1.25)			
DGOVI							0.18 (0.47)		
DGOVI(-1)							0.22 (0.56)		
DPRIVI(-1)	-0.07 (0.41)		-0.16 (0.80)		-0.03 (0.14)		-0.10 (0.41)	-0.10 (0.44)	
ECM(-1)	-0.16 (0.80)	-0.25 (2.35)**	-0.29 (2.17)**	-0.25 (2.28)**	-0.17 (1.91)*	-0.16 (2.60)**	-0.11 (1.02)	-0.08 (1.38)	-0.08 (1.77)*
R2	0.85	0.83	0.82	0.72	0.75	0.74	0.58	0.54	0.50
R2(ADJ)	0.60	0.71	0.58	0.58	0.42	0.62	0.16	0.21	0.34
SE	0.15	0.13	0.15	0.15	0.17	0.14	0.20	0.19	0.18
DW	1.64	1.66	2.35	2.32	2.09	2.11	1.66	1.59	1.87
F	3.33	6.75	3.40	5.09	2.30	5.83	1.38	1.62	3.51
DF	-4.1	-4.21	-6.11	-5.91	-4.77	-4.81	-5.17	-4.73	-5.29
ADF(2)	-2.16	-2.31	-3.86	-3.92	-3.77	-3.83	-3.94	-3.55	-4.11
CHOW		1.13		2.06		1.51			2.07

NOTE: THE ECM TERM IS DEFINED AS THE DIFFERENCE IN THE LEVELS OF THE LEFT HAND SIDE AND RIGHT HAND SIDE VARIABLES.

and total government investment (GOVI), like those from the Engle-Granger estimates, always generate insignificant coefficients. Examples are reported in equations 5, 6, and 7 in table VII-11. Equation 8 reports the results of including only the PVCRDY variable along with the core model. The reparameterization in equation 9 implies that only demand and internal funds variables, i.e. output, markups and credit, matter.

An interesting feature of the results in table VII-11 is that the ICOSTS variable takes a positive sign in equations 2 and 6. This may seem paradoxical since a rise in investment costs would usually be associated with a fall in investment. However, in a highly oligopolistic market, changes in costs may not matter in the short run since they can be passed on to consumers. In addition, a rise in investment costs may be reflecting, in part, increases in aggregate demand in the short run. However, the long run effect of a rise in investment costs on private capital formation is significantly negative as evidenced by the cointegrating vectors in table VII-8.

As with the previous results, the unrestricted equations indicate the importance of government infrastructure investment and quantities of private credit, as well as a positive role for government expenditure. Again, the other government spending variables, NIGVEX and GOVI, were always insignificant. These empirical findings again point to the absence of evidence of crowding out at the macroeconomic level.

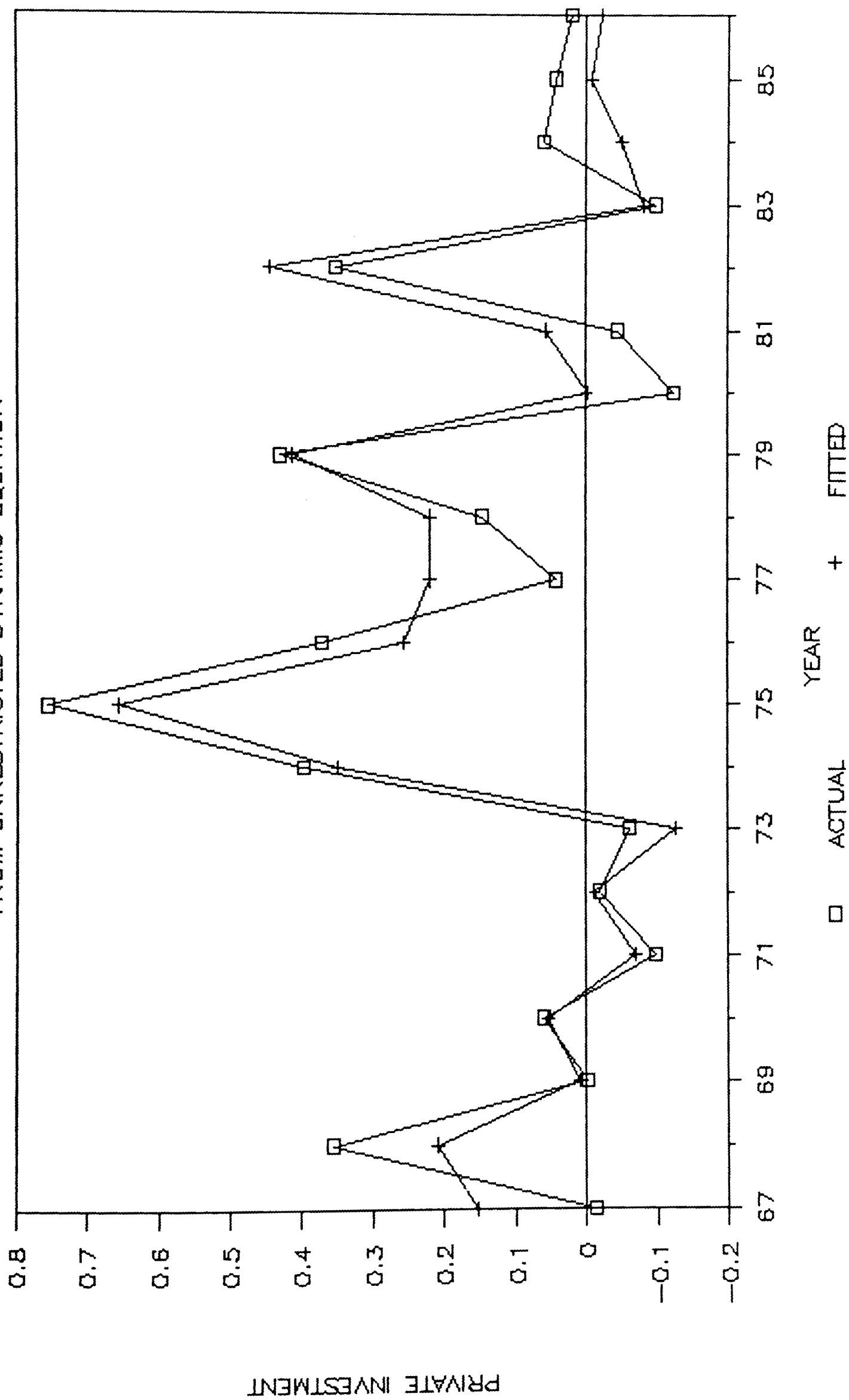
The error correction term is significant in all of the reparameterizations, lending support to the model hypothesized. The lagged private investment term is never significant although its inclusion tends to improve the diagnostic statistics. As before, this may be because of lagged variables that had to be omitted to preserve degrees of freedom. Equations 2 and 4 perform particularly well with significant coefficients and cointegration tests that indicate white noise errors. Figure VII-12 plots the actual and fitted values for private investment using equation 2 from table VII. Once again, the model fits remarkably well over the sample period. The Chow tests for a structural break at 1974 also indicate considerable parameter stability. Like the previous results from the Engle-Granger procedure, the parameter stability implied by the Chow tests is an indication that the consequences of the policy changes between the pre and post infitah periods have been captured through the economic determinants on the right hand side of the regressions. The significance of this is explored below.

An Evaluation of the Results

The best results from the Engle and Granger procedure are equations 2 and 4 in table VII-9 and for the generalized dynamic modelling equations 2 and 4 in table VII-11 perform particularly well. The diagnostic tests from both procedures are not markedly different, nor are the coefficient estimates. This may be in part because it was not possible to do justice to the unrestricted dynamic modelling because of limitations on the number of lags it was possible to

Figure VII-12

ESTIMATED PRIVATE INVESTMENT FROM UNRESTRICTED DYNAMIC EQUATION



include. Nevertheless, the plot of actual and fitted values for the unrestricted version is a slightly better representation of the data than that from the Engle-Granger procedure. Both estimates confirm the core model hypothesized in chapters III and VI which identified the role of demand, markups, and costs in investment determination. The long run multipliers in table VII-8 reveal that the accelerator has the largest impact on private capital formation, followed by investment costs and the markup. The cointegration tests indicate that these models resulted in approximately stationary error processes at the first stage and white noise errors in the second.

The two stage and the unrestricted dynamic modelling provide strong evidence on the crucial role of the quantity of credit. The long run coefficient for PVCRDY is approximately unity from table VII-8. The more Keynesian ICOSTS variable consistently outperformed the neoclassical interest rate variables, R and R/W . This is because the ICOSTS variable takes into explicit account the interaction of demand and supply in the capital goods market and includes the important distinction between tradable and non-tradable capital goods thereby providing a more realistic measure of the user cost of capital. The combination of the ICOSTS variable and PVCRDY provides a much better measure of the cost of capital to the firm in a repressed financial system than the neoclassical interest rate.³⁰

The insignificant effect of interest rates on investment has been a common and often problematic finding in much empirical work. A number of explanations have been proposed in the literature to

³⁰ This is also consistent with the survey findings in chapter IV.

explain why it is not possible to obtain a significant coefficient for the cost of funds when in theory the interest rate should be a crucial variable. These include uncertainty about internal rates of return, unsophisticated investment decision procedures, the long time frame of investment decisions compared to short run fluctuations in interest rates, and the possibility that changes in borrowing costs are overshadowed by variations in demand.³¹

In this model, the insignificance of the interest rate is justified by the existence of markup pricing, the preference for using internal funds for investment financing,³² and the effects of "financial repression." In a rationed financial market, the allocation of credit has little to do with the price of borrowing and much more to do with the quantity. In the Egyptian case, the existence of rationing did not imply that credit was in short supply since the banks were highly liquid during much of the period. Rather, it meant that what credit there was available was allocated according to non-price criteria.

This is not to imply that the interest rate was not important, since its low level was a crucial factor determining the tendency of firms to become overindebted, as discussed in chapter IV. Rather, it is argued that in a repressed financial system, the interest rate serves a different role than that of clearing the market for credit.

³¹ See Hay and Morris, 1979, pp. 393-394 for a discussion.

³² In addition to firms preferring internal financing of investment, the banks avoid providing funds for longer term activities because they are not permitted under Central Bank regulations to charge higher interest rates on longer term loans. Instead, the banks prefer to roll over short term loans, which obviously adds greater uncertainty for the firm.

Specifically, the rate of interest becomes a mechanism whereby the government transfers a subsidy to that part of the private sector that has access to the formal financial system.

Neither modelling procedure provided any evidence of crowding out as a result of government policy. None of the government spending variables had a significantly negative coefficient. Equation 2 in table VII-11 provides strong evidence of the positive effects of government investment in infrastructure on private capital formation. The long run coefficient on GVIINF in equation 2 of table VII-8 is also significantly positive. This implies that infrastructure investment is complementary to private activity by reducing costs to firms and therefore induces higher levels of private investment. Equation 4 in table VII-11 also provides possible evidence of crowding in as a result of aggregate government expenditure, GOVEX. This is also supported by the positive long run coefficient for GOVEX in the cointegrating vector equation 5 in table VII-8. The impact of aggregate government expenditure may operate through raising the level of aggregate demand in the economy because the public sector has a higher propensity to consume than the private sector, thereby inducing greater private capital formation. In addition, the significance of aggregate government expenditure may be a reflection of the distribution of government rents from oil, the Suez Canal, and aid in favour of the private sector. Recall, however, that the time series properties of this variable are ambiguous, so the results are not conclusive.

The error correction mechanism is consistently significant, whether as the lagged residual from the levels regression in the Engle and Granger procedure or as the lagged levels term in the unrestricted estimates, thereby confirming its appropriateness as a representation of the data. In general, the error correction model seems to be an appropriate means of capturing the process by which agents adapt to the highly complex environment in which investment decisions are made. The plots of the actual and fitted values from the two procedures indicate a remarkably close fit, especially given the considerable number of shocks experienced over the 1960-86 period. Without having to rely on ad hoc dummy variables, it has been possible to identify the underlying economic process, or "deep parameters," that determined private investment. This implies that the model of investment determination hypothesized, based on demand, costs, mark ups and government investment in infrastructure, was able to capture the effects of government policy shifts through economic explanatory variables.

Some Preliminary Conclusions

Although the above econometric analysis lends considerable support to the model of investment determination hypothesized in chapters III and VI, it also highlights the limits of this type of analysis and the difficulties in assessing the impact of government policy. In theory, by estimating the signs and magnitudes of public policy multipliers it should be possible to respond to the long- running debate about crowding out versus crowding in.³³ However, at the

³³ Buiter concludes from his theoretical survey about crowding out versus crowding in that ultimately the question is an empirical one

aggregate level, it is virtually impossible to prove definitively whether crowding out or crowding in has occurred because of the problem of constructing the counterfactual.

In order to prove that crowding out occurred, for example, it would be necessary to show not only that the public sector expanded while the private sector contracted, but also that the private sector sought to expand and was displaced by the public sector. It would be easy to conclude that a negative multiplier on a government policy variable implied crowding out when in fact it may be reflecting a possibly wise countercyclical policy on the part of the state.

What is possible to conclude at the macroeconomic level, however, is what did not happen. For example, a positive public policy multiplier is a fair indication that crowding out did not occur as is a negative multiplier a reasonable basis for concluding that crowding in did not occur. In the language of statistics, this approach allows one to reject the null hypothesis, but not necessarily to accept the alternative.

The results above for Egypt provide no evidence of crowding out at the macroeconomic level. This is not to say that one cannot identify cases of crowding out at the sectoral or firm level, many of which were discussed in the survey findings in chapter IV. Rather, it is simply argued that in the aggregate and on a net basis, private investment was not negatively affected by government

that must be addressed through the estimation of public policy multipliers. Buiter, 1985.

spending or deficit financing. The results also lend some support to crowding in as a result of aggregate government expenditure and, in particular, to government investment in infrastructure. However, the positive coefficients on GOVEX and GVIINF may also be reflecting a procyclical stance on the part of the state. Whether the results are capturing causality or simply the coincidence of government spending with private investment during a boom period is not clear. Nevertheless, within the constraints of the methodology, the empirical results provide clear evidence that crowding out did not occur and that there may have been crowding in of private investment.

PART FOUR: AN APPLICATION

CHAPTER VIII

FOREIGN EXCHANGE WINDFALLS AND PRIVATE INVESTMENT IN EGYPT

Introduction

The evolution of private investment in Egypt was fundamentally affected by the foreign exchange windfall of the 1970s. This chapter will focus on that particular period in light of the theoretical literature on "Dutch disease." This will provide an opportunity to evaluate the utility of the investment model developed earlier and to explore the external determinants of investment more fully. The objective is to show that the approach to investment determination taken here can provide a useful framework for analyzing the effects of various shocks to the evolution of investment in the economy. The decision to analyze the foreign exchange windfall is illustrative and particularly interesting in the Egyptian case. A similar type of analysis could be performed for changes in the other determinants of investment such as the level of aggregate demand, market structure, or trade regime.

In addition, the Dutch disease literature is complementary to that on the determinants of investment because it provides a framework for analyzing the sectoral distribution of investment in a small

open economy.¹ Although the theoretical determinants of investment remain the same, a foreign exchange windfall has the effect of changing the magnitudes of some of these variables, thereby changing the sectoral incentive structure faced by investors.

Dutch Disease and Investment

There is an enormous literature, both theoretical and empirical, on the phenomenon of Dutch disease.² The basic hypothesis of these models is that a foreign exchange windfall results in a rise in the price of nontradable goods relative to tradables, thereby implying a real appreciation of the exchange rate. The "spending effect" of the windfall that draws resources out of the booming and lagging sectors into nontradables may be accompanied by a "resource movement effect" whereby labour moves out of tradables and nontradables and into the booming sector in response to changes in the marginal product of labour. This is the simplest version of the Dutch disease story. There are a wide range of variations of the basic model that introduce different assumptions about markets, government

¹ An alternative would have been to analyze the sectoral distribution of investment econometrically. Although this could have been an interesting exercise, it was limited by the availability of private investment data that was disaggregated sectorally. Behrman analyzed the sectoral determinants of investment econometrically for Chile. He found that the determinants varied considerably across sectors. See Behrman, 1972. This is not surprising since the role of particular variables in investment determination would depend on a range of sectoral characteristics. At the aggregate level, however, these sector-specific determinants are blurred by the determinants of the intersectoral mobility of new investment.

² For a survey of the literature see Corden, 1984 and Neary and van Wijnbergen, 1987. For applications of the Dutch disease model to Egypt, see De Macedo, 1982 and Dervis and van Wijnbergen, 1984.

policy, the trade regime, expectations formation, and the structural characteristics of economies.

The implications of the standard Dutch disease model for investment are twofold. The investment response to the change in relative profitability between tradable, nontradable, and booming sector activities is often called the "productivity effect."³ Private investment tends to flow into the booming sector and into nontradable activities. The rise in investment contributes to the spending effect, thereby exacerbating the real appreciation and the current account deficit. There is also a "portfolio effect" whereby domestic investment and foreign assets vary over time in countries that try to maintain a balanced portfolio in situations where foreign and domestic assets are not perfect substitutes.⁴ Because capital is sector-specific in the short run, a trade shock does not have the conventional international trade effects on wages and factor shares.⁵ Nevertheless, under putty-clay technology new investment is not sector-specific and can respond to changes in price signals. The classic ending to the Dutch disease story is one of "de-industrialization" resulting from the outflow of resources from the traded manufacturing sector into nontraded activities such as housing and services.

The more recent literature on construction booms considers the effect of alternative assumptions about expectations formation on investment during a trade shock.⁶ Bevan, Collier and Gunning

³ Corden, 1984, p.373.

⁴ Corden, 1984, p.374.

⁵ Neary, 1978.

⁶ See Bevan, Collier, and Gunning, 1989.

consider the cases where: (a) the trade shock is regarded as consistent with prior expectations ("inclusive"); (b) the shock is inconsistent with prior expectations and agents revise their future plans ("exclusive revised"); and (c) the shock is inconsistent with prior expectations and agents do not revise their plans because the event is considered unrepeatable ("exclusive unrevised").⁷ These alternative expectations scenarios have different implications for the effect of a windfall on permanent income and consequently on savings and investment. Ultimately, under all of these different assumptions about expectations, a positive windfall has a net positive effect on investment. Such a rise in investment would also be expected from a social point of view in light of the fact that income from the extraction of a natural resource such as oil represents a depletion of national wealth and therefore a higher investment rate would be necessary to establish alternative sources of wealth.⁸ However, the effect on the sectoral composition of investment depends on whether agents perceive that the shock will persist, since investment decisions under putty-clay technology must take into account long run expectations about relative prices.

A Trade Shock in the Context of the Model

In the context of the model of investment developed here, the implications of a foreign exchange windfall may be very different. Recall that in the model of investment in chapter III and VI, a foreign exchange windfall affects the real exchange rate defined as

⁷ Bevan, Collier, and Gunning, 1989, p. 4.

⁸ See Dervis et al for a discussion of the optimal investment rate under a windfall. Dervis et al, 1984.

the relative price of nontradables to tradables. The real exchange rate entered into the direct and indirect costs of the firm (equations 3, 4, and 5 from chapter III):

$$C_D = wL + (1-\Phi)P_m^D M^D + \Phi e P_m^W M^W$$

$$C_I = [(1-\theta)P_k^D + \theta e P_k^W][(\delta+r-z)(1-i)/(1-u)]I$$

where C_D = direct costs

C_I = indirect costs

w = wages

L = labour

Φ = share of imported materials

P_m^D = price of domestic materials

M^D = quantity of domestic materials

e = exchange rate

P_m^W = price of world materials

M^W = quantity of world materials

θ = share of imported capital goods

P_k^D = price of domestic capital goods

P_k^W = price of world capital goods

δ = depreciation rate

r = interest rate

z = capital gains

i = value of investment incentives

u = rate of corporate taxation

I = investment.

Assuming that domestic inputs to investment are largely nontradable, a real appreciation, symbolized by a rise in the price of nontradables (P_m^D and P_k^D) relative to tradables (P_m^W and P_k^W) has the effect of reducing the relative cost of imported intermediates and imported capital goods. In a developing economy with no major indigenous capital goods industry, a fall in the price of imported capital goods implies a fall in the price of machinery relative to other investment goods such as land and buildings. Under the assumption of putty-clay technology, this would have the effect of changing the shares of imported materials (Φ) and capital goods (θ) in production if agents perceived the relative price change as permanent.

In addition, the spending effect of a windfall results in a rise in aggregate demand, particularly for producers operating in oligopolistic markets under protection. The demand increase is particularly large if the windfall accrues to agents with a high marginal propensity to consume, such as the government (from petroleum) and low income households (from remittances) in the Egyptian case. With barriers to entry, markups would rise as a result of changes in the price elasticity of demand and market shares. Recall equation (17) in chapter III which posits that the determinants of the desired capital stock are:

$$K_t^* = f(\pi^e, \pi_{t-1}) = f(\tau^e, Y^e, C^e, \tau_{t-1}, Y_{t-1}, C_{t-1}).$$

The effect of a positive windfall perceived as permanent would be higher levels of expected demand and expected markups as well as a

possible change in investment costs. This would result in an increase in the desired capital stock and a change in the composition of investment costs between tradables and nontradables.

The conclusions that would be drawn from the model are that a windfall would result in an increase in aggregate investment that would be highly capital intensive and import dependent. The sectoral distribution of that investment between tradables and nontradables would depend on the real exchange rate, the prevailing tariff structure, and, given putty-clay technology, whether or not agents perceived the windfall as permanent or temporary. These theoretical suppositions will be compared with the empirical evidence from Egypt below.

The Egyptian Foreign Exchange Windfall

The foreign exchange bonanza experienced by Egypt was caused by the boom in petroleum prices during the 1970s. Revenues from exports of Egyptian petroleum accrued largely to the government. The government also had access to sizable rents from the Suez Canal with its reopening ^{after the 1973} war and from American aid after the signing of the Camp David accords. The private sector also benefited directly from the windfall through the remittances of migrant labour working in the oil exporting countries of the Middle East. These remittances went through the "own exchange" market to finance private sector imports. During the first oil shock in 1973/4, Egypt was a net oil importer. Combined with rising commodity prices in the early 1970s, the first oil shock resulted in a deterioration in Egypt's

terms of trade. However, because emigration was made a constitutional right in 1971, the flow of remittances from migrant workers in the Gulf generated an offsetting positive effect from the first oil shock. With the second oil shock in 1979, Egypt had been a net exporter of oil since 1976 and experienced an unambiguous improvement in the terms of trade.⁹ Although there were actually two dramatic oil price rises, the flow of remittances had a smoothing effect on the foreign exchange windfall. It is therefore plausible to treat the entire period as one of a windfall.

The focus of the discussion that follows will be on the effect of a natural resource shock on the real side of the economy - on the level of real income and the intersectoral allocation of factors. The financial effects of the windfall were a growing "dollarization" of the economy which served to shift investment intertemporally.¹⁰ Because private agents were permitted to hold foreign exchange accounts in Egypt during the infitah, there was a shift in asset holding out of Egyptian pounds and into foreign exchange, largely U.S. dollars which were held abroad by the domestic banking system. This was in response to the higher returns to foreign assets in the context of low, often negative, real interest rates on savings held in Egyptian pounds, rising world interest rates, growing domestic inflation, and a depreciating^{nominal} exchange rate.

The returns to foreign assets, calculated as the London interbank rate (LIBOR) adjusted by world and domestic inflation and exchange

⁹ Hansen, 1988, p. 43.

¹⁰ For a more detailed analysis of the financial aspects of Dutch disease in Egypt, see De Macedo, 1982.

rate movements between the Egyptian pound and the U.S. dollar, are depicted in figure VIII-1.¹¹ The peaks in the returns to foreign assets coincided precisely with the foreign exchange windfall and resulted in considerable currency diversification. By the mid-1980s, foreign exchange deposits accounted for 40% of total liquidity.¹² Deposits in LE also grew, although at a much slower pace, despite the negative real interest rates.¹³ This shift in favour of assets denominated in foreign exchange meant that the government had less control over the monetary regime.

Relative Price Movements

One approach to determining whether a Dutch disease style real appreciation has occurred is to analyze disaggregated price indices to determine whether the price of nontradables has risen relative to tradable goods. The available price indices for Egypt are given in tables VIII-2 and VIII-3. Reconciling the categories used by statistical authorities with those useful for Dutch disease analysis is a common empirical problem. Rather than construct aggregate indices using Dutch disease categories, the Egyptian wholesale and consumer price indices are reported in disaggregated form, but with an indication of whether they would most likely be categorized as booming(B), traded(T), or nontraded(NT).

¹¹ Note that the sources and definitions for the data for this as well as all other graphs presented in this chapter are provided in appendix E.

¹² International Monetary Fund, 1986, p. 2.

¹³ Foda explained this growth of deposits in domestic currency as resulting from the expansion in the money supply, the increased use of banks by the public, the tax exempt status of deposits, and the shortage of alternative investments. Foda, 1982, p. 23.

Figure VIII-1

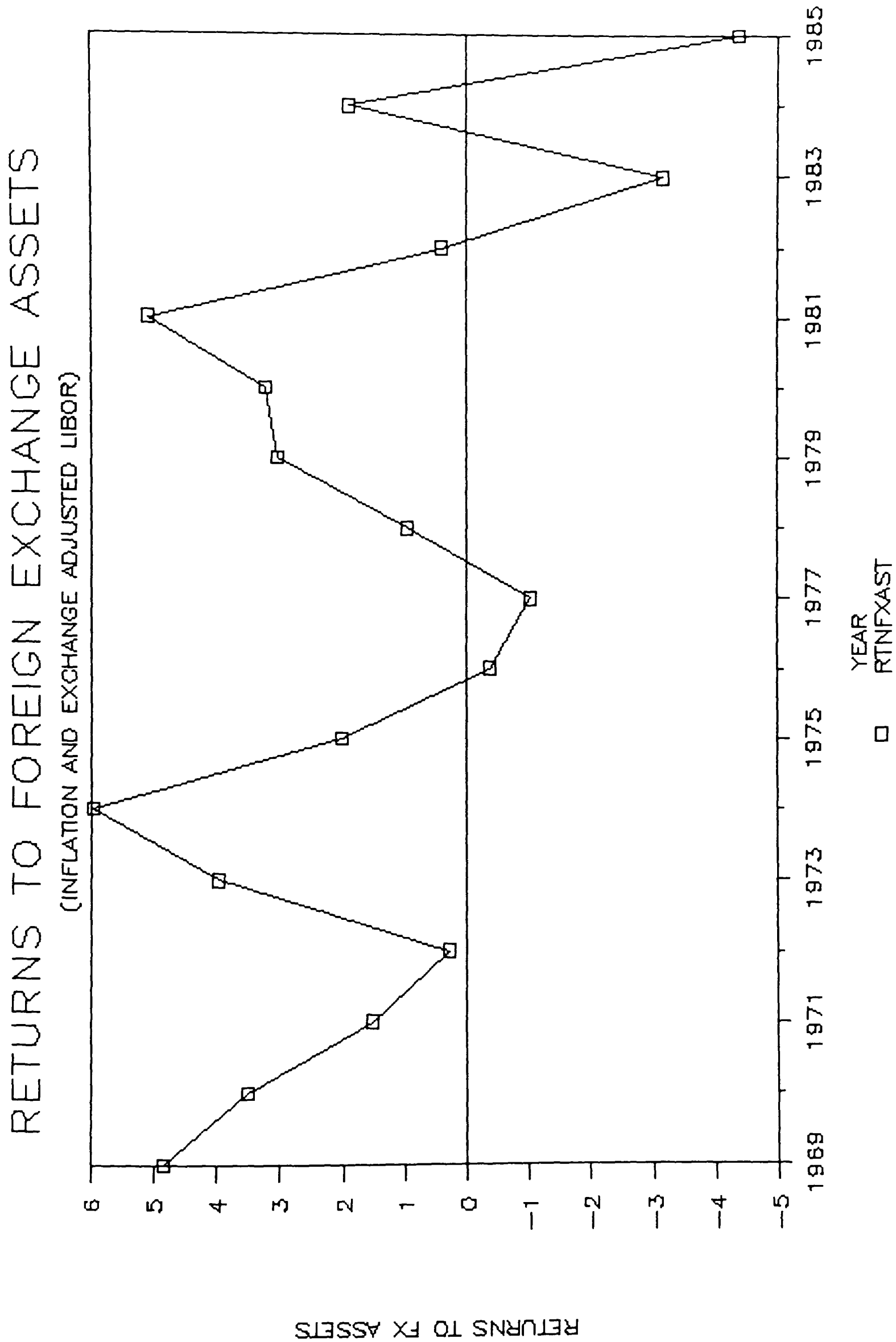


TABLE VIII-2: WHOLESALE PRICE INDICES, (1980=100)

YEAR	PETROL &FUEL (B)	CONSTRUCTION MATERIALS (T/NT)	MACHINERY &IMPLEMENTS (T/NT)	CHEMICALS (NT)	WOOD (T)	METALS (NT)
1972	53.56	-	-	-	-	-
1973	55.51	-	-	-	-	-
1974	59.19	-	-	-	-	-
1975	62.23	-	-	-	-	-
1976	66.91	-	-	-	-	-
1977	68.99	50.48	64.43	71.16	76.54	72.57
1978	73.11	61.00	79.03	71.87	75.05	78.81
1979	82.52	93.52	93.52	79.60	75.45	85.04
1980	100.00	100.00	100.00	100.00	100.00	100.00
1981	104.12	112.67	100.38	109.30	99.23	110.10
1982	110.58	135.56	101.45	122.36	100.19	121.02
1983	118.21	136.12	101.45	126.60	100.33	127.19
1984	123.24	150.30	101.45	127.64	104.46	140.63
1985	152.73	168.19	110.90	132.92	116.32	154.58
1986	179.58	181.48	122.72	139.99	125.69	157.99

NOTE: PRIOR TO 1977, WHOLESALE PRICE INDICES ARE BROKEN DOWN ONLY INTO THE FOLLOWING CATEGORIES: FOOD, PETROL AND FUEL, AND MEDICINES.

SOURCE: CENTRAL AUTHORITY FOR PUBLIC MOBILIZATION AND STATISTICS, STATISTICAL YEARBO VARIOUS ISSUES.

TABLE VIII-3: CONSUMER PRICES INDICES, (1980=100)

YEAR	FOOD (T)	FURNITURE & DURABLES (T)	CLOTHING (T)	HOUSING (NT)	SERVICES (NT)	TRANSPORT & COMMUNICATIONS (NT)
1969	29.52	-	32.27	85.72	-	-
1970	31.09	-	32.46	86.20	-	-
1971	33.34	-	32.14	85.88	-	-
1972	34.91	-	33.72	84.62	-	-
1973	38.50	-	38.08	86.32	-	-
1974	45.09	-	43.28	88.69	-	-
1975	51.14	-	49.08	88.56	-	-
1976	58.55	-	54.04	88.16	-	-
1977	65.73	71.08	62.42	87.57	64.70	86.51
1978	74.19	80.46	74.86	87.94	74.81	86.56
1979	78.73	89.20	83.20	89.95	86.62	97.72
1980	100.00	100.00	100.00	100.00	100.00	100.00
1981	114.14	112.22	115.25	100.04	108.32	131.40
1982	129.49	139.94	138.39	100.14	132.12	160.35
1983	160.35	162.13	160.14	103.36	155.99	141.37
1984	227.70	181.31	186.42	104.54	202.87	161.81
1985	188.82	191.36	210.97	106.00	235.51	161.81
1986	247.40	212.92	260.32	115.85	313.00	212.14

NOTE: THE COMPOSITE CPI GIVEN HERE HAS BEEN DERIVED BY WEIGHTING THE URBAN AND RURAL PRICE INDICES PROVIDED BY CAPMAS BY POPULATION RESIDING IN RURAL AND URBAN AREAS BASED ON AN AVERAGE OF THE POPULATION CENSUSES FROM THIS PERIOD. THE WEIGHTS THAT WERE USED TO CALCULATE THIS COMPOSITE CONSUMER PRICE INDEX WERE 42.5% URBAN AND 57.5% RURAL . HOWEVER THE CONSUMER PRICE INDEX ONLY COVERS URBAN AREAS PRIOR TO 1973. ALSO, PRIOR TO 1977, CAPMAS CONSUMER PRICE INDICES ARE BROKEN DOWN ONLY INTO THE FOLLOWING CATEGORIES: FOOD, HOUSING, AND CLOTHING.

SOURCE: CENTRAL AUTHORITY FOR PUBLIC MOBILIZATION AND STATISTICS,
STATISTICAL YEARBOOK, VARIOUS ISSUES.

An analysis of the price effects of the foreign exchange windfall are complicated by the existence of widespread subsidies alongside hidden indexation. For example, the index of petroleum and fuel prices in the wholesale price index shows no sign of the 260% increase in world energy prices in 1973/4 and the 60% increase in 1979/80 because of subsidies to domestic consumers.¹⁴ However, private firms established under Law 43 were generally required to pay world prices for their energy. The index for construction materials in table VIII-2 is also likely to be an underestimate since there was a large black market for cement and other building materials during the construction boom of the 1970s. At times, the black market price of cement was as high as 225% of the official selling price.¹⁵ The machinery and implements index only includes domestically-produced capital goods, some of which are de facto non-tradables. The other categories in the wholesale price index, chemicals and metals, may not accurately reflect demand because of the subsidized production of public sector industries. Wood, virtually all of which is imported and on which no subsidies are operative, is probably a realistic index of traded goods prices.

These same problems are present in the consumer price index in table VIII-3. The housing index, the most frequently used proxy for nontradables, displays almost no movement over the 1969-1986 period because rents have been fixed in perpetuity in Egypt since the 1960s. However, the "key money", a one-off illegal payment required before moving into a rented dwelling, has risen steadily in

¹⁴ International Monetary Fund, Yearbook of Financial Statistics, 1984.

¹⁵ Interview, Suez Cement Company, December 1987.

response to growing demand for housing. This inflation in de facto housing costs caused by rising key money payments is not reflected in the official price index for housing. The indices for food, transportation and communication in table VIII-3 are also slightly biased downward because of government subsidies and possible rationing.

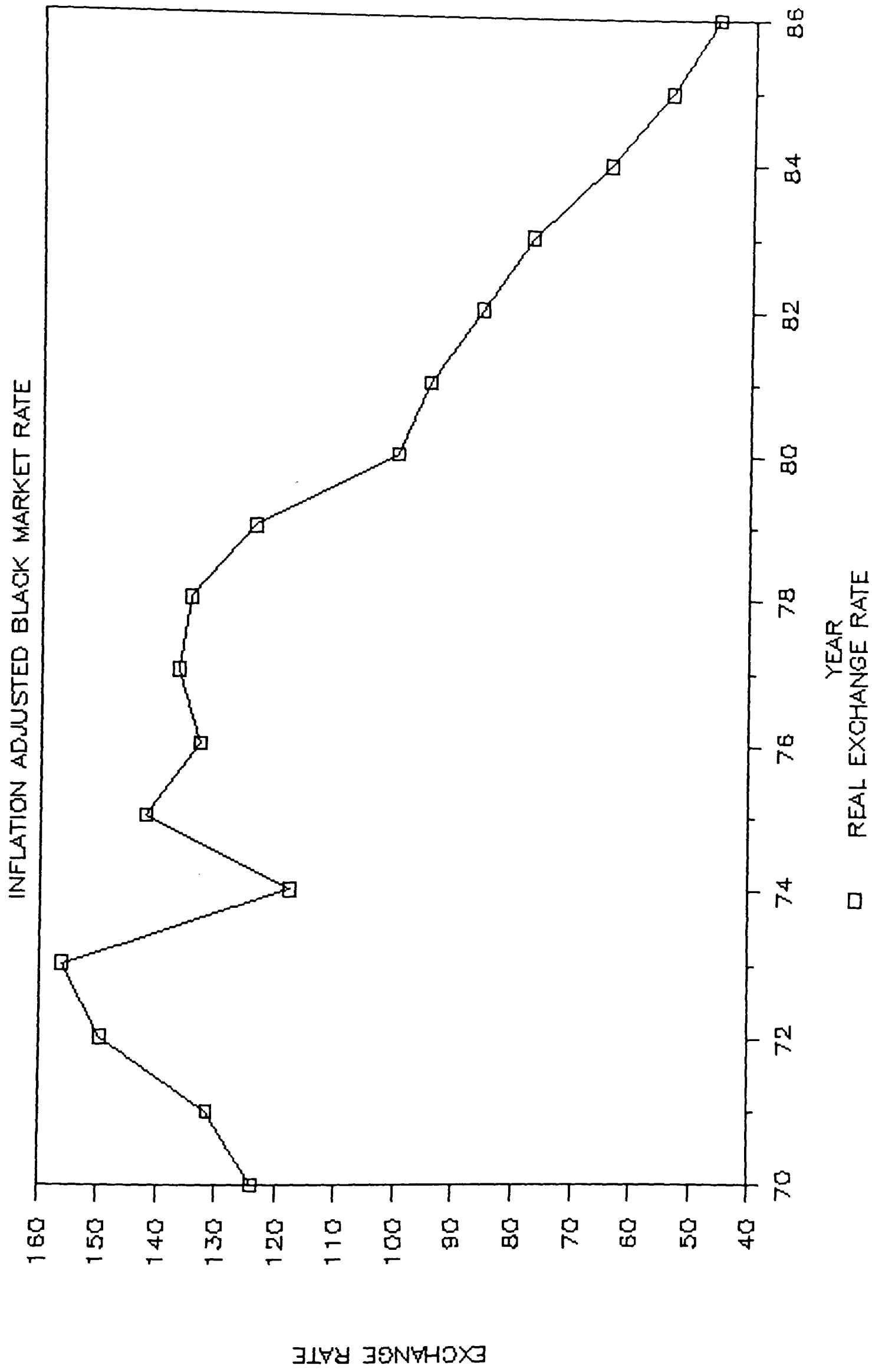
It would be possible to select one or two sectors that are likely to have more realistic price indices to represent entire Dutch disease categories. For example, services in the CPI may serve as a good nontradable index and wood or furniture and durables may serve as proxies of tradable price movements. However, the conclusion about relative price outcomes hinges crucially on the proxies chosen. This seems a rather dubious approach.

An alternative is to use the aggregate definition of the real exchange rate that adjusts the nominal exchange rate for movements in world and domestic inflation. Such an index is presented in figure VIII-4 where the nominal black market exchange rate has been adjusted for movements in the world wholesale price index and the domestic consumer price index. Although the pattern of the index seems to show a real appreciation in response to the oil shocks, it does not adequately capture the sectoral composition of this shift in favour of nontradables during the oil boom.

The alternative proposed here is to analyze sectoral movements in private investment and labour in response to changes in factor returns to tradables versus nontradables. This approach is arguably

Figure VIII-4

INDEX OF THE REAL EXCHANGE RATE



better, or at least complementary, to analyzing movements in price indices because it avoids problems with subsidies and implicit indexation and focuses on the more crucial economic question of resource movements. In addition, by analyzing the effect of a windfall on investment, it is possible to evaluate the underlying expectational framework used by agents.

Aggregate Private Investment

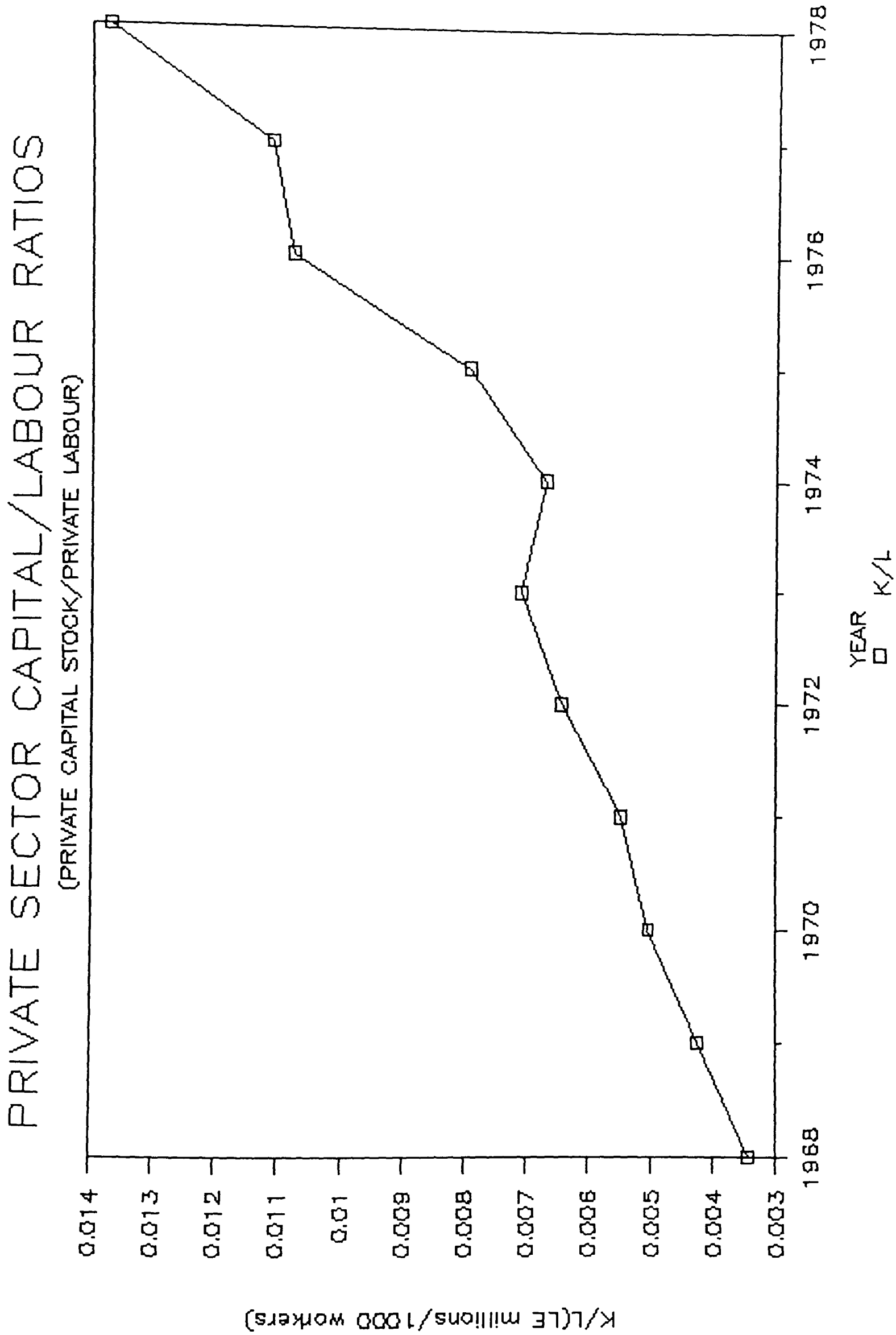
As expected, the foreign exchange windfall enabled a rise in private investment in the economy. Figure II-1 in chapter II showed the sharp increase in the ratio of investment to GDP over the period of the windfall. The jumps in the early and late 1970s parallel the rises in petroleum prices. The windfall financed the accumulation of assets denominated in foreign exchange and imports, which was facilitated by the liberal trade regime instituted as part of the infitah in 1974. Capital goods imports rose by 33%, intermediates by 9%, and consumer goods by 15% per year.¹⁶

The capital intensive nature of the investment that occurred is evidenced by the rising capital/labour ratio in the economy. Figure VIII-5 shows the evolution of the ratio of the capital stock to the labour force in the private sector.¹⁷ The growing

¹⁶ World Bank, July 1986, p.1. The much criticized growth in consumption imports rose from LE161.9 million in 1974 to LE1611.6 million in 1981. Abdel-Fadil and Osada, 1984, p. 169.

¹⁷ Figure VIII-5 reports the private sector capital-labour ratio for the 1968-78 period because these are the years for which data is available on labour in the private sector. The Central Authority for Public Mobilization and Statistics is several years behind in compiling the disaggregated version of the labour force sample surveys. Data for total labour in both the public and private sectors are available up to 1982. When total labour is used in the ratio with private capital for the period 1965-1982, there is the same upward trend as that depicted in figure VIII-5.

Figure VIII-5



capital intensity reflected the relative cheapness of imported capital goods and various government policies to subsidize capital relative to labour. These included the *infitah* investment allowances, customs exemptions on capital imports, and labour legislation that raised the costs of employment to firms. The decline in the cost of investment goods during the 1970s was depicted in the evolution of the ICOSTS variable in figure VII-1. Figure VIII-6 shows the close relationship between private investment and imported capital goods which makes the exchange rate an important factor in investment determination.¹⁸

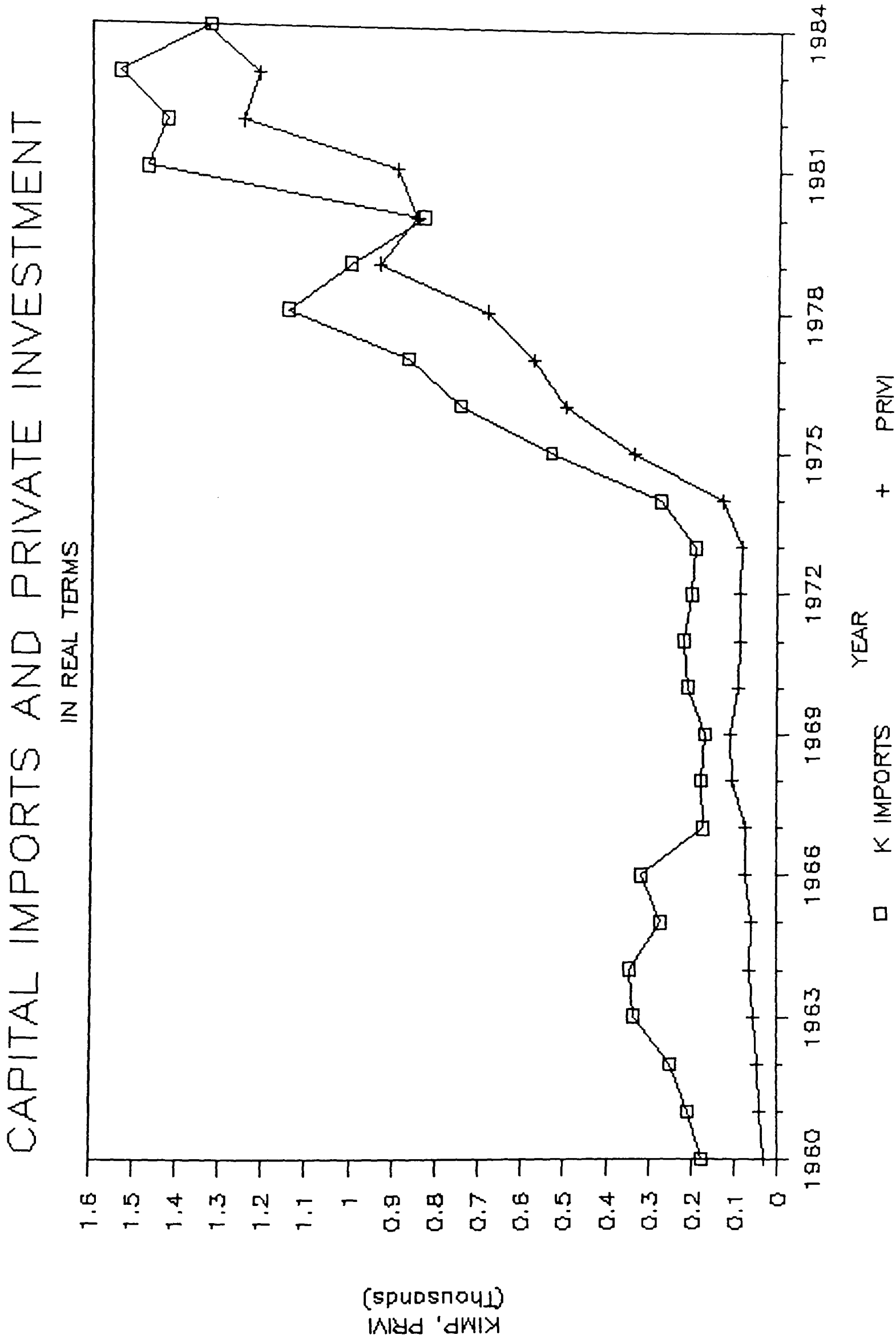
This pattern of increasingly capital-intensive, import-dependent private investment at the macroeconomic level is also consistent with the findings at the firm level in chapters II and IV. The more rapid increase in total capital invested under the *infitah* laws than in the number of projects presented in chapter II was evidence that activities became more large scale and capital intensive. Virtually all of the capital equipment for investments made by the firms surveyed in chapter IV was imported and 27% of the firms imported over 90% of their raw materials and intermediates.¹⁹ Consequently, these investments have not contributed as much as possible to employment generation.

The productivity of this higher private investment also seemed to be low. Productivity is difficult to measure in Egypt because of the

¹⁸ Of course the public sector consumed a large share of capital goods imports, especially during the 1960s.

¹⁹ Sixty percent of the firms surveyed reported relying on imported raw materials and intermediates for over 40% of their inputs.

Figure VIII-6



existence of a range of subsidies.²⁰ Figure VIII-7 depicts the trend in the ratio of the real private capital stock to total real output. In part, this reflects rising productivity of labour. The trend may also reflect declining productivity in the public sector's contribution to total output. However, the high capital output ratios may also imply that Egyptian entrepreneurs achieved less output per unit of investment than may be possible. This would be consistent with the survey findings in chapter IV that found overcapacity, excessive diversification, and little competitive pressure at the firm level.²¹

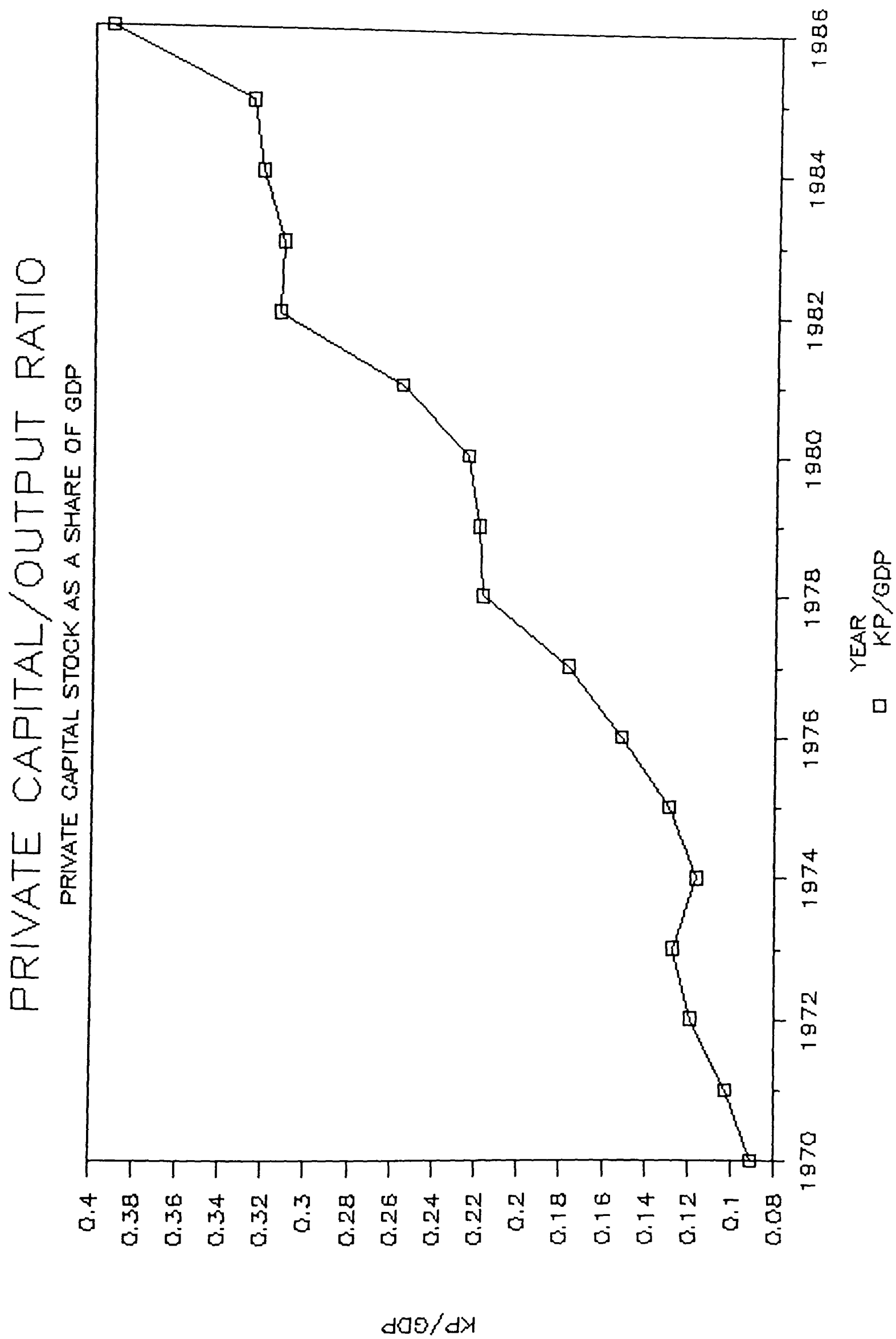
Sectoral Shifts in Private Investment

In order to explain the implications of the windfall for the profitability of different types of investment, the changing sectoral distribution of private capital formation will be analyzed. Table VIII-8 provides figures for sectoral private investment as a share of total private investment for the 1965-1982 period. The first column shows not much change in the sectoral share of agriculture over the windfall period except for a sharp rise in 1981-82 which probably reflects growing private investment in capital intensive land reclamation projects in response to

20 Some evidence on the relative productivity of the private versus the public sector is available for the period prior to 1970. Mabro and Radwan's estimates of total factor productivity suggest that productivity was slightly higher during the period of private enterprise (pre 1950) than under the mixed economy of the 1950s. Mabro and Radwan, 1976, pp. 185-6. However, Ikram's analysis of the 1946-70 period found no pattern in the the relationship between capital productivity and the nature of the economic system. Ikram, 1980.

21 This was especially the case with post-infatih enterprises. See chapter IV for a discussion.

Figure VIII-7



ABLE VIII-8: SECTORAL PRIVATE INVESTMENT AS A SHARE OF TOTAL PRIVATE INVESTMENT, 1965-1982

YEAR	AGRICULT	INDUSTRY	HOUSING	TRADE AND		TRANSPORT	SERVICES	PETROLEUM
				CONSTRUCT	FINANCE			
1965	0.23	0.03	0.52	-	0.05	0.05	0.11	-
1966	0.08	0.02	0.74	-	0.01	0.06	0.08	-
1967	0.07	0.02	0.82	-	0.003	0.04	0.04	-
1968	0.06	0.01	0.82	0.002	0.002	0.06	0.04	-
1969	0.05	0.06	0.74	0.02	0.01	0.08	0.04	-
1970	0.07	0.08	0.65	0.03	0.03	0.11	0.03	-
1971	0.08	0.08	0.56	0.00	0.03	0.23	0.02	-
1972	0.05	0.14	0.63	0.00	0.04	0.11	0.03	-
1973	0.06	0.13	0.56	0.00	0.04	0.18	0.04	-
1974	0.04	0.10	0.26	0.005	0.01	0.06	0.04	0.48
1975	0.03	0.14	0.25	0.003	0.008	0.14	0.009	0.42
1976	0.02	0.17	0.13	0.02	0.007	0.02	0.10	0.52
1977	0.05	0.20	0.13	0.03	0.006	0.02	0.11	0.45
1978	0.05	0.26	0.14	0.08	0.01	0.05	0.14	0.28
1979	0.05	0.22	0.13	0.07	0.006	0.04	0.07	0.42
1980	0.05	0.22	0.05	0.05	0.01	0.04	0.11	0.47
1981	0.22	0.22	0.33	0.007	0.01	0.04	0.08	0.09
1982	0.16	0.20	0.49	0.05	0.04	0.03	0.03	0.00

NOTE: NUMBERS MAY NOT SUM TO 1.00 IN ANY PARTICULAR YEAR BECAUSE OF ROUNDING OF FIGURES.

SOURCE: SHURA COUNCIL, 1985.

government incentives. Note, however, that data on private investment in agriculture are likely to be unreliable in an economy where most of the agricultural sector is based on small peasant holdings.

The share of private investment in industry moves in a manner that is contradictory to the conventional Dutch disease "deindustrialization" story. The sectoral share of industry rises from an all time low of 1% of total private investment in 1968 in the wake of the nationalizations to an all time high of 26% in 1978. The availability of abundant foreign exchange facilitated investment, especially to the manufacturing sector which depends more heavily than other sectors on imports of capital goods.

Private investment in housing as a share of the total experienced an enormous decline - from absorbing 82% of total private investment to as little as 13% in the late 1970s. Note that this decline in housing investment is in relative, not absolute terms. In fact, the level of private investment in housing grew considerably based on censuses from 1976 and 1986.²² The desirability of investment in housing was caused in part by government policies, in particular rising inflation and government subsidies to building materials and housing loans. The government's subsidies to the housing sector were intended to address the perceived housing shortage, but actually fueled the construction of housing units that were inflation hedges and would remain empty.²³

²² Handoussa, 1987 provides a useful summary of the evolution of investment in housing.

²³ Handoussa's statistics on this are enlightening. During the 1980-86 period an average of 211,000 new housing units were

Again, this pattern conflicts with the intuition of the Dutch disease model. As a nontradable, housing investment should rise with a windfall; as an inflation hedge, it would be expected to be low during the 1960s period of relatively low inflation and to grow during the 1970s when prices were rising. Essentially, private investment in housing must be understood as the default investment in times of uncertainty. During the 1960s when much of large and medium scale private industry had been nationalized, the private sector had few safe investment alternatives to housing. With the *infitah* in the 1970s, private investors diversified into other, more lucrative investments. The fact that investment in housing depended more on local currency meant that the availability of foreign exchange in the 1970s facilitated the transition toward more foreign exchange-dependent sectors. With the fall in the oil price in the 1980s and the consequent uncertainty about the country's economic future, housing once again became an important area for private investment.

The figures for private investment in construction reflect the boom in construction activity with the *infitah*. In addition to increased private demand for construction, the boom was fueled by government contracting of large scale projects, largely in infrastructure, to the private sector. The increase in government

constructed each year in urban areas. In rural areas the annual average was 171,000 per year during the 1975-86 period. Yet, 17% of the urban units and 14.5% of the rural units were empty at the end of 1986. This implies that, using a conservative estimate of \$5000 per unit, there are \$9 billion of idle, unproductive assets held in the form of empty housing in the Egyptian economy. Note that the fixed rental, pro-tenant laws discouraged the rental of unfurnished units.

investment in infrastructure during the windfall was depicted in figure VII-3. Prior to the infitah, the private sector was restricted to small scale projects with large contracts awarded exclusively to public sector construction companies. After a peak in 1978, the construction sector experienced some decline, but began to recover after 1982. This may reflect in part the reemergence of investment in housing as an important hedge under uncertainty associated with declining economic prospects.

Private activity in trade and finance is not accurately reflected in the investment figures in table VIII-8. What appears as a decline in private investment in trade and finance during the windfall period seems highly implausible given the massive inflow of imports and the establishment of 89 new banks during the period.²⁴ The explanation for the low figures in table VIII-8 are that the level of investment in these activities is not indicative of the scale of operations given the very low capital requirements of trade and finance activities (an office and a telephone are often sufficient). The considerable rise in wages in trade and finance as well as GDP growth in trade and finance are better indicators of the growing importance of these activities during the windfall.²⁵ In addition, it is again necessary to draw a distinction between absolute and relative changes - private investment in trade and finance increased in absolute terms, but the relative share declined given the growth in other areas of investment.

²⁴ Foda, 1985.

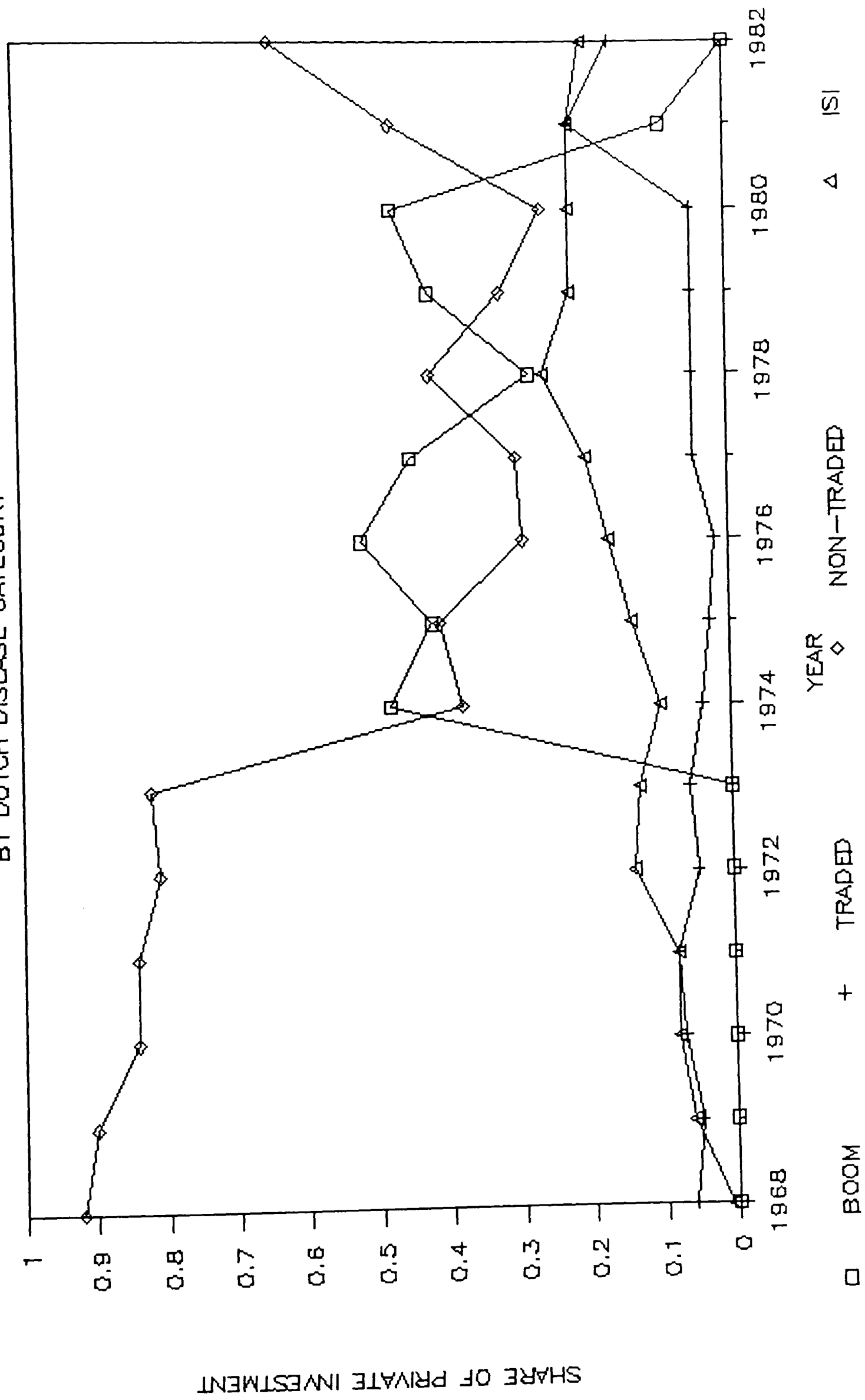
²⁵ Shura Council, 1985.

Two sectors, services and petroleum, behaved as would be expected in the classical Dutch disease model. Investment in services, a nontradable, rose during the windfall period and began to fall with the decline in the price of oil in the 1980s. Private investment in petroleum, the booming sector, rose sharply. These figures largely reflect private investment in petroleum services, rather than in exploration which is largely the domain of the public sector and foreign multinationals. The figures follow the movements of oil prices closely with a sharp fall in private investment with the fall in oil prices in the 1980s.

To evaluate the behaviour of private investment more directly in Dutch disease terms, the sectors have been aggregated in figure VIII-9. The booming sector is petroleum; the traded sector is agriculture; and the nontraded sector consists of construction, transport, finance, housing, and services. Industry is the import substituting sector and has been isolated in order to identify the effects of protection on the relative profitability of the industrial sector. It is hypothesized that because industry was protected, it was a de facto nontradable. The sectors that experienced growth in terms of their relative investment share were the booming petroleum sector and the protected industrial sector. The traded sector experienced virtually no change over the period. The non-traded non-industrial sector was the "lagging" sector, largely a reflection of the replacement of housing by petroleum as the major area for private investment.

Figure VIII-9

SECTORAL PRIVATE INVESTMENT SHARES BY DUTCH DISEASE CATEGORY



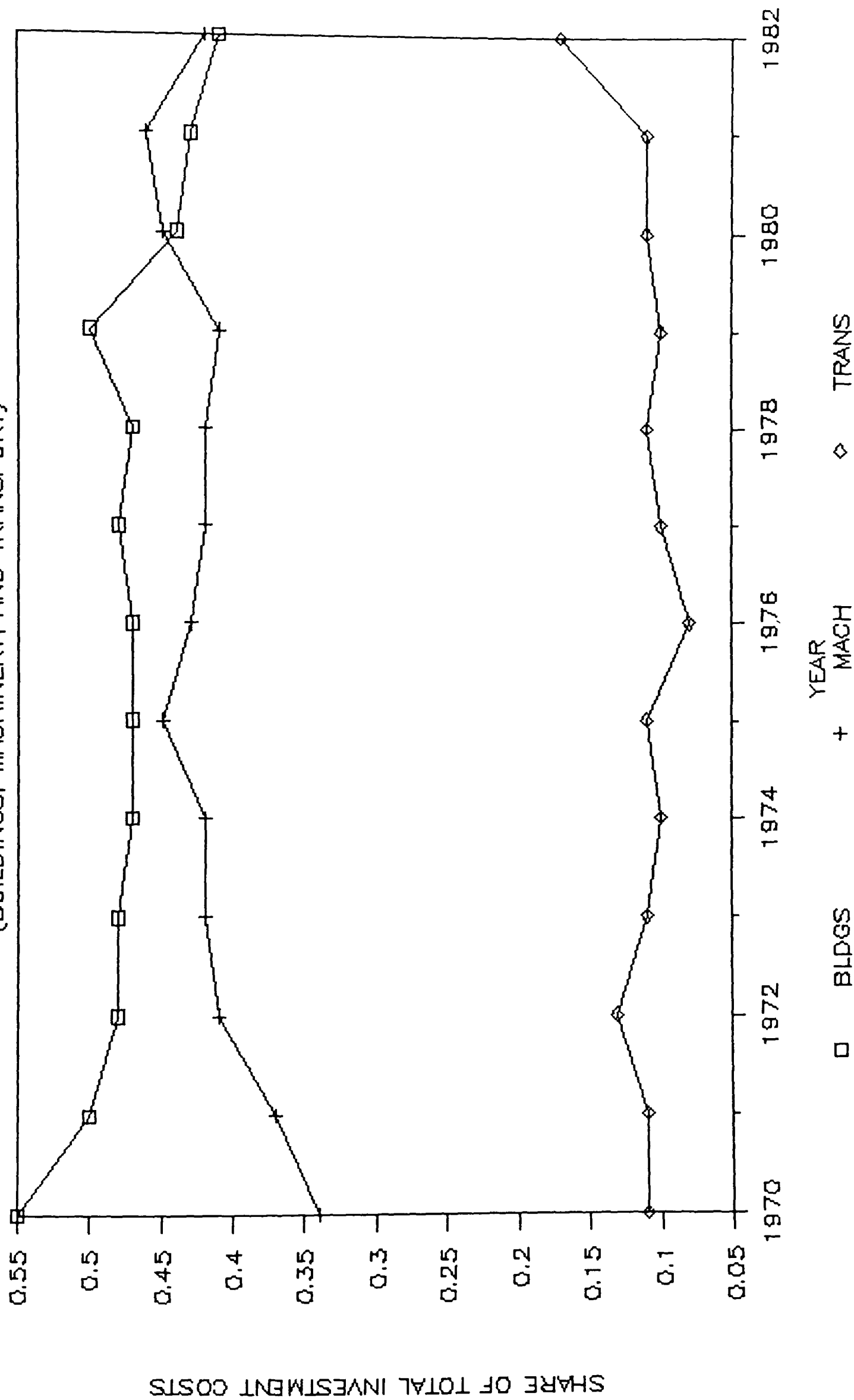
To understand this investment pattern, it is useful to analyze the supply of investment goods in a Dutch disease framework. The ability to adjust factor shares to the effects of a windfall depends on the sectoral supply function for traded versus nontraded capital goods. For traded capital goods, supply is highly elastic and is essentially a function of the exchange rate. For nontraded capital goods, the supply function is likely to be very inelastic, given bottlenecks, lags in installing capacity, and the oligopolistic structure of many domestic markets. With growing demand for nontradables during a windfall, the price of nontradable capital goods is likely to rise. This shift in the composition of investment costs is reflected in figure VIII-10 which shows the rising share of total investment costs spent on buildings (BLDGS) relative to machinery (MACH) during the windfall of the late 1970s.²⁶ The fact that the changes in the shares of investment costs are not more dramatic is probably because of technological constraints.

Although most types of investment depend on both tradable and nontradable capital goods, there is arguably greater dependence on one or the other in each sector. In the context of the model, this implies that the share of imported materials (Φ) and capital goods (θ) is more rigid in some sectors than others because of technology. Both the booming and import substituting sectors, with their needs for imported machinery, depend particularly on traded capital goods. The nontraded sectors rely more heavily on nontraded capital goods

²⁶ These figures for the shares of investment costs include the public sector and therefore probably understate the effect of the windfall on the relative shares of tradable and nontradable investment goods.

Figure VIII-10

SHARES OF INVESTMENT COSTS (BUILDINGS, MACHINERY, AND TRANSPORT)



such as land and infrastructure. The traded sector in Egypt, agriculture, depends on both traded and nontraded capital goods. Because a foreign exchange windfall makes tradable capital goods cheaper, the booming and import substituting sectors were more likely to realize an increase in investment. The nontradables sector, in contrast, was constrained in realizing an increase by the inelastic supply of nontradable capital.

Rather than witness a "deindustrialization" process as a result of the foreign exchange windfall, Egyptian industry experienced considerable growth. Although industrial production is potentially tradable, it was a de facto nontradable in Egypt. Because industry was protected by both tariffs and quotas, it behaved like a nontraded sector in the Dutch disease schema- gaining from the windfall and declining when it ended. However, these gains accrued to import substituting-oriented industries. Firms that previously could export their output no longer found it worthwhile when faced with a lucrative, protected domestic market. Non-petroleum exports plummeted in this period from 1.6 billion in 1974 to 1.1 billion in 1980 in nominal terms.²⁷ Only 30% of industrial exports and only 5% of overall exports were produced by the private sector.²⁸

This poor export performance partly reflected the reduced access to Eastern European markets after the rapprochement with the United States and growing protectionist sentiment in the West. Egypt was also pressured by the International Monetary Fund to terminate its bilateral trading agreements with 30 countries, largely in Eastern

²⁷ World Bank, 1986.

²⁸ National Bank of Egypt, 1986.

Europe and the developing world.²⁹ However, a number of the firms surveyed in chapter IV stated they had export orders from Europe and the Middle East but simply did not find it worthwhile to fill them. They preferred instead to produce in oligopolistic domestic markets behind a protective tariff wall.

Protection and the Lagging Sector during a Windfall

There are a number of potential justifications for protecting the lagging sector during a foreign exchange boom.³⁰ One argument is that real income or rent losses to particular factors resulting from an unexpected shock should be avoided because the social welfare function is conservative. However, a more efficient strategy would be to tax the booming sector directly and use the revenue to subsidize the losing factors. In cases where there is real wage resistance in the lagging sector, it is possible to argue that protection is important to reducing unemployment. Again, though, direct subsidies to employment is allocatively a more efficient approach.

An alternative argument is in the spirit of the "infant industry" justification for protection - that the existence of market imperfections and externalities in information, learning, and capital markets render the adjustments to a temporary shock costly and suboptimal. The costs of adjusting to a temporary shock outweigh the efficiency losses of protection. As above, taxing the

²⁹ Handoussa, 1987, p. 37.

³⁰ These arguments are discussed in greater detail by Corden, 1984, p.375; and Neary and van Wijnbergen, 1986, pp. 28-30.

booming sector and subsidizing the lagging traded goods sector is preferable to the more common protectionist policies that rely on an overvalued exchange rate, tariffs and quotas. However, the existence of administrative problems, information and transactions costs, and widespread corruption may make tariffs, quotas, and exchange rate protection more attractive policies for implementation purposes. Under all of these scenarios, however, the protection is intended to be as temporary as the windfall and should be phased out when the trade shock ends.

In the Egyptian case, the protection to industry was not instituted specifically in response to the Dutch disease windfall, but had existed since the 1960s as part of the government's encouragement of import substitution. However, the availability of protective tariffs became particularly useful when the combined effects of the foreign exchange windfall and the *infatah* facilitated greater private investment in industry by affecting demand, costs and mark ups.³¹ In addition, the *infatah* legislation inspired greater confidence in the private sector after 1974, evidenced by the decline in the share of the default investment under uncertainty, housing.

The early stages of the *infatah* were associated with trade liberalization and a flood of imported commodities. Private import-export offices mushroomed all over Cairo as anyone with

³¹ The importance of increasing demand, declining investment costs and rising markups for private investment were shown econometrically in chapter VII.

access to a telex machine rushed to cash in on the boom.³² However, after the initial gluttony subsided and the memory of the nationalizations of the 1960s faded, private investors became increasingly aware of the profitability of domestic production under protection. This was facilitated by an amendment to Law 43/1974 that allowed investments that produced import substitutes to reap the gains of the incentives and capital subsidies under the *infatih* legislation originally intended exclusively for export-oriented activities. In addition, the government was willing to protect domestic producers with quantity controls.³³ These factors, combined with the entrepreneurial learning, growing confidence and the lags inherent in the investment process, meant that by the late 1970s, private investors began to shift from importing commodities to domestic production of import substitutes under protection.³⁴ This shift was evidenced in the growing share of industry in private investment and some decline in investment in trade and finance.

Within the industrial sector, there is a tremendous range of effective protection across industrial sectors and between firms within an industrial sector.³⁵ A World Bank study of domestic

32 The survey results in chapter IV indicate how widespread trading activities were during the early *infatih*. For a sociological description of these commercial agents, see Zaalouk, 198.

33 A number of the firms surveyed stated that guarantees of quantity controls were a precondition to their decision to invest. Generally the controls operated such that if a domestic producer installed capacity that would satisfy 30% of the domestic market's needs, then only 70% of the market demand would be permitted to be imported.

34 Chapter IV provides a number of examples of firms that made this transition from importing to domestic production under protection.

35 The most recent analysis of the protective structure for industry was conducted by the World Bank. See World Bank, January 1983. Earlier studies of protection include Hansen and Nashishibi, 1975; Ikram, 1980; and Papanek, 1982. The World Bank's 1983 report calculated domestic resource costs and effective rates of protection

resource costs and effective protection in 1983 found that private sector firms within the same industrial sector had effective rates of protection that ranged from negative to highly positive values.³⁶ In general, the study found that food products had negative rates of effective protection while textiles, metals and engineering and building materials showed positive rates of protection in ascending order.

Hansen's calculations of effective protection rates for private sector industry using data from the World Bank's 1983 study found negative value added at world prices for food, metal, engineering and textiles. Nevertheless, Hansen did find support for the infant industries argument in the form of the tendency for domestic resource costs to decline over time.³⁷ In general, older, more established industries such as food, beverages, and some textiles were increasingly competitive over time while new industries were often uncompetitive.³⁸ Nevertheless, there was considerable variation in domestic resource costs within industries and between individual firms within an industrial sector.

Another study of the tariff structure in Egypt by Lucas and Kheireldin using calculations of domestic resource costs and effective rates of protection concluded that protection was granted to those industries in which Egypt was least competitive and from which there were the least economic gains, such as iron, steel, and

for the textile, food, metals/engineering, and building materials industries based on a survey of both public and private firms.

³⁶ World Bank, 1983, p.359.

³⁷ Hansen, 1988, p. 89.

³⁸ This is also consistent with the survey findings in chapter IV.

automobiles.³⁹ The viability of many of the investment projects surveyed in chapter IV was completely contingent on the existence of protection. Sectors with greater comparative advantage were often discouraged through price controls on output and taxes on inputs, such as cement and leather, or by the high costs of inputs obtained from highly protected industries, such as the high cost of domestic steel reducing the competitiveness of the engineering goods sector. Although there was some reform of the tariff structure in 1986, it did not represent a fundamental change in the trade regime.

The effective protection given to the private sector was higher than that for the public sector, reflecting the private sector's ability to set its output prices at the levels implied by the structure of tariffs.⁴⁰ The World Bank called this "probably an unintended benefit of the system of administered prices."⁴¹ Most public firms were found to be willing to sacrifice their access to subsidized inputs in exchange for freedom from artificially low administered output prices. In contrast, few of the private firms studied would have preferred a free market where border prices prevailed to the existing protective regime.⁴² The private sector tended to invest in those areas where tariffs were high or there were quantity restrictions on imports - such as construction materials, luxury goods, clothing, engineering and assembly operations.

³⁹ Lucas and Kheireldin, 1981, p. 5. Also discussed in Papanek, 1982, p.16. Hansen also found an inverse relationship between effective protection and social profitability. Hansen, 1985, pp. 98-108.

⁴⁰ The way in which protection was absorbed into firms' mark ups was discussed in chapters III and IV.

⁴¹ World Bank, 1983, p. 295.

⁴² World Bank, 1983, pp. 295-297.

Egypt's policy of protecting the industrial sector was not a specific response to the windfall designed to protect the potentially lagging sector in a Dutch disease framework. However, the existence of this protection affected the magnitude and the sectoral pattern of investment that occurred when the foreign exchange windfall occurred. Without the protection, the entire windfall period probably would have been characterized by importation of final goods and deindustrialization of the small private manufacturing sector that already existed. The existence of the protection has meant that industry actually grew at a rapid rate during the windfall; but, this industrial growth was critically dependent on imports and protection.

Labour Movements

In addition to the spending effect in the Dutch disease model that results from a windfall, there is a resource movement effect that results from the rising marginal product of labour in the booming sector. Assuming that labour is intersectorally mobile, workers are expected to move out of the lagging and nontradables sectors into the booming sector. Corden calls the movement of labour from the lagging sector into the booming sector "direct deindustrialization, whereas that from nontradables into booming sector activities is "indirect deindustrialization."⁴³ The effect on real wages is indeterminate since wage earners consume nontradables. In the case of an oil boom, or any other type of enclave-based boom, there is no major effect on labour markets

⁴³ Corden, 1984, p.361.

because of the small number of fairly skilled labourers needed in the petroleum industry.

The sectoral shares of labour in Egypt are presented in table VIII-11. The changes over the 1960-1981 period were very slight and the effects were diluted by the fact that the figures are for both the public and private sectors. The most significant changes were in agriculture, construction, and services.⁴⁴ The steadily declining share of the agricultural sector can partly be explained by technology and growing mechanization in agriculture over the period. The rising labour shares of construction and services are consistent with the growth in nontradables during a boom.

The pattern of labour movements becomes more apparent in the graph in figure VIII-12. Using the same categorization as that for investment, the graph shows the change in the sectoral shares of labour during the windfall. The sectors that experienced no change in their labour share were the import substituting industrial sector and, predictably, the booming petroleum enclave. The traded goods sector experienced a sharp decline in its labour share whereas labour in the nontraded goods sector increased considerably.

An additional dimension in the Egyptian labour market is immigration to the oil exporting countries of the Middle East. Although no

⁴⁴ This analysis assumes that labour movements are fairly fluid. Unions are weak in Egypt, so wage and employment rigidity resulting from union pressure is not very important. There are other types of rigidities, for example associated with skills or government employment legislation that restricts firing, but in the aggregate the assumption of relatively flexible labour movements is not implausible over a twenty year period.

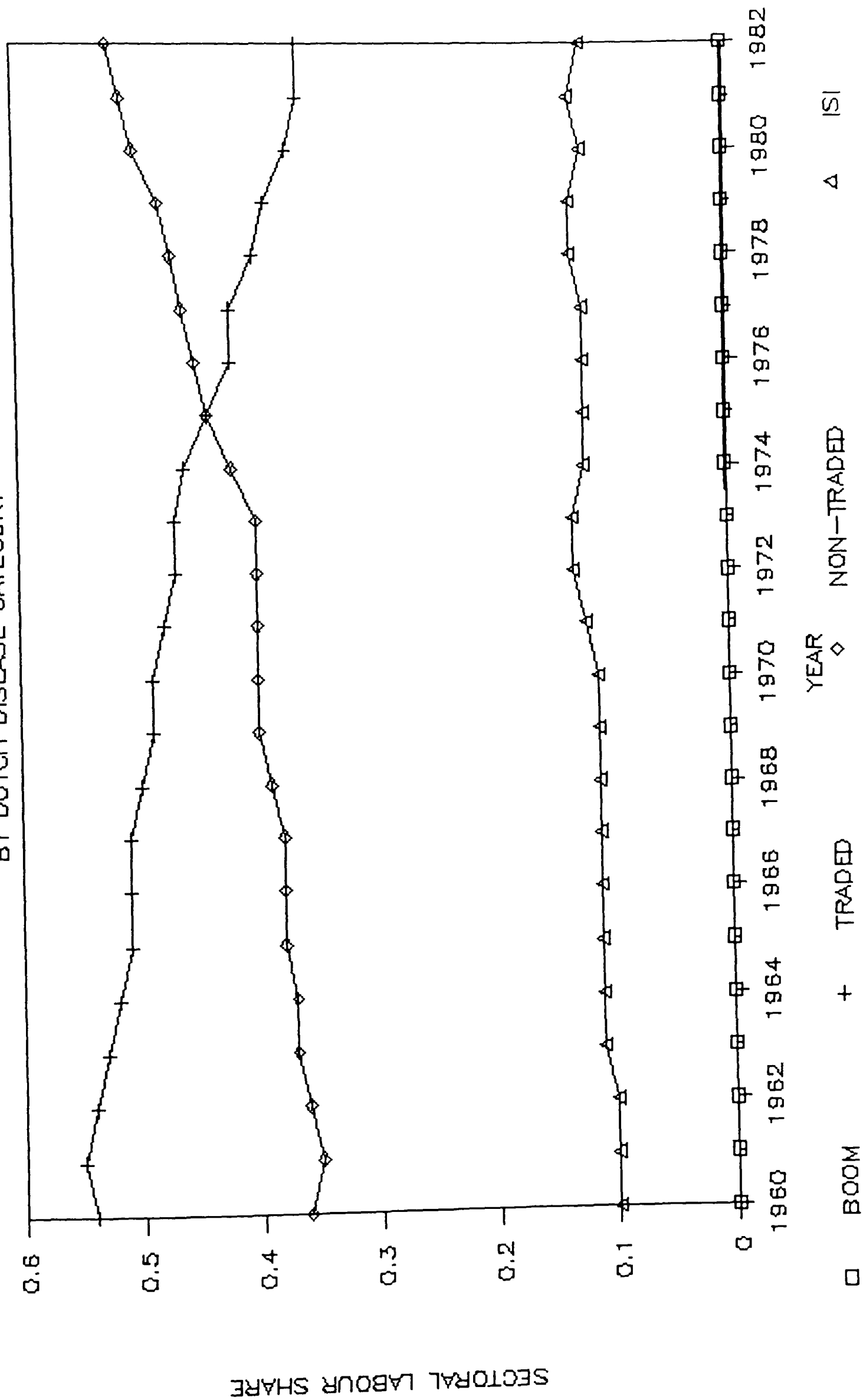
ABLE VIII-11: SECTORAL LABOUR FORCE AS A SHARE OF TOTAL LABOUR, 1960-1981

YEAR	AGRICULT	INDUSTRY	HOUSING	CONSTRUCT	ELECTRIC	UTILITIES	TRADE & TRANSPORT FINANCE	SERVICES	PETROLEUM	
1960	0.54	0.10	0.003	0.03	0.002	0.004	0.11	0.04	0.18	-
1961	0.55	0.10	0.003	0.03	0.002	0.004	0.10	0.04	0.18	-
1962	0.54	0.10	0.003	0.04	0.002	0.004	0.10	0.04	0.17	-
1963	0.53	0.11	0.003	0.05	0.003	0.004	0.10	0.04	0.17	-
1964	0.52	0.11	0.003	0.05	0.003	0.004	0.10	0.04	0.18	-
1965	0.51	0.11	0.003	0.05	0.002	0.004	0.10	0.04	0.19	-
1966	0.51	0.11	0.003	0.04	0.002	0.004	0.10	0.04	0.19	-
1967	0.51	0.11	0.003	0.04	0.002	0.004	0.10	0.04	0.19	-
1968	0.50	0.11	0.02	0.03	0.002	0.004	0.10	0.04	0.19	-
1969	0.49	0.11	0.02	0.04	0.003	0.004	0.10	0.04	0.19	-
1970	0.49	0.11	0.02	0.05	0.003	0.004	0.10	0.04	0.19	-
1971	0.48	0.12	0.02	0.04	0.004	0.004	0.10	0.04	0.19	-
1972	0.47	0.13	0.02	0.04	0.004	0.004	0.10	0.04	0.20	-
1973	0.47	0.13	0.02	0.03	0.004	0.005	0.10	0.05	0.20	-
1974	0.46	0.12	0.02	0.03	0.004	0.005	0.10	0.04	0.22	0.002
1975	0.44	0.12	0.01	0.05	0.004	0.005	0.10	0.04	0.22	0.002
1976	0.42	0.12	0.01	0.05	0.005	0.006	0.11	0.04	0.23	0.002
1977	0.42	0.12	0.01	0.05	0.005	0.006	0.11	0.04	0.24	0.002
1978	0.40	0.13	0.01	0.05	0.005	0.006	0.11	0.04	0.24	0.002
1979	0.39	0.13	0.01	0.06	0.006	0.006	0.11	0.04	0.24	0.002
1980	0.37	0.12	0.01	0.06	0.005	0.006	0.12	0.04	0.26	0.002
1981	0.36	0.13	0.02	0.06	0.005	0.006	0.11	0.04	0.28	0.002

SOURCE: SHURA COUNCIL, 1985.

Figure VIII-12

SECTORAL LABOUR SHARES BY DUTCH DISEASE CATEGORY



comprehensive figures on the number of migrants from Egypt are available for the recent period, estimates are that there were 400,000-500,000 migrants in the mid-1970s. This rose to over 1 million in the early 1980s and by 1985 the level may have been over 2.5 million because of growing demand for Egyptian labour in Iraq.⁴⁵ This massive immigration in response to the oil boom in the economies of neighbouring countries had the effect of increasing the tradability of Egyptian labour. Because the windfall was much greater and labour was scarce in the Gulf economies, considerable wage differentials existed between Egypt and its neighbours. Few of the Egyptian migrants went to work in the booming petroleum sector in the Gulf economies; rather, they worked largely in the nontradable areas of construction and services.

Factor Movements and Output

The above analysis indicates that factors did not behave in the classic way during the windfall in Egypt and that the pattern diverged from that expected in the standard Dutch disease model. The booming sector behaved like a typical enclave, attracting a higher investment share and virtually no labour. The traded goods sector typically lost labour but experienced no change in its investment share. This was probably a reflection of the relative cheapness of capital goods and the existence of investment subsidies, particularly to capital intensive land reclamation projects in tradable agriculture.

⁴⁵ Approximately 5% of the labour force was abroad in the mid-1970s and 9-10% by 1981/2. Commander, 1987, p. 125.

The nontraded goods sector had reduced investment, partly reflecting the shift out of housing and into other activities and partly indicating the constraints in the supply of nontradable capital goods. The increase in labour in nontradable activities can be interpreted in part as an attempt to respond to demand in the face of supply shortages for capital. In addition, the rising share of employment in nontradables partly reflects the fact that many nontradable activities, such as services, are highly labour intensive.

The import substituting sector had higher investment shares during the windfall which was a reflection of the growth of highly capital intensive industrialization because of cheap foreign exchange and protection, subsidies to capital, and greater confidence. Because tradable capital goods were in plentiful supply and relatively cheap, there was no change in the labour share in industry.⁴⁶

In general, the labour factor behaved as expected in a Dutch disease framework. The pattern of investment, however, was atypical since the share of capital formation rose in industry and declined in nontradables. This pattern can be readily explained in the context of the model of investment determination described previously. Essentially, the evolution of factors was determined by the protective structure, the nature of the capital goods supply industry, and the effect of expectations.

⁴⁶ This is further confirmation of the findings at the firm level in chapter IV and at the aggregate level in this chapter that that much of the private investment that occurred was capital intensive.

The increased savings, especially in the form of foreign assets, and investment represented the usual response to a temporary shock. Because the *infitah* legislation permitted both public and private agents to accumulate foreign assets, it was possible to phase the effect of the boom somewhat. However, the shift in the distribution of investment between tradables and nontradables implied that agents perceived the windfall to be, in some sense, permanent.⁴⁷ Under putty-clay technology, where capital is mobile *ex ante* but not *ex post*, a shift of investment to nontradables, such as services or construction, or to *de facto* nontradables, such as protected industry, indicates that agents expect that the change in relative prices that resulted from the windfall to persist at least in the medium term. If agents had perceived the shock as purely temporary, the irreversibility of investment would make it not worthwhile to alter decisions about the sectoral distribution of capital formation and the composition of investment costs.

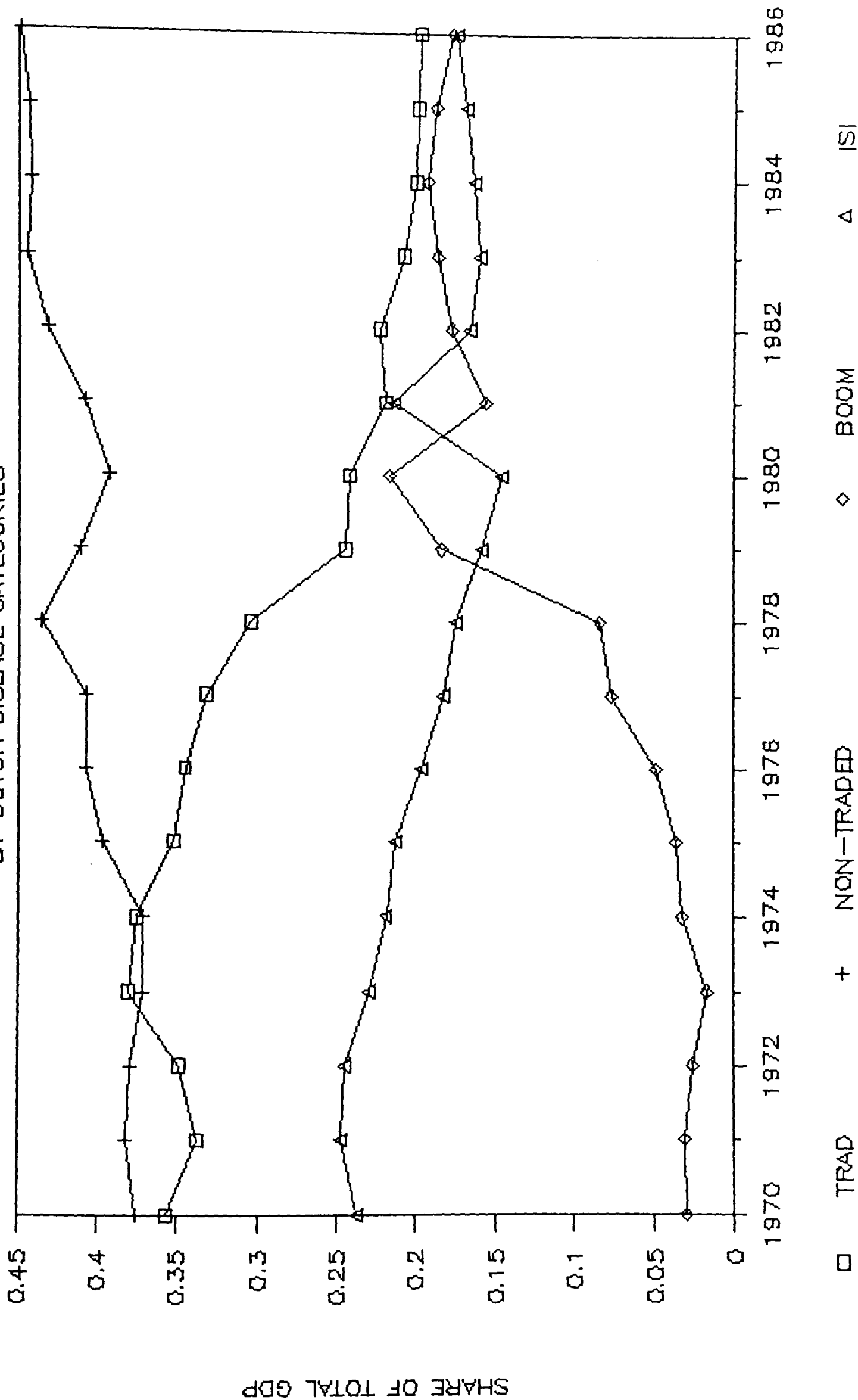
The output implications of the shock are depicted in figure VIII-13 using the same sectoral categorizations as previously. The figure depicts the effect on real GDP of the trade shock and the consequent shifts in factor shares.⁴⁸ In keeping with the Dutch disease model, booming sector output rose sharply, the traded sector declined and the nontraded sector grew during the windfall. From relative parity at the start of the period, the nontraded sector

47 Such a response to the oil shock of the 1970s is not totally irrational given the efficacy of the OPEC cartel at the time. The actions of many economic agents, including the international banks, governments in oil importing countries, and planning authorities in the oil exporting nations, were based on the assumption that the rise in oil prices in the 1970s was permanent.

48 Total GDP was used since no breakdown for private sector output is available.

Figure VIII-13

SECTORAL GDP SHARES BY DUTCH DISEASE CATEGORIES



became twice as important as traded activities in terms of output in the wake of the windfall. The import substituting sector, industry, experienced a decline in output, despite the growth in its investment share, reflecting the rising capital-output ratios and possible inefficiency of production in the sector.

The relationship between investment and output is analyzed in table VIII-14 using incremental capital-output ratios (ICORs). ICORs have been calculated for total investment and private investment with and without the petroleum sector. Table VIII-14 also provides ICORs for total investment divided into the traded, booming, import substituting and nontraded sectors.⁴⁹ ICORs should only be treated as indicative measures since they only capture a crude relationship between investment and aggregate output.⁵⁰ Nevertheless, the figures reveal that, in addition to very high ICORs that imply very low output resulting from investment, ICORs have actually been negative for several years in succession.

A single negative ICOR is plausible since a shock may affect output while the level of investment is maintained. However, several negative ICORs in succession have to be explained in terms of congestion costs and externalities or in terms of investment in the rent-seeking sector when rents are rising. Negative ICORs have

⁴⁹ These sectoral ICORS have been calculated as public and private investment in a sector divided by the change in GDP generated from that sector.

⁵⁰ Since no figures are available for GDP of the private sector, a large part of the calculated ICOR reflects productivity in the public sector.

TABLE VIII-14: INCREMENTAL CAPITAL TO OUTPUT RATIOS (IN REAL TERMS)

YEAR	TOTI/ GDP	TOTI/ GDP (NON-OIL)	PRIVI/ GDP	PRIVI/ GDP (NON-OIL)	TRADED ICOR	BOOM ICOR	ISI ICOR	NON-TRAD ICOR
1962	0.09	0.09	0.00	0.00				
1963	0.36	0.36	0.02	0.02				
1964	12.55	12.55	0.72	0.72				
1965	-0.39	-0.39	-0.02	-0.02				
1966	0.60	0.60	-0.32	-0.32	-1.92	0.00	-0.24	
1967	0.85	0.42	0.01	0.00	0.06	0.00	0.05	
1968	-0.43	-0.41	0.10	0.09	-0.64	0.00	0.77	
1969	1.25	-21.61	0.00	0.08	-0.32	0.00	-0.56	
1970	0.83	-2.45	0.02	0.02	0.06	-1.43	0.05	
1971	-0.28	0.01	-0.07	-0.08	0.39	0.00	-0.16	-0.01
1972	0.09	-0.01	0.01	0.01	-0.60	0.71	-2.37	0.36
1973	1.17	-0.01	-0.04	-0.03	0.07	-0.21	2.18	1.48
1974	0.27	0.00	0.04	-0.02	-0.12	0.68	0.97	0.46
1975	7.75	0.14	2.10	1.98	-0.61	2.45	-31.77	2.78
1976	0.16	0.00	0.24	0.08	-0.08	0.73	-4.78	-0.29
1977	0.33	0.00	0.02	0.05	0.28	0.01	3.50	0.30
1978	4.65	0.28	0.81	7.87	-0.09	-0.74	-9.73	1.19
1979	0.30	0.00	0.15	0.11	-40.48	0.17	0.60	0.41
1980	-0.01	0.00	-0.03	-0.04	0.00	-0.01	-0.48	0.05
1981	0.27	0.00	-0.06	0.24	1.79	0.76	-0.01	0.37
1982	-0.78	0.00	-0.29	-0.36	0.49	11.16	0.03	-0.32
1983	-0.07		-0.03	-0.05				
1984	-0.02		0.03	0.04				
1985	-0.23		0.02	0.02				
1986	0.46		-0.01	-0.01				

- NOTES: - ICORS WERE CALCULATED AS THE CHANGE IN THE CAPITAL STOCK, I.E. REAL NEW INVESTMENT DIVIDED BY THE CHANGE IN REAL GDP. THE THE NON-OIL ICORS IN COLUMNS 2 AND 4 HAVE HAD THE PETROLEUM SECTOR SUBTRACTED FROM BOTH THE INVESTMENT AND OUTPUT FIGURES.
- THE SECTORAL ICORS ARE DEFINED AS: TRADED=AGRICULTURE, BOOM=PETROLEUM, ISI=INDUSTRY, AND NON-TRADED=CONSTRUCTION+HOUSING+SERVICES+TRADE+FINANCE+TRANSPORT+UTILITIES.
- NO FIGURES ARE AVAILABLE FOR GDP DISAGGREGATED BY THE PUBLIC AND PRIVATE SECTORS. CONSEQUENTLY, THE ICORS FOR PRIVATE INVESTMENT IN COLUMNS 3 AND 4 HAVE TOTAL GDP IN THE DENOMINATOR AND DO NOT STRICTLY REPRESENT THE PRIVATE SECTOR ICOR.
- FIGURES FOR PRIVATE INVESTMENT IN THE PETROLEUM SECTOR WERE ONLY AVAILABLE UP TO 1982, THEREFORE IT WAS ONLY POSSIBLE TO CALCULATE THE NON-OIL ICOR UP TO 1982.

SOURCE: SEE DATA APPENDIX.

been particularly common in the traded and industrial sectors in Egypt as well as throughout the 1980s.⁵¹

Although the real appreciation of the exchange rate in Egypt had positive effects on aggregate private investment, the real gains were for the non-traded sector, in keeping with the Dutch disease model, including import substituting industry. However, output increases did result from the higher rate of capital formation in non-traded goods, whereas they did not in the industrial sector where protection altered resource allocation.

When the windfall subsided and a real depreciation of the exchange rate occurred,⁵² the existence of protection meant that none of the conventional gains from depreciation resulted. For protected firms oriented toward the domestic market, a depreciation simply meant a rise in costs, which was eventually passed on to consumers by oligopolistic firms, rather than an increase in demand.⁵³ This implies that the Marshall-Lerner conditions do not hold for investment under protection. In other words, the negative effects of a depreciation on the inelastic demand for capital goods imports are not offset by increased exports, at least in the short run and certainly not if protection is maintained.

⁵¹ This is consistent with many of the survey results presented in chapter IV.

⁵² The depreciation of the aggregate real exchange rate is depicted in figure VIII-4.

⁵³ The rise in investment costs during the 1980s, partly a result of the depreciation of the black market exchange rate, is depicted in figure VII-1.

Despite the government's targets for greater reliance on the private sector, many of the firms which had evolved during the windfall were accustomed to production inefficiency and high profits, and seemed an unlikely engine of future growth without considerable reform. Many of the firms surveyed in chapter IV complained about the rising costs of imported inputs needed to operate their imported machines. Because firms had invested as if the relative price structure caused by the windfall would persist and technology was putty-clay, it was not possible to adapt quickly to changing economic circumstances. There was no question of reducing protection after the windfall, since the two phenomena were unrelated in the eyes of policy-makers. The phasing out of protection would also face the obstacle of an increasingly powerful private sector political lobby.

CHAPTER IX

CONCLUSIONS

The results of this research have many general implications for economic methodology and approaches to investment modelling as well as more specific consequences for policy in Egypt. These conclusions will be discussed below.

Methodological Conclusions

A number of the conclusions from this research are methodological ones about how to approach the question of what determines private investment and what effect government policy has on the process. By combining a historical perspective with an integration of the microfoundations and macroeconomics of investment at the empirical level, it has hopefully been possible to provide a more realistic model of the causes of capital formation in the economy. Rather than simply hypothesizing a theoretical model of the determinants of aggregate investment, the macroeconomic specification emerged out of a detailed analysis of the historical experience and of firm behaviour.

The microfoundations in part two also revealed the complex transmission mechanisms whereby government policy affects private activity. This indicated the need to broaden the terms of the conventional crowding out versus crowding in debate to take into account the array of government policies that impinge on private

investment decisions. The analysis highlighted some of the dilemmas for policy makers, such as the investment gains in response to protection at the microeconomic level and the export losses at the macroeconomic level. Similarly, the evidence from firms gave an indication of the macroeconomic costs that resulted from financial repression and from having to hedge uncertainty.

The approach taken at the macroeconomic level in part three addressed many of the methodological weaknesses in the existing literature on investment. The common problem of "spurious correlations" in investment functions was addressed by testing the time series for stationarity and insuring that the residuals from the econometric estimation were "white noise." The consequences of not taking into account the stationarity of the time series was considered for an array of standard models and the likely misspecification and conflicting empirical results were discussed.

By using two different estimation techniques along with the microfoundations, the validity of the model hypothesized in chapters III and VI was confirmed further. A comparison of the actual and estimated values for private investment over the 1960-86 period revealed how well the model fit the data despite the considerable shocks to the economy over the period. This implied that the underlying economic determinants of private investment or, in some sense, the "deep parameters" over the 1960-86 period had been captured.

The use of an error correction approach and the application of unrestricted dynamic modelling allowed for some of the effects of expectations and uncertainty on aggregate investment. While it was not possible to do justice to the complex response to uncertainty described in chapter IV, the approach at the macroeconomic level did take into account some important features of private sector behaviour. The error correction model included an explicit term to capture the process by which rational, but fallible, agents adapted their expectations to new information about the long run equilibrium capital stock. The use of unrestricted dynamic modelling allowed for the lagged behavior^u associated with an uncertain environment.

The limits of econometric testing of whether the government "crowds in" or "crowds out" private investment and the impossibility of constructing the counterfactual were also discussed. While it is not possible to conclude whether crowding out or in occurred at the macroeconomic level, i.e. to accept the alternative hypothesis, it is possible to draw conclusions about what did not happen, i.e. to reject the null hypothesis. In addition, the model provided a framework for analyzing the effects of government policy by considering explicitly the role of a number of possible instruments such as the exchange rate, the quantity of credit available to the private sector, and the composition and financing of the government budget.

Investment Modelling and Empirical Implications

The model of investment behaviour that emerged from parts two and three had features from a number of different approaches in the literature. Firms' decisions about investment were outcomes of the oligopolistic structure of markets, putty-clay technology and financial repression. The consequences of these factors for investment determination were an important role for mark ups, internal financing, demand, and the cost of investment goods defined, not as the interest rate, but as the price outcome from the interaction of supply and demand in the market for capital goods.

By constructing an index of the relative price of investment goods, it has been possible to provide a more meaningful indicator of the true cost of capital to the firm under a repressed financial system. In an economy with a well functioning credit market, the Keynesian equilibrium condition equating the marginal efficiency of investment with the interest rate is likely to hold. However, under financial repression the interest rate is administratively determined and is not a true reflection of the cost of capital. Instead, a combination of the price of investment goods and the quantity of credit available to the private sector is a more realistic proxy of the cost of capital to the firm.

Ultimately, the investment decision depended on expected profits which were a function of demand, costs, and mark ups. The effect of government policy on private investment operated through these determinants, such as the implications of public infrastructure

investment for private production costs or the consequences for private mark ups that resulted from government restrictive licensing. This model, while particularly useful for a developing economy, may also be applicable in a number of developed economies characterized by oligopoly, rigidities in the market for capital goods and credit rationing because of imperfect information. The framework adopted here, which combines features from the putty-clay, Keynesian, Kaleckian and structuralist literature, may have more general applicability in a number of countries.

The empirical utility of the model was explored in the analysis of a trade shock and a real appreciation in chapter VIII using the "Dutch disease" literature as a framework for analyzing the sectoral behavior of private investment. Contrary to the conventional Dutch disease result of deindustrialization associated with a foreign exchange windfall, the share of private investment in industry rose while that in nontradables fell in the Egyptian case. This pattern of investment was readily explained in the context of the model presented in part two. The evolution of investment and labour shares across sectors was determined by the protective structure, the nature of the capital goods supply industry and the effect of expectations. The fact that agents altered the sectoral distribution of investment in response to the trade shock under putty-clay technology implied that they perceived that the relative price changes that resulted from the shock would persist.

Further extensions of the model have interesting implications for a range of stabilization policies. For example, policies such as

devaluation, credit ceilings and reductions in public investment, have negative effects on private capital formation. In the context of protection, putty-clay technology and inelastic demand for imports, the likely outcome of devaluation is a reduction in investment, at least in the short run until efficiency gains are achieved. Similarly, credit ceilings imposed on a repressed financial system are likely to result in a worsening allocation of resources since those who possess borrowing power are often different from those whose projects have the highest returns. The model also provided evidence of the potential negative impact of fiscal austerity and cuts in public infrastructure investment on capital formation in the private sector.

Some of the fall in investment that results from such stabilization policies may be desirable if, for example, more efficient labour intensive production results. However, the costs of this transition in factor shares may be high because firms are locked into their technological choices for long periods. An evaluation of the efficacy of stabilization policies cannot occur in an institutional vacuum and must take into account these differential effects of government policy over the short and long run. The question of how government stabilization policy can facilitate this transition to more efficient production could be an important extension of this research.

Implications for Egyptian Economic Policy

The recent Egyptian experience with investment promotion has produced mixed results. The sharp rise in the investment ratio during the 1970s seems to have resulted more from the effects of the foreign exchange windfall on demand, costs, mark ups and government spending than from the effect of the fiscal incentives offered under the *infitah* laws. The survey results in chapter IV, as well as evidence from other surveys of firms from the period, indicated that for the majority of enterprises, the *infitah* fiscal incentives did not affect their investment decisions at the margin.

However, government policy was crucial in determining the types of investment that occurred through its effect on the trade regime, the operations of the financial system, and the nature of expectations. Private investment responded to an incentive structure shaped by government policy and private sector lobbying. This incentive structure favoured capital-intensive, energy dependent, heavily indebted, import substituting activities in the protected sectors where the mark up, or economic rent, that firms could extract was greatest. By creating these rents, government policy served to "crowd in" greater private investment.

While a thorough analysis of rentier income is beyond the scope of this research,¹ the previous analysis in chapters IV, VII and VIII indicated the importance of certain privileges and subsidies granted

¹ Such an analysis is particularly difficult given the fungibility of income from rents with income from other sources. A more detailed analysis of economic policy making in rentier states would be a fruitful area for future research.

by the government to the evolution of private capital formation. Although many of these privileges existed before the *infitah*, such as subsidized credit and protection, the coincidence of the *infitah* with the foreign exchange windfall enabled private entrepreneurs to exploit these subsidies on a larger scale.

In addition to direct crowding in as a result of rental income, government policy also crowded out private activity in some cases. The survey results in chapter IV gave an indication of the rationing of inputs to the private sector that resulted from public sector priority access over certain goods and services. There was also some direct competition between public and private sector firms, although this was somewhat reduced by the tendency of the public sector to focus on serving lower income consumers while the private sector tended to produce higher quality goods. The degree to which such direct crowding out occurred tended to be very sector-specific with crowding out more likely in those areas where the government had a greater political or economic stake.²

The econometric evidence from Egypt on the effects of government policy on private investment does not point to indirect crowding out through the financial market. Although the Egyptian government borrowed heavily from domestic banks to finance the deficit, it allowed the supply of credit to expand to accommodate the private sector. None of the firms surveyed found access to credit a problem and the banks were generally highly liquid until the imposition of credit ceilings in 1987. The consequences of

² The survey results in chapter IV and in appendix D provide a number of examples.

financial repression and the government's deficit financing policy were credit rationing on the basis of reputation alongside excessive borrowing on the part of those firms that had access to credit.

Although the monetization of some of the deficit was inflationary, in the context of trends in world prices, the government's policy was fairly conservative, with the exception of the periods of war in 1956, 1967 and 1973. The government has run a surplus on the current budget since 1960, in part a reflection of rising oil revenues since the mid 1970s. The existence of a deficit on the total budget reflected the need for government borrowing from the private sector to finance the public investment budget.³ Some of this public investment, particularly that in infrastructure, may have crowded in private investment according to the econometric evidence in chapter VII.⁴ The government was also able to use some of its oil rents to keep prices of certain commodities, such as energy and food, low, thereby slowing the growth of overall inflation.⁵

With the exception of the nationalizations of 1962, which could only be called crowding out, the macroeconomic evidence indicated that

3 Hansen, 1988, pp. 131-137.

4 Some of the public investment, such as that in public sector industry, may have crowded out private activity. However, the findings in chapter IV indicate how difficult it is to assess this since public sector production constituted both a source of cheap inputs and a source of direct competition to the private sector. The econometric evidence in chapter VII found an insignificant effect for non-infrastructure government investment.

5 The rise in the inflation rate during the mid-1980s coincided with falling government income from oil rents. The government could no longer sustain its policy of transferring oil rents to the private sector through subsidies on commodities such as energy and certain food items.

government spending over the 1960-86 period seemed not to have been a substitute for private investment and may have been a complement. This could have been because during the periods of expansionary government policy, the private sector did not want to expand, such as in the wake of the nationalizations, or because the government's expansion was complementary to private investment objectives. During the *infatih*, the existence of the foreign exchange windfall favourably affected the magnitudes of the determinants of private investment as well as the government's ability to share rents with the private sector.

Government policy did not operate through indirect channels because of the structure of the financial system. Indirect crowding in was not possible because of the absence of a bond market.⁶ Indirect crowding out did not occur because interest rates were administratively determined and did not necessarily respond to changes in government borrowing.⁷ The absence of indirect channels for government policy reflected the nature of the Egyptian financial system and the credit policies followed by the Central Bank.

The effects of government policy tended to operate through direct channels. Direct crowding in occurred because of the creation of economic rents as a result of policies such as protection and subsidies to inputs like energy and credit. In addition, government investment in infrastructure contributed to crowding in of private investment by reducing private production costs. Direct

⁶ This type of indirect crowding in is discussed by B. Freidman, 1978 and 1985.

⁷ The evidence on the absence of indirect crowding out was presented in chapters IV and VII.

crowding out occurred in sectors where rationing in favour of the public sector was prevalent.

In general, the experience with economic "liberalization" in Egypt has not been one of eliminating subsidies and allowing the private sector to operate in a Walrasian market place. Rather, it has arguably implied a transfer of subsidies and rents away from the state and, in part, from consumers, in favour of private sector firms, many of which had strong ties to the government. To prove this conclusively, it would be necessary to perform a rigorous analysis of income distribution, which is beyond the scope of this research.⁸

However, the results presented here do give an indication of the importance of the privileges granted to the private sector in the form of cheap credit, a protected domestic market, lax collection of taxes, and lower real wages resulting from an array of subsidies to consumers. Arguably, without these implicit and explicit subsidies, there would not have been such a substantial rise in private investment after 1974 and the character of that investment would have been very different.

Yet despite these incentives, a climate of uncertainty has persisted, as evidenced by the extent to which firms perceived the need to hedge risk in chapter IV. The costs of this hedging to the economy were high and could have been achieved through more efficient channels such as a well functioning stock market, an operational tax collection system, and greater government

⁸ Studying income distribution is particularly difficult in the Egyptian case because of an absence of reliable data. See Hansen, 1988 for a discussion.

credibility.⁹ The continuing caution in the private sector reflected the absence of confidence in the government's policies as well as a possible awareness of their unsustainability.¹⁰

There are a number of possible justifications for the types of policies that the Egyptian government followed. One explanation is a belief in "trickle down," whereby a shift in income in favour of investors would eventually result in growth that would benefit the whole economy. Alternatively, the infant industries argument, justified in terms of learning, institutional obstacles or the need for government strategic intervention on behalf of domestic oligopolists competing with foreign oligopolists,¹¹ might be used. A political economy argument might be that the government had to pay the price for the nationalizations of the 1960s in the form of economic rents to lure the private sector back into business. What seems clear is that the government has crowded in private investment in part by creating economic rents in some sectors, in the form of protection, licenses, and an array of subsidies.¹² While this strategy was successful in increasing private capital formation, this was achieved at considerable efficiency costs.

9 A stock market would allow entrepreneurs to diversify risk without having to take on direct management of new enterprises. A functioning tax system would improve the operations of the banking system and allow the development of true joint stock companies. Greater government credibility would reduce the need to hold idle resources, such as imported inputs and empty housing units.

10 The issue of how governments achieve credibility with the private sector, especially given a volatile policy history, is an important area for further research.

11 See Yarrow, 1985 for a discussion of the theoretical justification for such government strategic intervention.

12 See Krueger, 1974 for an analysis of the consequences of rent-seeking in the context of import quotas.

The government's policy was successful in terms of increasing private capital formation, as evidenced by the rise in the ratio of real private investment to GDP from the meagre 1% of the 1960s to an approximate level of 5-6% during the 1970s and 1980s. Given the decline in public capital formation in the recent period, this rise in private investment is necessary to maintain the overall level of capital formation in the economy. However, rather than be concerned with further raising the level of private investment, the real issue for future government policy should be the efficiency and productivity of the investment that has occurred. Investment is not an end in itself, but is desirable only for its consequences for output and, ultimately, for the standards of living of the population.

Yet the evidence on capital productivity, certainly in the private sector as presented in this research and also for the public sector as discussed elsewhere¹³, is disappointing. Capital-labour and capital-output ratios have been rising steadily while the problem of unemployment has worsened. Incremental capital to output ratios have been negative for several years in succession, especially in the traded and industrial sectors. In addition, export performance has deteriorated steadily over time indicating the inability of Egyptian entrepreneurs to compete at world market prices despite decades of protection for infant industries that behave like stubborn adolescents that refuse to mature.

¹³ For an analysis of productivity in the public sector in Egypt see World Bank, 1983; World Bank, 1987; and Handoussa, 1988.

Consequently, future policy toward private investment should focus on supplanting the windfall with private domestic savings as a source for new capital formation and on increasing the efficiency of existing and future investment. The capital stock in both the public and private sectors is substantially larger than any new investment that may be forthcoming. Given the prevalence of putty-clay technology, it will be particularly difficult to achieve this transformation in factor shares and productivity for the capital stock. The government will have to evaluate a range of policy instruments that can affect productivity and the production of tradables.¹⁴ Such instruments might include a gradual reduction of protection over time possibly combined with export subsidies, institutional changes that improve technology, training or transport, or policies to reform the financial system or to reduce the costs of uncertainty to the firm. Also, by focusing on productivity rather than trying to raise the investment rate, it would be possible to avoid squeezing consumption further.

The Egyptian government has exhausted the economic growth that it was possible to generate from import substitution. The existence of a foreign exchange bonanza during the 1970s made it possible to

¹⁴ For an inventory of government policy instruments that affect the production of tradables, see Killick, 1985, p. 277. For recommendations on policies that would increase manufactured exports in Egypt, see Papanek, 1982, pp. 72-73 and World Bank, 1983. For an analysis of desirable reforms to Law 43, see Ahmed et al, 1985, pp. 91-99. The proposed changes to Law 43 include: (a) a multiple rate structure whereby incentives were targeted according to sectors or other criteria such as employment generation or export performance, (b) differential eligibility periods depending on economic criteria, (c) making the tax holiday effective after project completion, (d) a monetary ceiling on incentive benefits calculated as a percent of total investment or of profits, and (e) abolition of the customs duty exemptions and establishment of a duty drawback scheme for exporters.

prolong import substitution because of the availability of income from rents. In addition to further entrenching import substitution, the windfall of foreign exchange affected the types of investment that were made in favour of nontradables and import substitutes. However the decline in the world price of oil has made it necessary to create new, and more sustainable, sources of wealth. The government needs to encourage the transition from import substituting to exportable activities in order to move toward more sustainable development. Convincing the private sector to make this transition, particularly during a period of economic austerity, is the challenge of transforming rent-seekers into capitalists.

APPENDIX A

THE ISLAMIC FINANCIAL INSTITUTIONS

"Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done."

- John Maynard Keynes¹

Some of the most important and controversial institutions to emerge in Egypt have been the Islamic financial institutions. Essentially, Islamic banks and investment institutions substitute interest charges with equity participation because of religious prohibition of usury.² However, alongside the more conventional Islamic banks which operate under the regulations of the Central Bank of Egypt have emerged a new type of organization.³ These Islamic finance companies operate like venture capital firms or mutual funds in that they invest the assets of individuals and pay out their actual returns instead of a fixed rate of interest.⁴ These companies were unregulated, did not have banking licenses, and held deposits that were uninsured and kept in the personal accounts of their company directors.

1 Keynes, 1949, p. 159.

2 For a description of Islamic finance, see Abd El Moni'em, 1982 and Foda, 1982, pp. B6-B9.

3 Although the conventional Islamic Banks have been successful at mobilizing small savings, they have had difficulties in finding sufficient investment outlets. They also face problems because of the mismatch of their deposit maturities (short term) and investments (long term equity participation); their inability to operate in countries that require insurance for depositor's funds; and the absence of an interest-free interbank market for surplus funds.

4 The Arabic name of these institutions, "shariket tawzif el amwal", translates literally into companies to employ funds.

There are approximately 20-25 such institutions, but the largest six: El Sherif, El Rayyan, Badr, El Saad, Hoda, and El Hilal dominate. Any discussion of their operations is necessarily speculative because of the absence of published balance sheets for any of these institutions. Their success at mobilizing small savings was evidenced by their estimated one million depositors.⁵ Estimates of their total assets range from \$1 billion to \$5 billion. The main attraction for depositors was the exceptionally high rates of return offered, ranging from 20-40%.

The origins of these Islamic finance companies is in currency speculation in the own exchange market during the infitah.⁶ By borrowing in LE from the banking system, the same individuals who would later establish the Islamic finance companies were able to buy foreign exchange, largely from workers remitting their earnings, through the "own exchange" market.⁷ This foreign exchange was then deposited in the commercial banks and was used to open letters of credit for the bank's private sector customers. The profits from this currency speculation seem to have come from the combination of a depreciating LE, differential inflation rates, and the high real interest rates on the dollar in the world market. Some speculated that the high returns offered actually stemmed from a "pyramid game" whereby new depositors' funds were used to payoff old depositors.

⁵ French, 1987, p. 81.

⁶ The exception is El Sherif who started in the manufacturing of plastics, but later diversified into the more speculative activities of the other Islamic finance companies.

⁷ The same individuals whose bank accounts were closed for currency dealing in 1983 by the then Minister of Economy Mustafa Said are now the heads of the Islamic finance companies. Interview with Mustafa Said, November, 1987.

Illicit activities, gold, real estate, and some genuine industrial projects were also probably part of their portfolios. In fact, returns of 20-30% were possible by simply holding foreign exchange as well as from genuine industrial ventures.⁸

With the credit squeeze in the early 1980s, the currency speculators cut their ties with the banking system and began mobilizing savings directly. An Islamic rubric combined with high returns facilitated the attraction of savings which otherwise would have remained outside the formal banking system. Although it seems that most of their revenues continued to come from speculation, they also embarked on a number of high profile projects, often in areas such as retailing or real estate.

The government was strongly opposed to these Islamic finance companies, but was reluctant to confront them because of their economic power and the potency of their Islamic rhetoric. Although the chairman of the Central Bank warned depositors about the unreliability of the Islamic finance companies, the government waited for a considerable time before imposing any regulations or reporting requirements. The government had to turn to the Islamic financial companies for help on several occasions - such as when the new foreign exchange regime was instituted in 1987 and when the public sector Nasr automobile company was in need of hard currency for investment purposes.⁹ Eventually, in 1988 the government

⁸ See the discussion of rates of return in the chapter 4.

⁹ The government sought the cooperation of the Islamic finance companies in implementing the new foreign exchange legislation. In the past, the black market exchange dealers could raise the exchange rate through concerted action. For example, at one time the black market rate jumped from LE2.02=\$1 to LE2.30=\$1 overnight but after

imposed reporting requirements and a legal structure on the Islamic finance companies which resulted in several bankruptcies. The loss of savings in the wake of these bankruptcies has had disastrous consequences for a large number of depositors, many of whom were small savers who had placed their assets in these Islamic companies.

The economic effect of the Islamic finance companies is difficult to measure in the absence of reliable data. Their ability to mobilize savings caused many bankers to press for further interest rate increases. Although the investments made by the Islamic institutions seem to have been relatively insignificant in economic terms, they had an important effect on the expectations of Egyptian savers and investors.

those responsible were called in for a discussions the Central Bank the rate dropped back to LE2.06=\$1. French, 1987, p. 86. In the Nasr automobile case, the company borrowed \$50 million from El Saad in order to invest in the production of a new line of cars. In exchange, El Saad took control of the next two years of the public sector company's production which it sold on the market at a huge mark up.

APPENDIX B

QUESTIONNAIRE

Background

1. When was the firm established?
2. What was the initial capital? How was it financed?
3. How many shareholders are there? Are there any foreign/multinational interests?
4. What percentage of the shareholders have a role in management?
5. Do most shareholders have diversified investments?
6. Is the firm a part of a group? If yes, what are the other parts (multisectoral or vertically integrated)? Is there interaction between the constituent parts or are they run independently? Does the existence of a group result in risk diversification?
7. How many employees does the firm have?
8. What does the firm produce?
9. How many competitors does the firm have? (is market structure competitive, oligopolistic, monopolistic, monopolistic competition)
10. What are the relative share of output for the domestic market and for export? Share of government contracting?

Investment Experience

11. Describe the process by which your most recent (or first) investment project evolved with respect to the following (note timing at each stage):
 - a. conception
 - b. evaluation of feasibility

- c. market survey/evaluation of demand conditions
 - d. financing (retained earnings, share issue,
commercial bank credit, development bank credit)
 - e. legal procedures
 - f. securing foreign exchange, import requirements (what
share of investment imported?)
 - g. construction and operation
 - h. training
 - i. advertising and marketing
 - j. subsequent replacement investment - how was it
planned and financed?
12. Describe an investment project which you considered and subsequently did not implement (vis à vis above issues). What were the differences? What were the reasons behind the liquidation of investment projects?
13. What have been the rates of return on various firm investments? What were the circumstances under which different rates of return were acceptable (lower return with investments of lower risk, gains with government, etc.)?

Investment Issues

14. What is the objective of the firm (maximization of profits, sales, rate of growth, rate of return; minimum performance target)? What criteria are used to evaluate success?
15. What are the firm's pricing procedures? How are new products priced? What is the firm's sense of the price elasticity of demand?

16. Are there any government price controls on your inputs or output?
17. If cost plus pricing is used, how has the mark up changed over time? How does the mark up respond to the desire to invest? increased costs? a change in demand? shift in confidence? greater uncertainty?
18. How does the firm formulate its expectations about future levels of demand (how is target output set)?
19. Is there an efficient second hand capital goods market?
20. Has the firm ever had difficulties in securing finance? (rationing? criteria?) What were the financing terms obtained?
21. Has the firm ever had difficulties in securing foreign exchange? Has the firm ever obtained foreign exchange from the government allocation for the private sector? from the commercial banks at the incentive rate? What price is paid for foreign exchange?
22. What share of intermediate inputs are imported? What proportion of inputs (non-infrastructure) are purchased from the public sector? What proportion of sales are to the public sector? What share of output is for export?
23. Does the tax system have an effect on the choice of investment project or the means of finance? What has been the effect of government incentive policies on investment decisions at the margin (would you have invested in the absence of the incentives)?
24. What defense mechanisms does the firm have against currency depreciation, inflation, and various types of uncertainty?

Other:

APPENDIX C

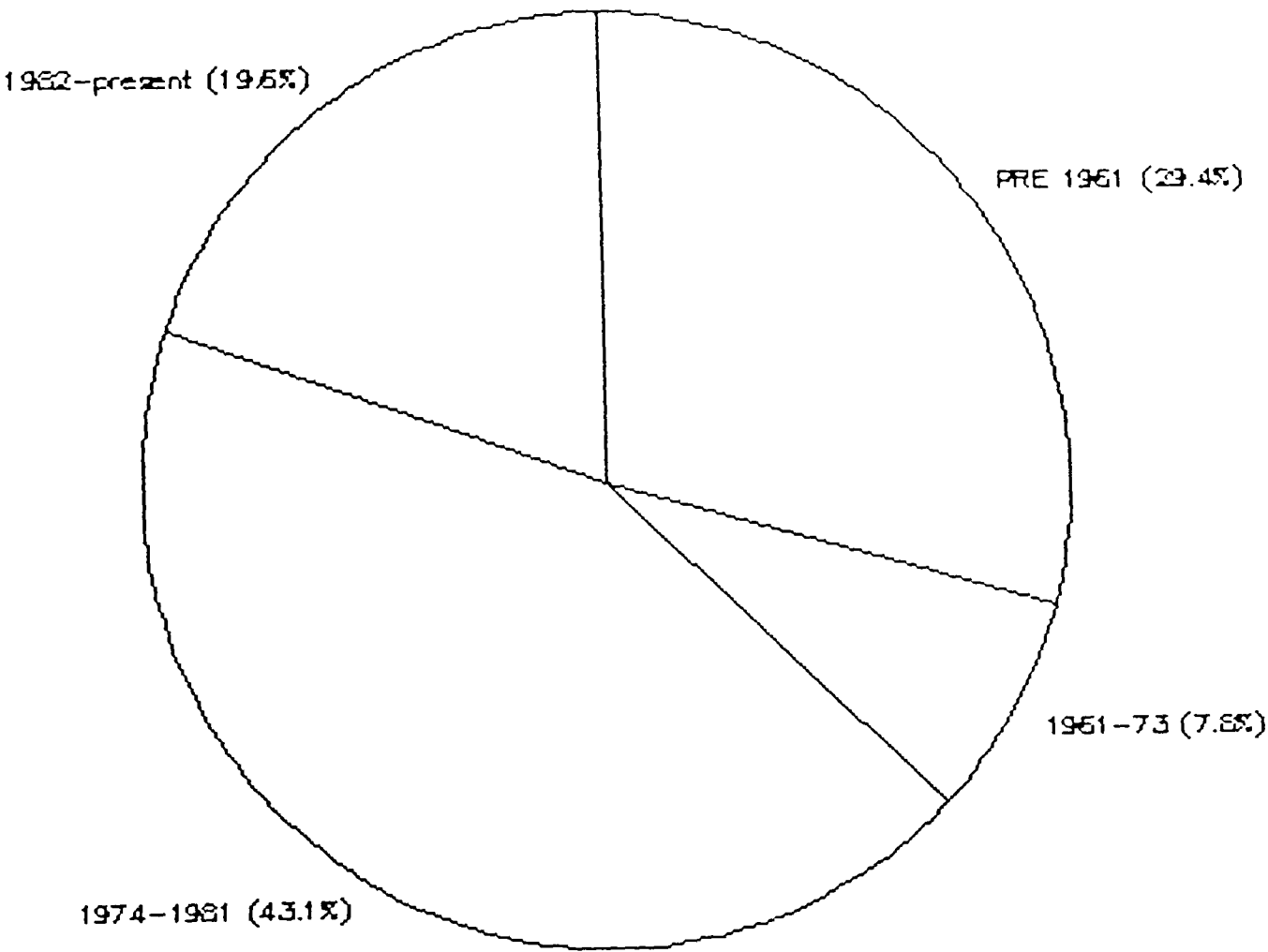
TABULATION OF SURVEY RESULTS

This appendix provides a summary of the survey results in tabular form. As stated in chapter IV, since the sample was not randomly selected, the results should not be treated as statistically significant. Nevertheless, the tabulations in this appendix are included in order to buttress the more general discussion in chapter IV. The order of the figures follows that in the questionnaire in Appendix B for those questions in which the responses could be meaningfully quantified. Some of the questions, such as on the history of the investment project, did not lend themselves to tabulation and are presented in a more qualitative form in chapter IV.

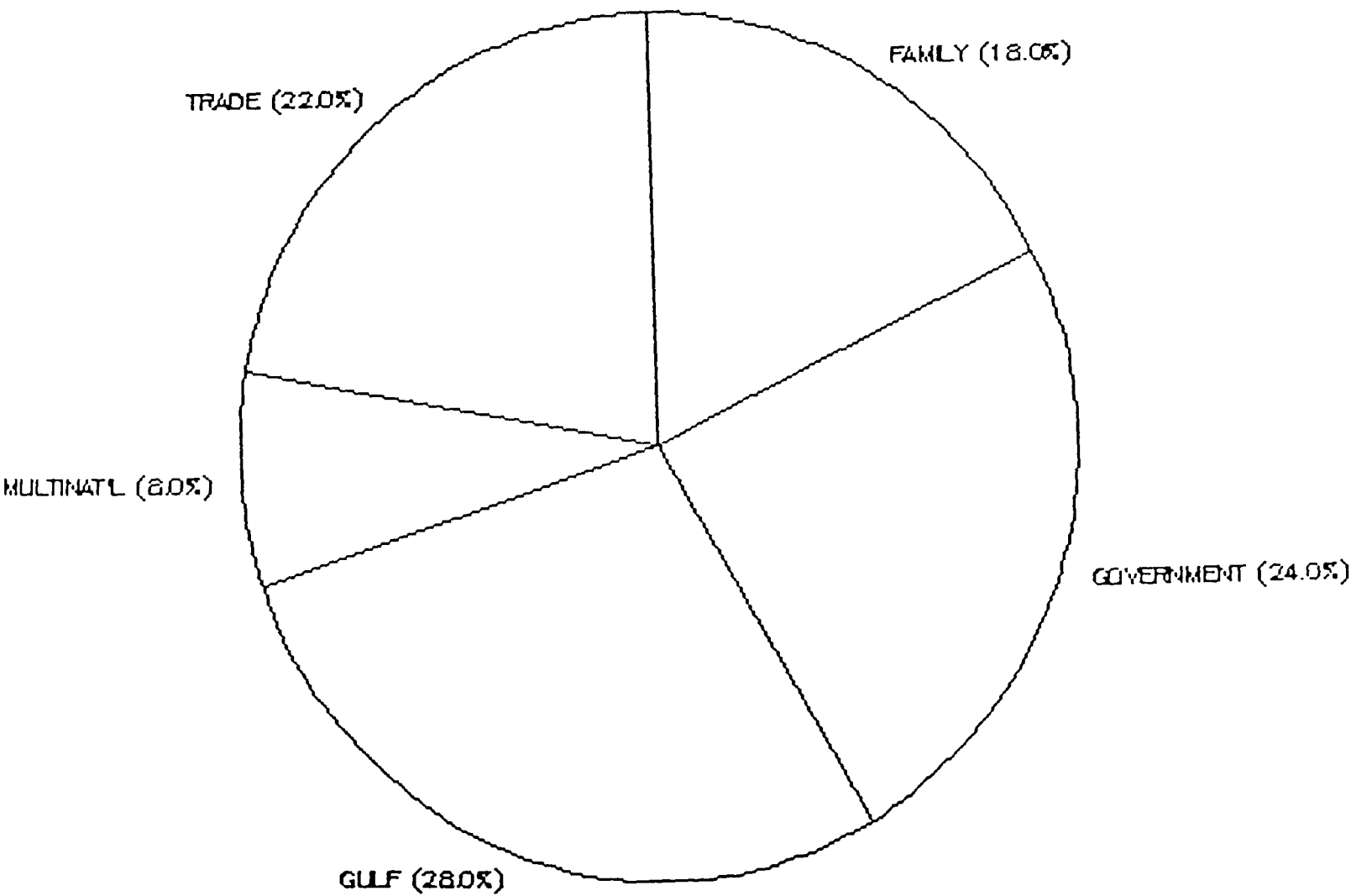
The figures are fairly self explanatory, but a few clarifications are necessary. Labour force size was measured in terms of number of full-time workers. The sectoral breakdown of economic activities was divided into: textiles (tex), food processing (food), engineering industries (eng), chemicals (chem), metals (met), construction (cons), finance (fin), trade (trad), services (serv), wood and furniture (wood), agriculture and land reclamation (agr), and other (oth). The histogram is presented in terms of the primary activity, on which the interview concentrated, and the secondary activity in cases where firms were part of a group. The methods of hedging uncertainty were divided into foreign exchange hedging, holding inventories of imported inputs, cultivating links with the government, diversifying across and within sectors, and

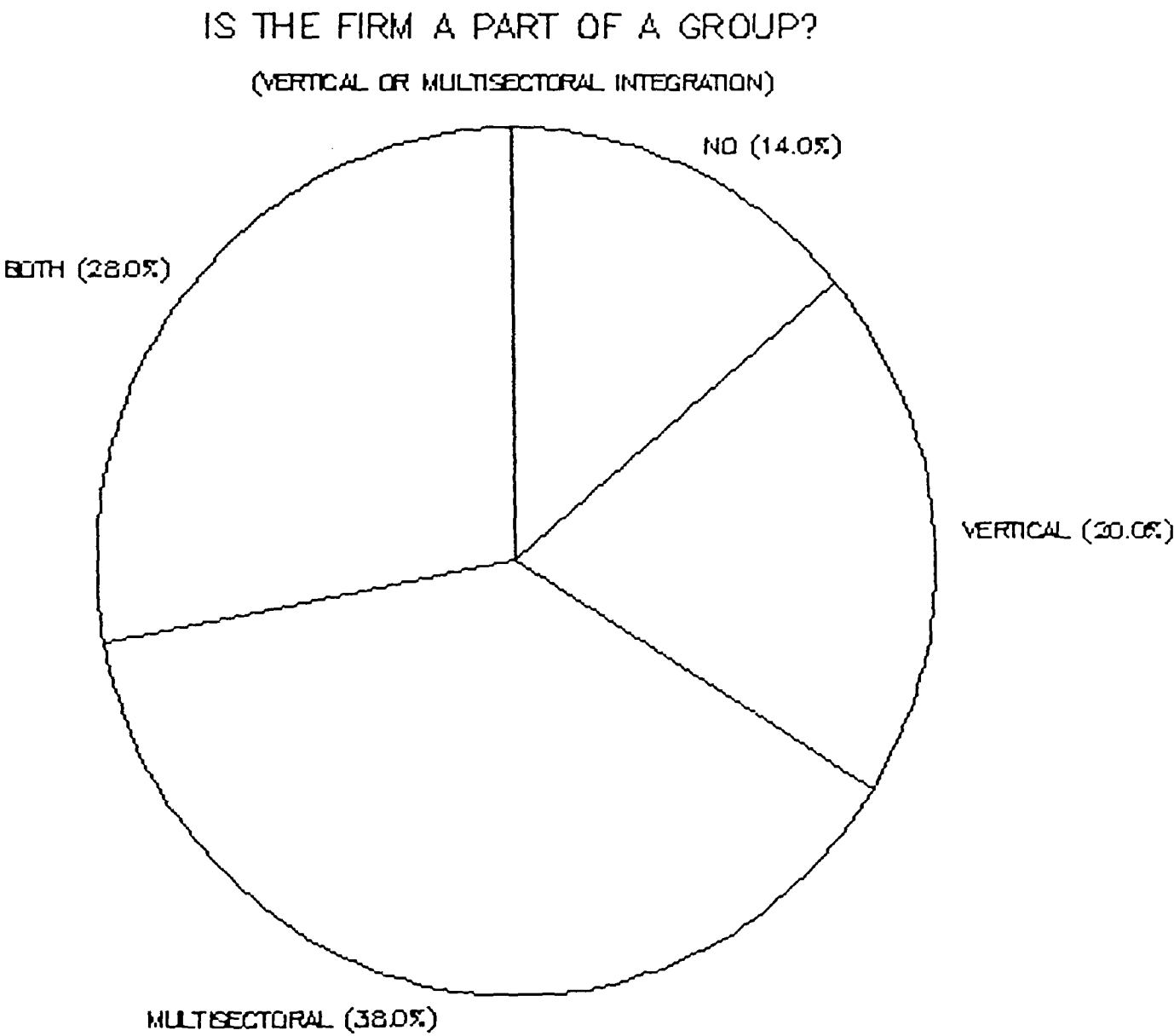
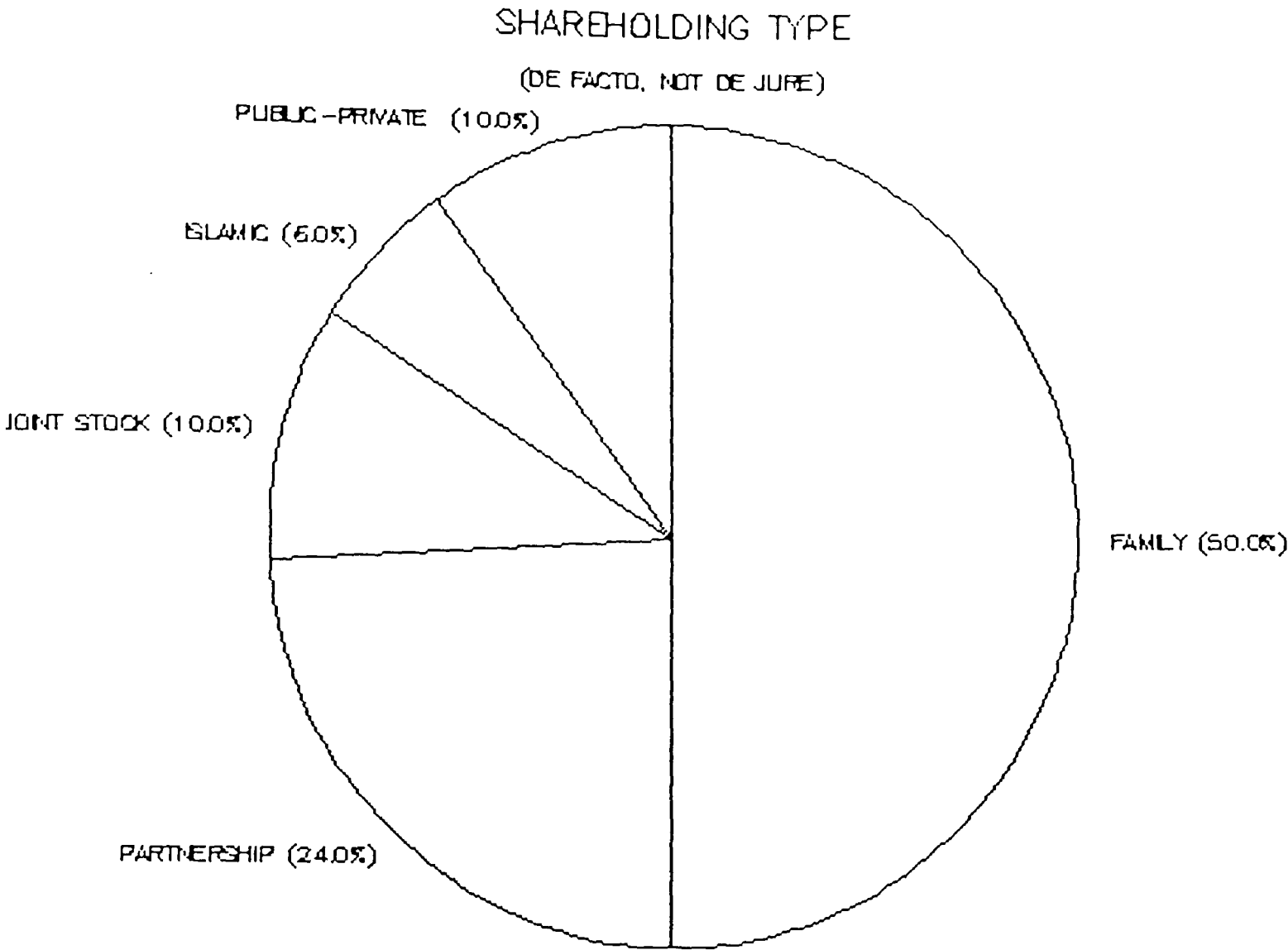
timing in terms of lagging investment responses or insuring that projects have quick returns.

ESTABLISHMENT DATE

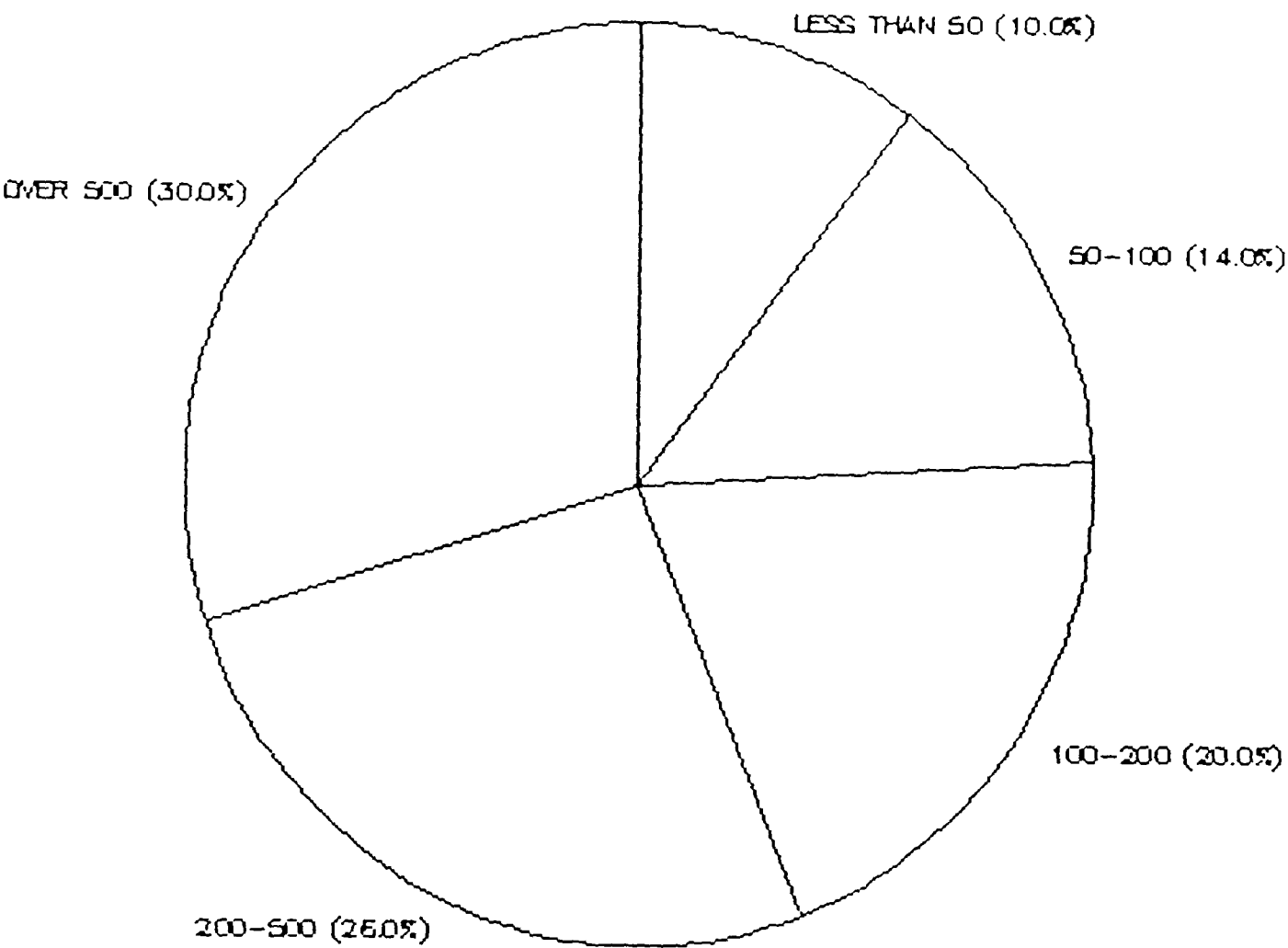


ORIGINS OF INVESTMENT PROJECT

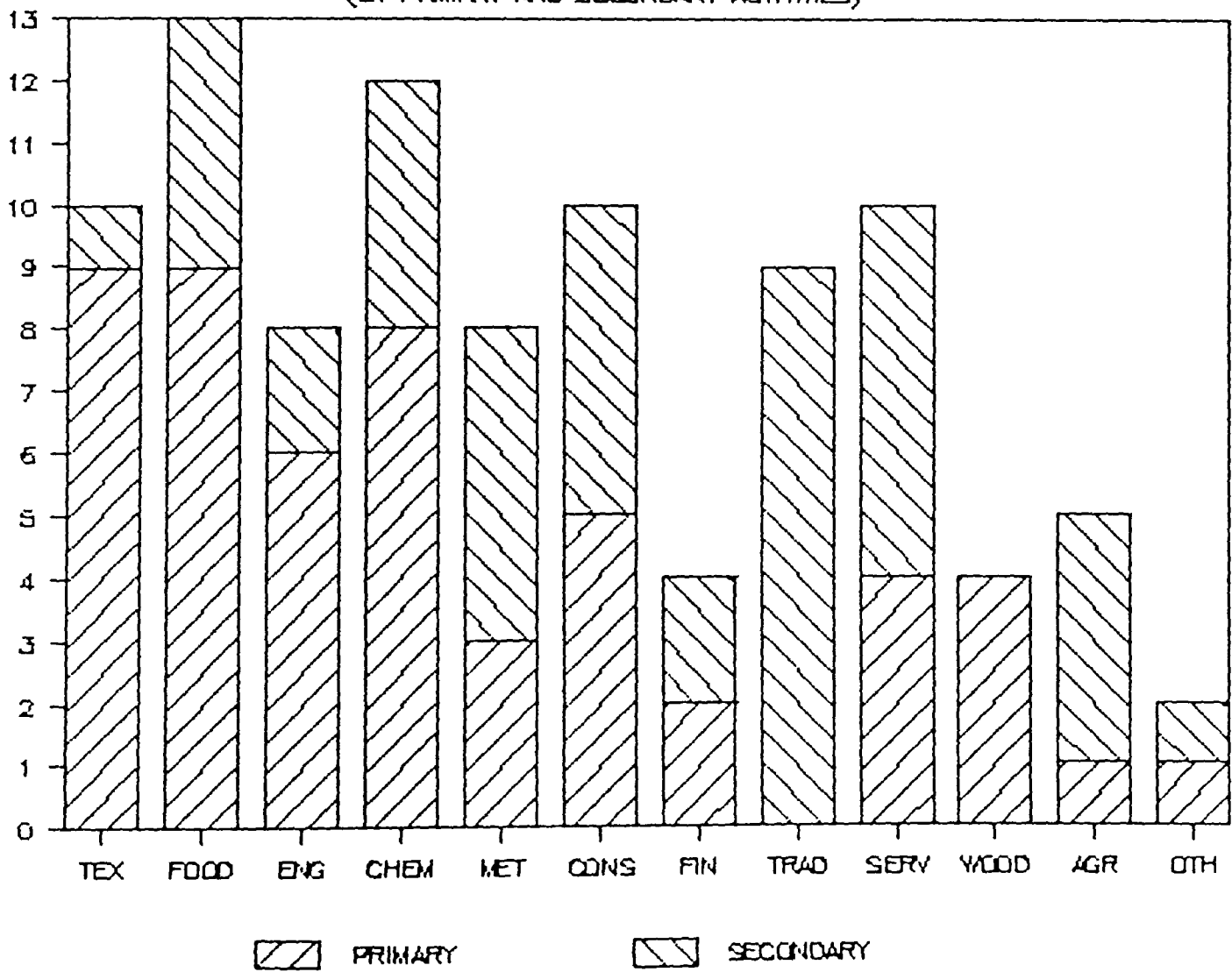




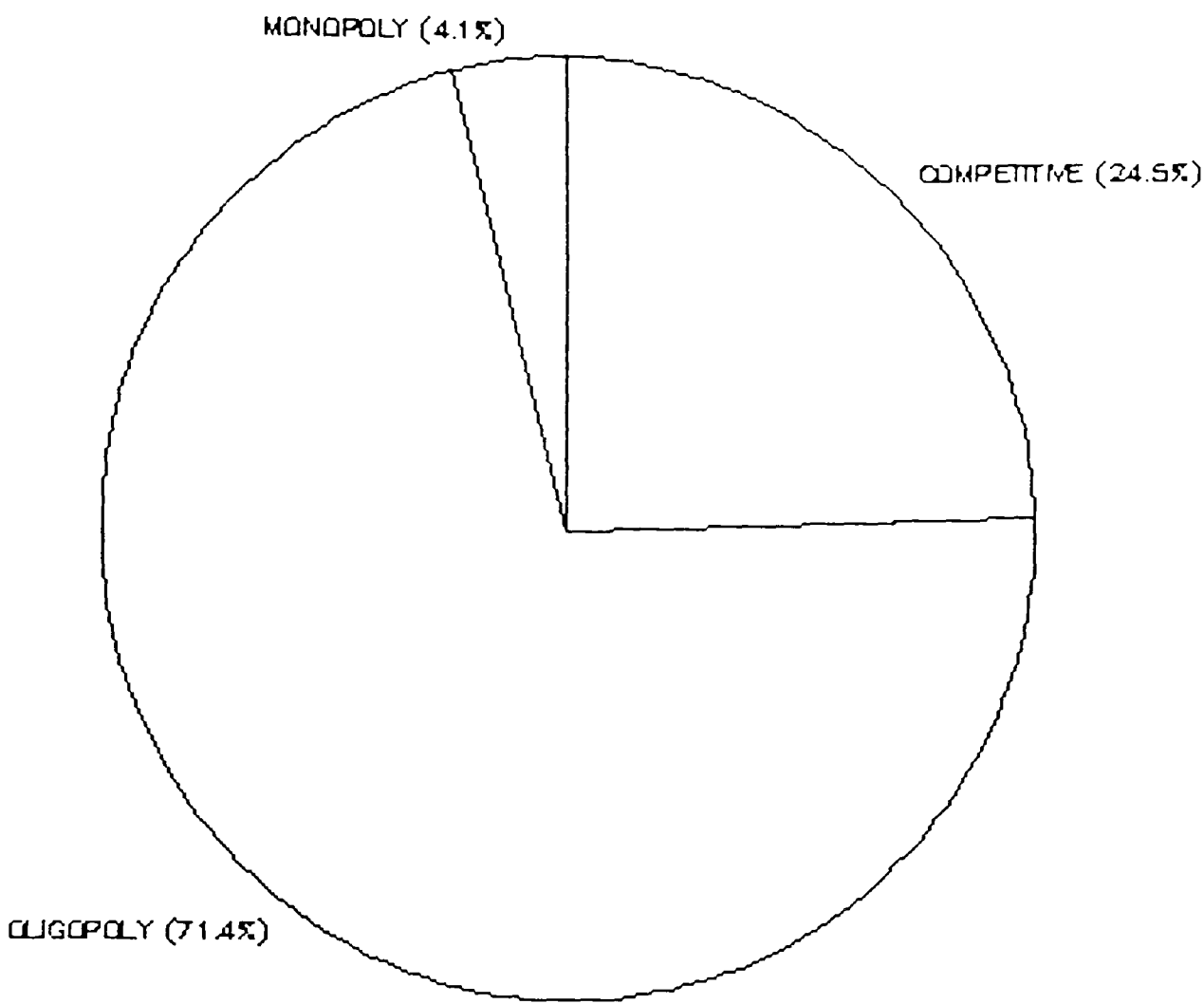
LABOUR FORCE SIZE



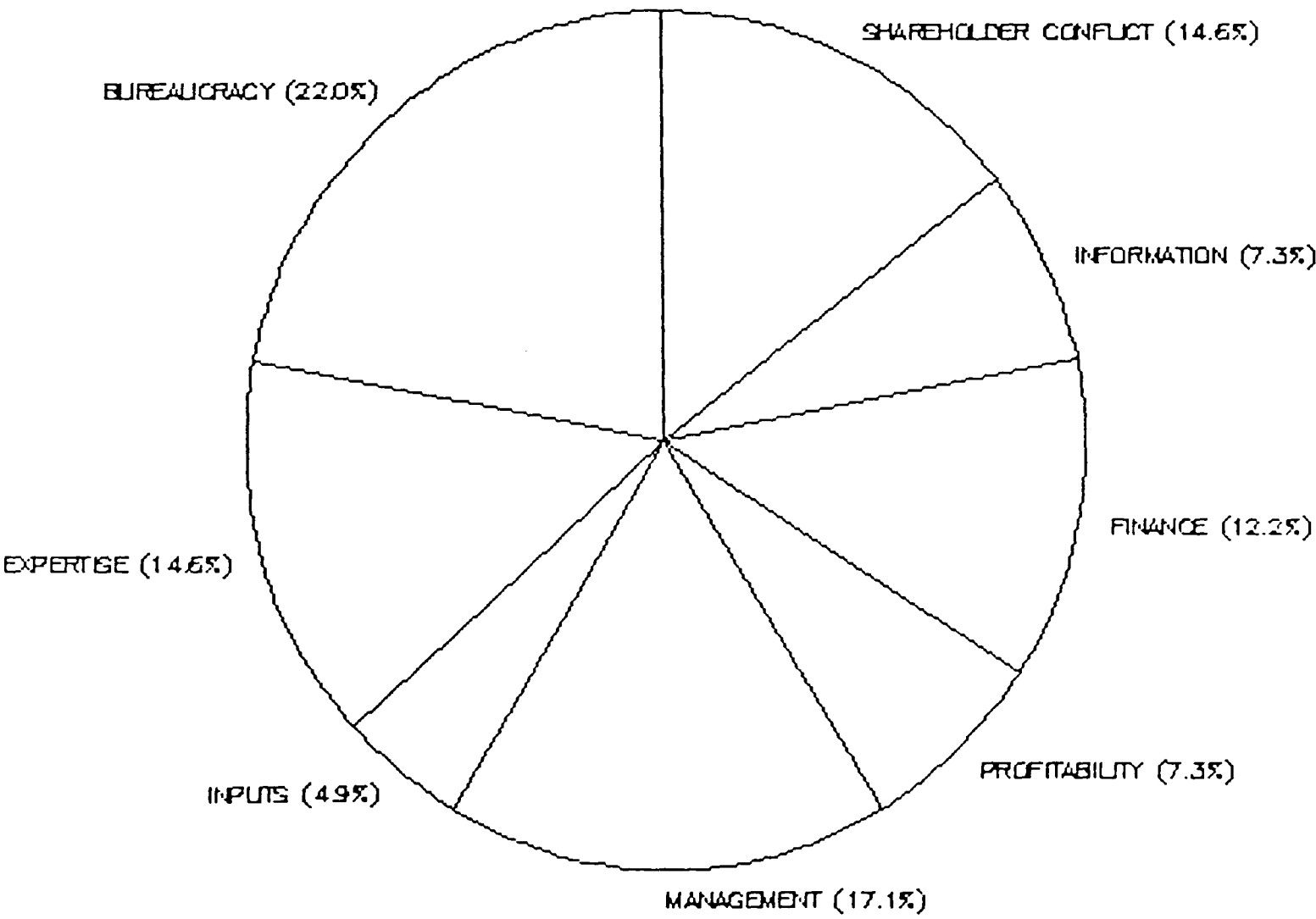
SECTORAL BREAKDOWN—ECONOMIC ACTIVITIES
(BY PRIMARY AND SECONDARY ACTIVITIES)

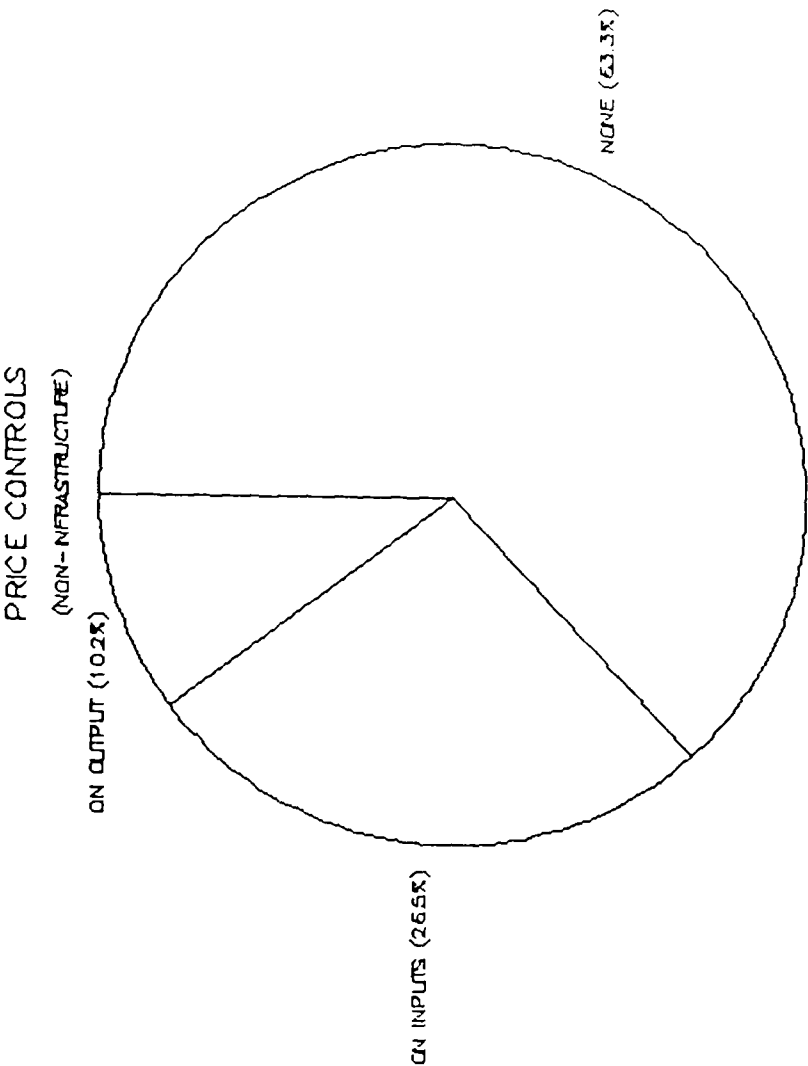


MARKET STRUCTURE

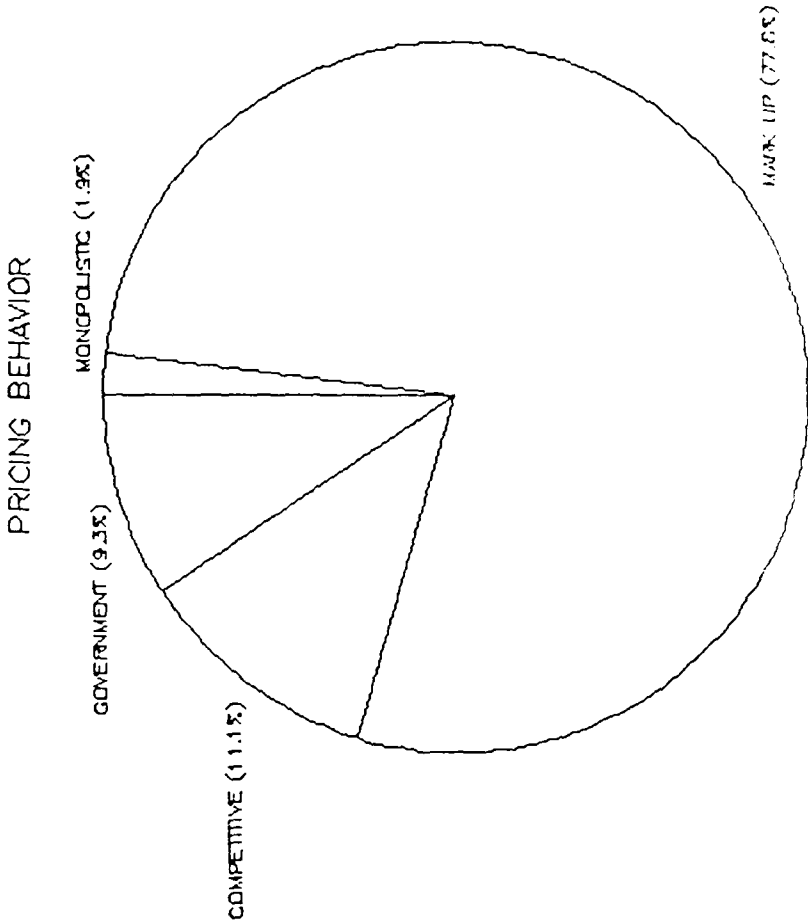
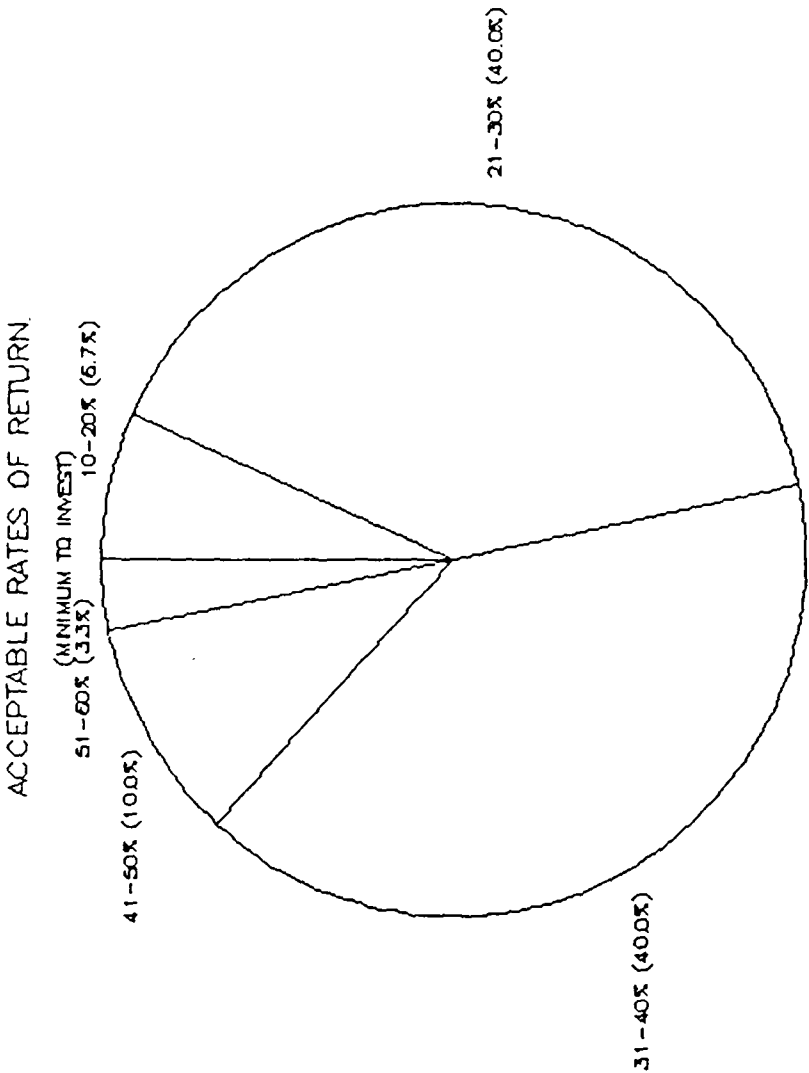
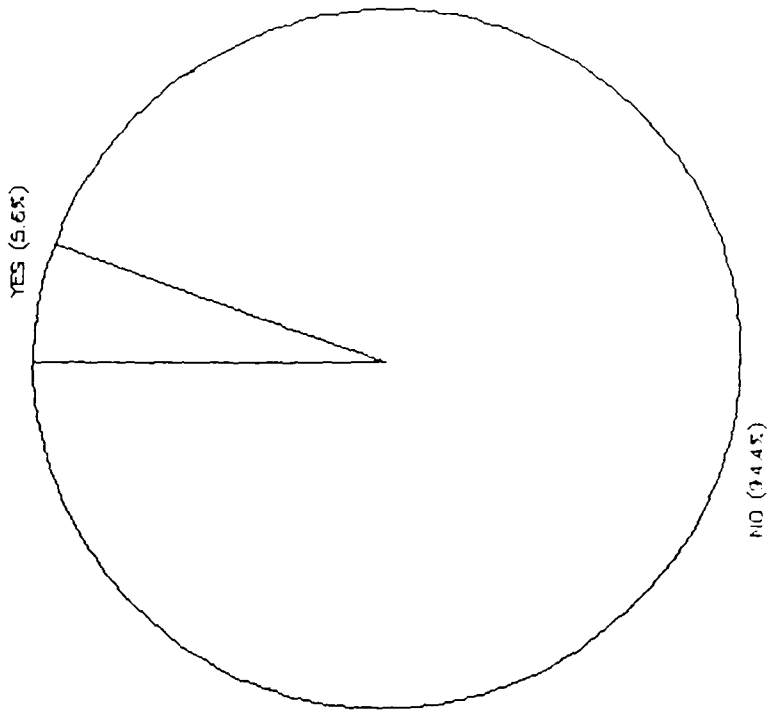


CONSTRAINTS TO NEW INVESTMENT PROJECTS

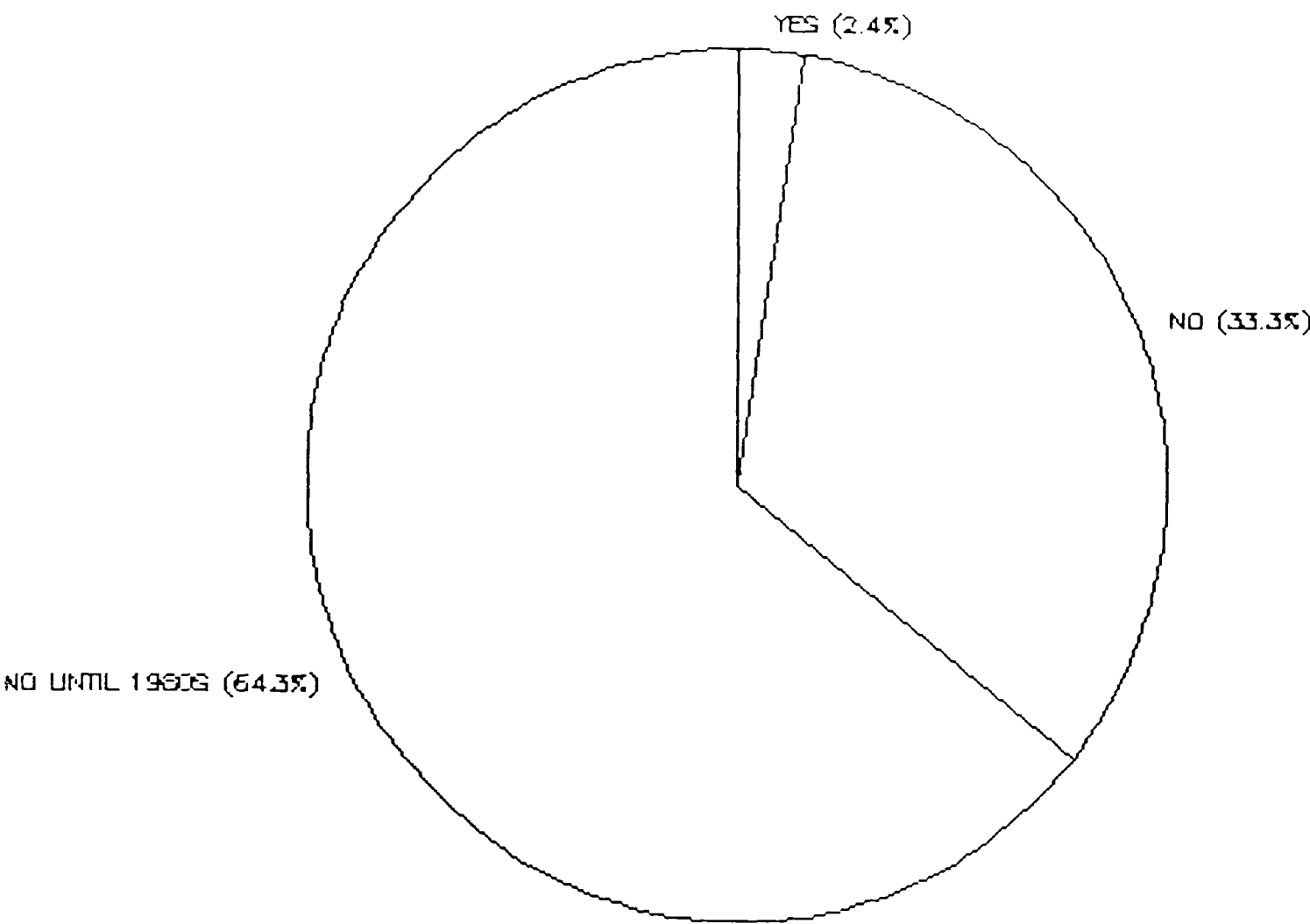




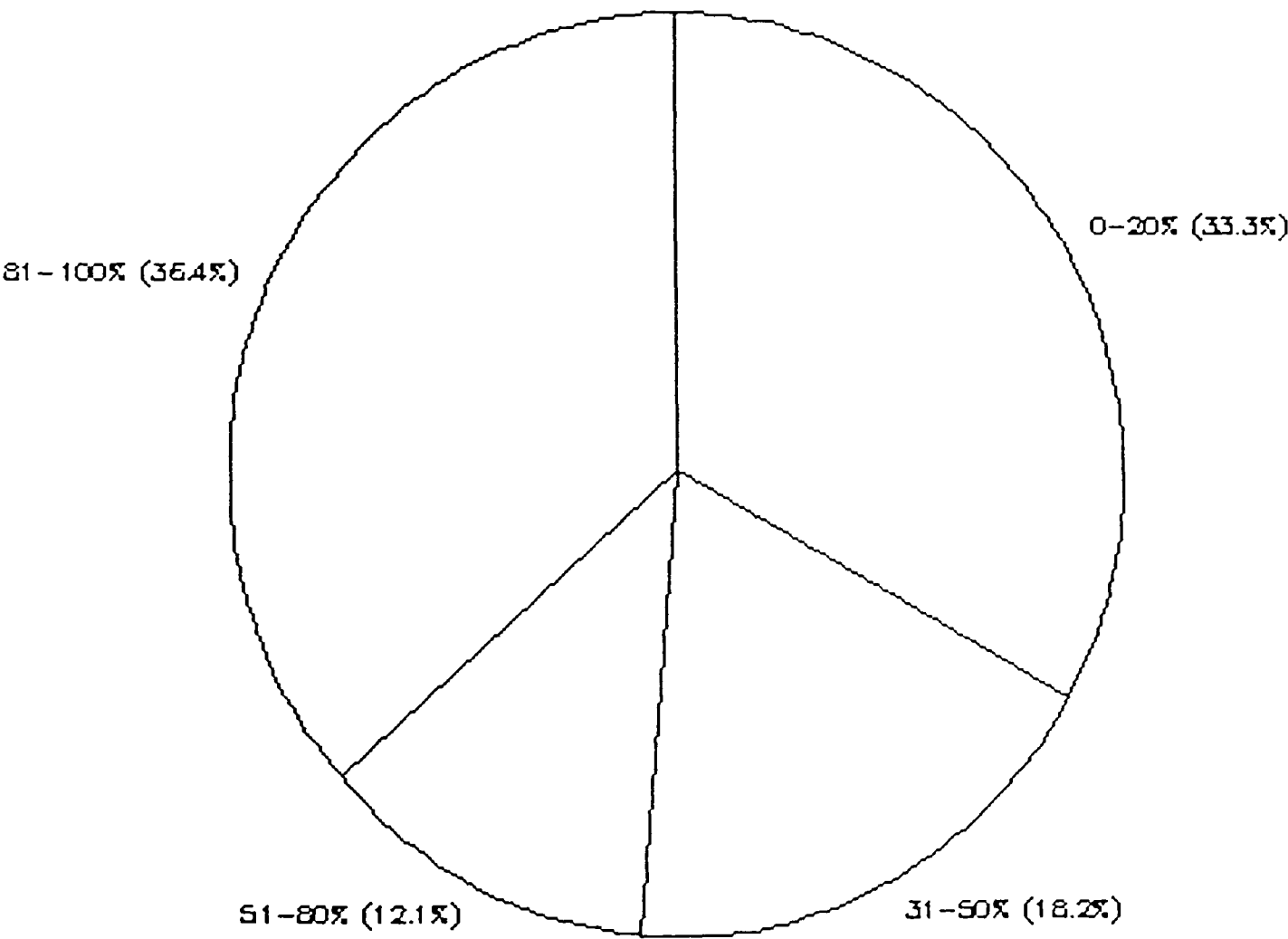
MARKET FOR SECOND HAND CAPITAL GOODS



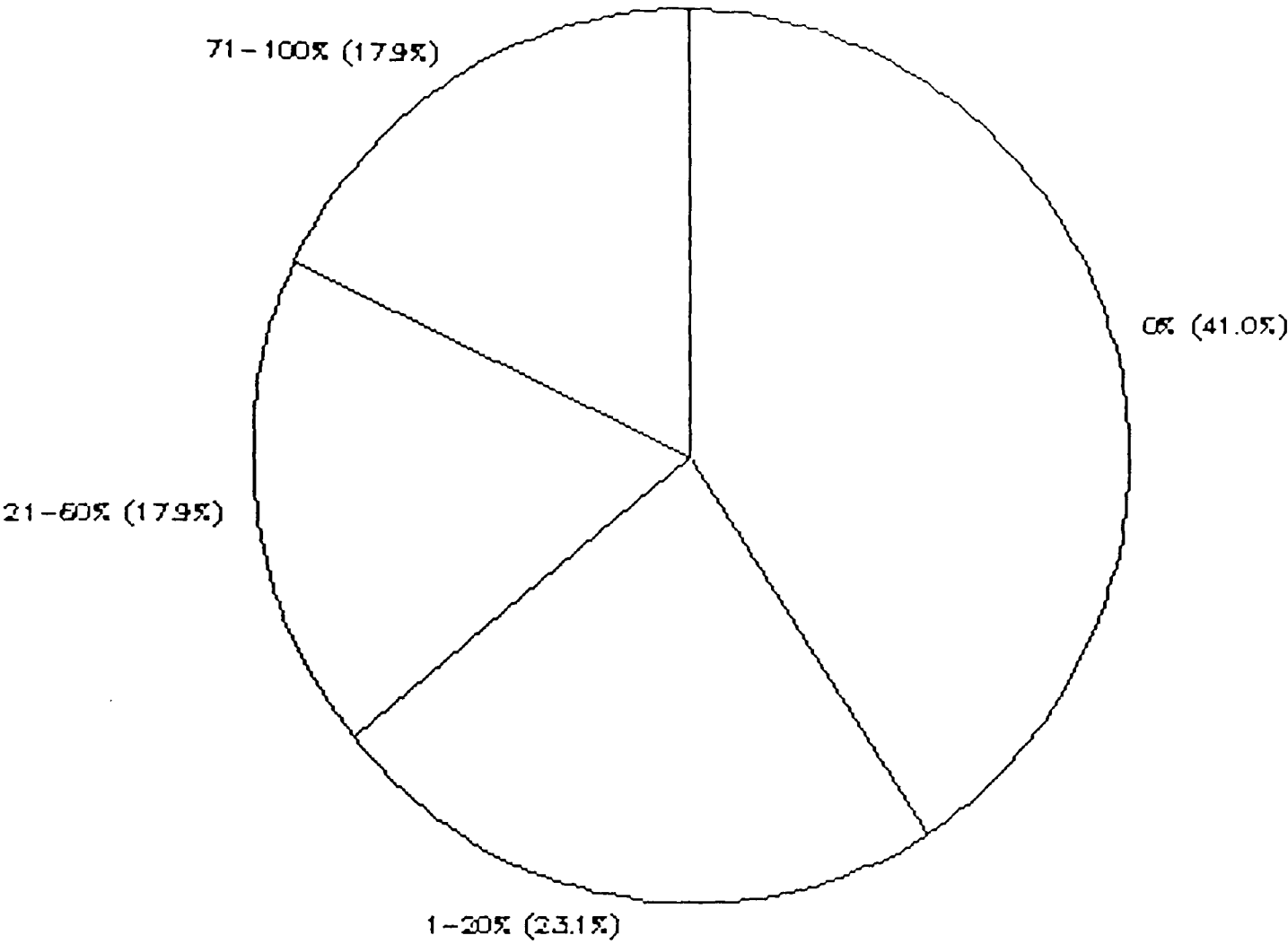
WAS CREDIT A CONSTRAINT TO INVESTMENT?



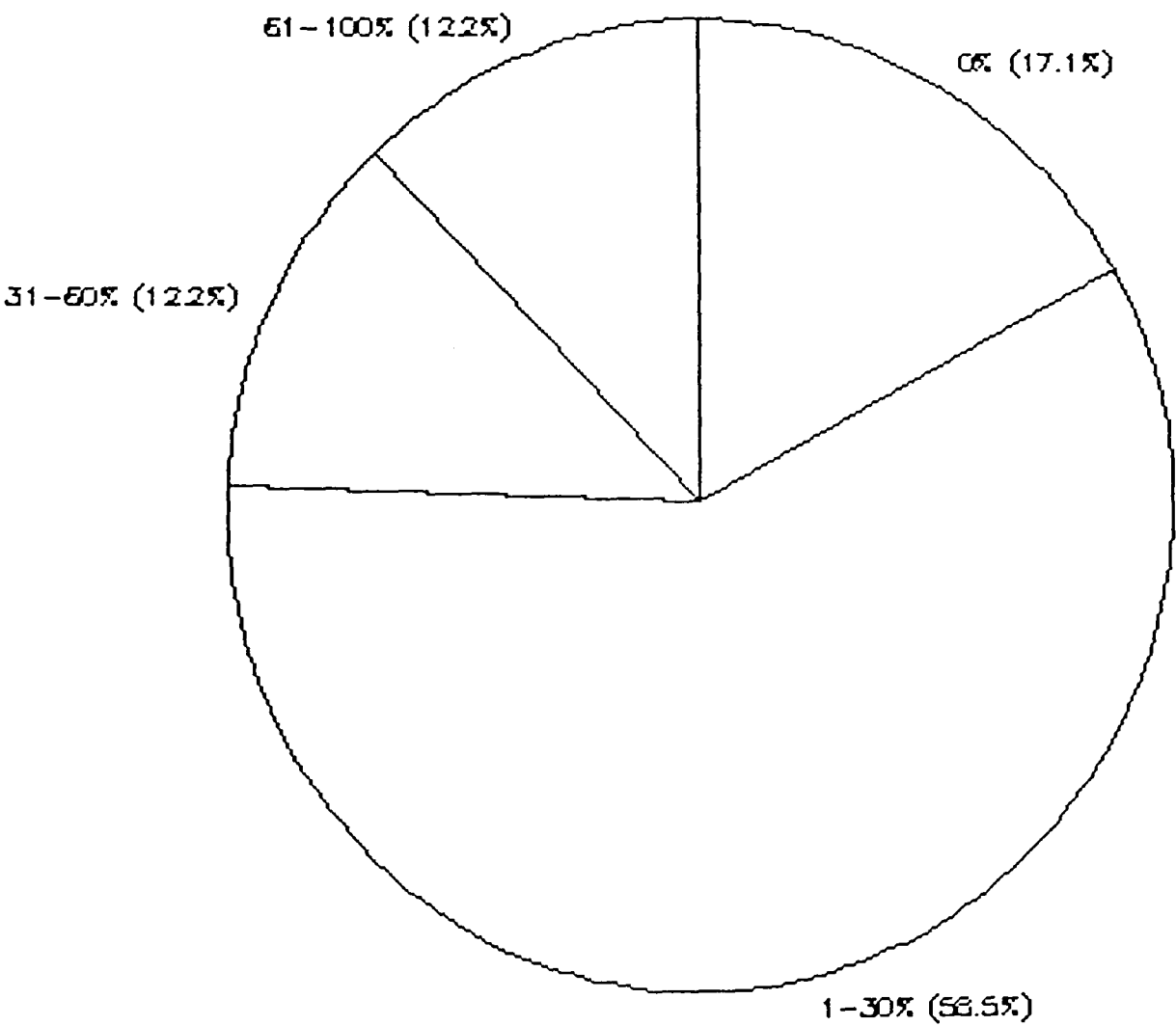
SHARE OF IMPORTED INTERMEDIATES



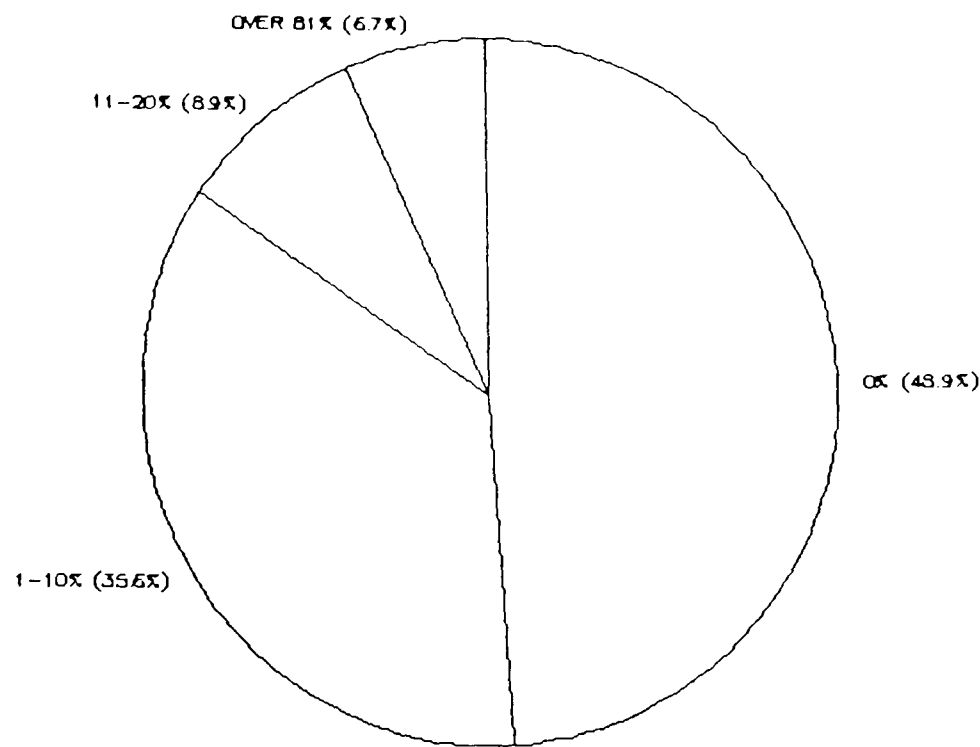
SHARE OF INPUTS FROM THE PUBLIC SECTOR
(NON-INFRASTRUCTURE)



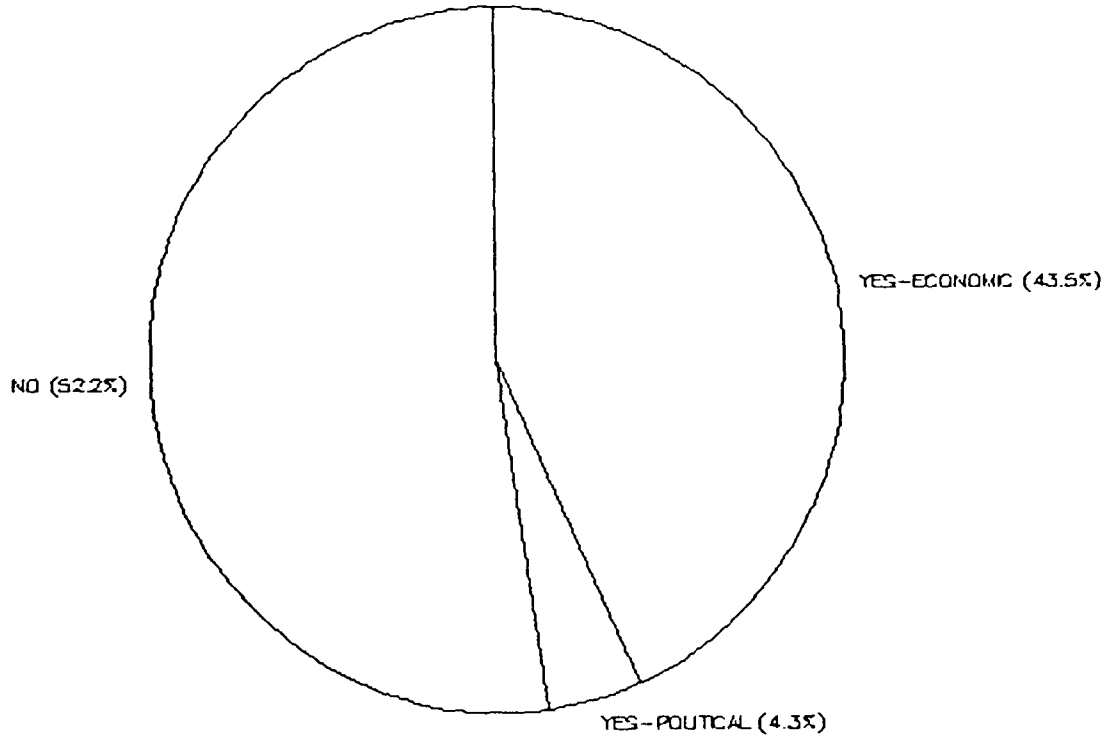
SHARE OF SALES TO THE PUBLIC SECTOR



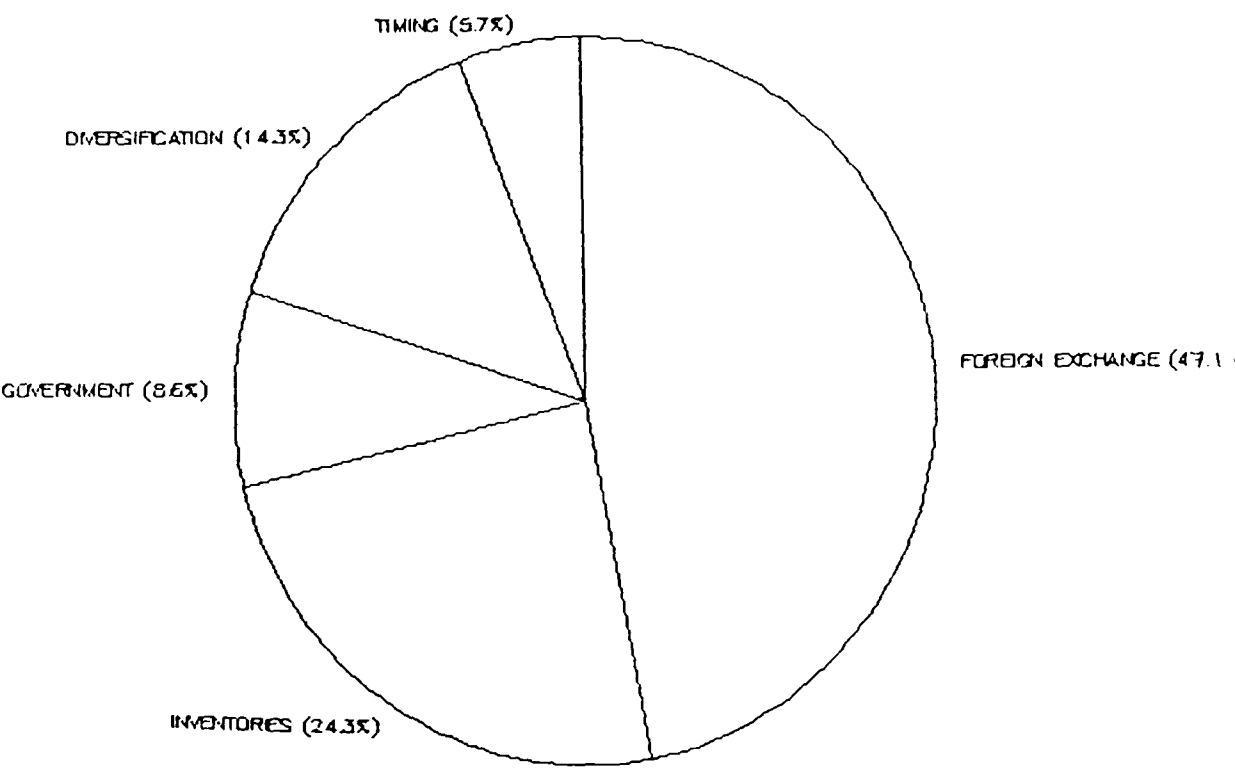
SHARE OF PRODUCTION EXPORTED



WERE INVESTMENT INCENTIVES CRITICAL?



METHODS OF HEDGING UNCERTAINTY



APPENDIX D

PUBLIC-PRIVATE JOINT VENTURES

One of the most interesting areas of public and private sector interaction are the joint ventures established under the infitah investment laws. These joint ventures have private legal status and therefore constitute an implicit privatization of public assets. The majority of these joint ventures are established under law 43/1974, although a small number have been established under law 159/1981. The public sector's motives for establishing joint ventures with the private sector are usually a desire to circumvent the restrictive legislation that regulates prices, salaries, and management autonomy in the public enterprises. For private firms, the public sector is a desirable partner because of its size, assets, and especially its contacts. Because of the public sector participation, the operations of these joint ventures are often different than fully private sector firms, hence this discussion has been relegated to this appendix.

Table II-6 in chapter II gave a picture of the pattern of public-private joint ventures. Of the 1302 projects approved by the Investment Authority as of 30 June 1987, 273 have some public sector participation (approximately 21%). The majority of this equity participation is from public sector enterprises (often in kind rather than in cash), followed by the public sector banks and insurance companies. The majority of public sector investment capital is in industry and finance, followed by agriculture, services, and construction. The importance of the public sector

shareholding varies from case to case. Some joint venture firms are dominated by the public sector with a token private shareholding so as to obtain private sector legal status, whereas others have only a token public shareholding often by a state financial institution. On average, the total public sector shareholding is 58% of the total equity of all law 43 firms, with a sectoral breakdown between projects in the industrial (62%), agricultural (59%), financial (56%), construction (53%), and services (46%) sectors.

There are many parallels between the financial status of these public-private joint venture firms and the private firms described previously. High debt/equity ratios are common in some sectors as evidenced by the following calculations by Silmy for 1984 (in LE millions):

<u>Sector</u>	<u>Debt</u>	<u>Equity</u>	<u>Debt/Equity</u>
Agriculture	18	50	36%
Industry	78	185	42%
Energy	14	7	200%
Construction	19	30	63%
Tourism&Transport	87	123	71%
Trade	18	62	29%
Services&Other	16	18	89%
Banks	12	28	43%
Insurance	-	-	-
Total	249	503	50%

Source: Silmy, 1987, p.76.

The heavy reliance on credit is also evidenced from the breakdown of sources of finance of the public-private joint ventures (LE millions as of 1984):

<u>Equity</u>	<u>Total</u>	<u>% of Total</u>
Public sector share	1190	6.9%
Private sector share	1341	7.9%
Reserves and retained profits	577	3.4%
Special losses	610	3.6%
Long term loans	7677	45.0%
Creditor banks	2508	20.6%
Creditors and others	2126	12.6%

Source: Silmy, 1987, p. 73.

Given the existence of government guarantees and ties with the public sector banks combined with the excess liquidity of the banking system at the time, it is not surprising that public-private joint ventures were able to leverage considerable credit.

Silmy divided his evaluation of the economic performance of the public-private joint ventures between those firms that generated profits (LE 342.1 million) and those that generated losses (LE 113.7 million). The average rate of return on equity in the profitable

enterprises was 10.1%, but this dropped to 1.4% when calculated as the return to total investment costs, which included loans. There was considerable variation of returns to equity according to the following sectoral breakdown: banks (38.9%), industry (27.7%), energy (13.6%), insurance (11%), tourism and transport (8.8%), services and other (5.7%), trade (2.6%), agriculture (2.5%), and construction (0.7%). Calculated as returns to investment costs(including loans), the order becomes: energy (6.3%), tourism and transport (3.3%), services and other (2.6%), banks (2.0%), insurance (2.0%), industry (1.5%), agriculture (0.9%), trade (0.8%), construction (0.3%). The highest rates of loss among the unprofitable projects were in tourism and transport (22.2%) and industry (9.9%).¹

There were seven cases of public-private joint ventures in the sample conducted as part of the survey presented in chapter IV, two in finance and five in industry. Although in no way representative, a description of some aspects of these cases gives a flavour of the complexity in analyzing the behavior of these enterprises. Although it is difficult to generalize, the behavior of public-private joint ventures depends, to some extent, on the distribution of shares between public and private; however, there are several exceptions to this trend. Since one cannot adequately analyze the behavior of these firms without a realistic model of government behavior (a tall order), they are included here for illustrative purposes only.

¹ Silmy, 1987, p. 77.

Often decisions by the public sector to enter into joint ventures with the private sector are, like many purely public investment decisions, highly politicized. An example of this is the decision to establish a domestic car manufacturing plant through a joint venture between the public sector Nasr company and General Motors. Although elaborate economic arguments about promoting feeder industries, export markets and economies of scale were used, the motives for the project stemmed from the desire of the Minister of Defense to have General Motors construct an engine plant from which military vehicles could be outfitted. Decision making about the investment were raised to a highly political level with the involvement of the American Ambassador, the United States Agency for International Development, and several high level Egyptian officials.² The decision was made to embark on the project despite the fact that even under the most optimistic assumptions about market demand and costs, feasibility studies showed that the economic rates of return to the project were low or negative.³

A similar example is that of Arab Contractors, a public-private joint venture conglomerate controlled by Osman Ahmed Osman. The highly diversified investments made by Arab Contractors are interrelated with its manufacturing arms supplying inputs to the parent company, often financed by its bank, the Suez Canal Bank. Having public sector participation has meant that Arab Contractors

² For a description of the General Motors deal, see Springborg, 1987, pp. 10-11.

³ Kearney Management Consultants, 1985, p.1.

has gained sizable state contracts and preferred access to subsidized inputs.⁴

Another case is that of Suez Cement, established as a public-private joint venture in 1976 under law 43. The project was initiated by the government with 80% of the shares held by public sector cement companies, banks, insurance and trading companies; the remaining 20% of the equity was privately held. Suez Cement's high debt/equity ratio of 5/1 combined with considerable debt exposure in foreign exchange, cost overruns and delays in construction caused the firm severe cash flow problems which necessitated raising the firm's equity from LE 16 million to LE 56 million.⁵ The consequence of this was to shift the shareholding structure such that the public sector controlled 90% of the company. As of December 1987, the firm had never distributed dividends to shareholders.

An analysis of Suez Cement's pricing behavior reveals the complex behavior often found in public-private joint ventures. Cement production is one of the few areas in which Egypt has considerable comparative advantage. The sector is dominated by four public sector firms linked to the Ministry of Housing who sell at the official price of approximately LE 53 per ton. Because of insufficient domestic capacity and the construction boom during the infitah, there was an active black market in cement in which the price in 1987 was approximately LE 120/ton. As a private company

4 For a description, see Waterbury, 1983, pp. 181-183 and Gillespie, 1984.

5 At a meeting in November 1985 a decision was made to increase the company's capital to LE 112 million, but the company's board of directors have been unable to raise the equity.

facing severe financial problems, one would expect Suez Cement to sell its output at or close to the black market price. In fact, the firm sells cement for LE 80/ton largely to private traders. The cement market is somewhat divided with public sector construction needs receiving subsidized cement from public sector producers who get input subsidies; meanwhile, private demand for cement is met by the pseudo-private Suez Cement production which is less subsidized.

Part of the difference between Suez Cement's selling price of LE 80/ton and the black market price of LE 120/ton is absorbed in transportation and retailing costs. However, the difference also stems from a desire to avoid conflict between the company and the Ministry of Housing, through which Suez Cement gets access to some subsidized inputs like kerosene, even though as a law 43 private company Suez Cement should pay world prices. The Ministry of Housing also provides a guaranteed market in periods when demand is slack.⁶

The case of Suez Cement can be contrasted with that of Vestia, a joint venture between the public sector textile giant Stia and a French multinational. Vestia produces men's garments using a completely refurbished plant originally built by the Hungarians in 1968 when Egypt was allied with the Eastern bloc. To some extent, the joint venture is vertically integrated with the public sector partner since 100% of fabric inputs coming from Stia and almost all

⁶ The chairman of Suez Cement recounted an incident when, during a slump in demand, the Ministry of Housing's cement office purchased Suez Cement output at LE 80/ton and resold it at a loss at the subsidized price of LE 53/ton.

the management staff holding dual appointments. On the other hand, Vestia's pricing behavior, marketing, management policy, and rate of return of 45% in 1986 have little in common with behavior associated with much of public sector industry.

It is difficult to evaluate the experience of the public-private joint ventures without conducting a systematic comparative study. The government's assessment is reflected in the falling number of public-private joint ventures approved as of the mid-1980s. By 1987, it was government policy to no longer approve such joint ventures because of resource constraints in the public sector, the poor performance of some of the projects, and corruption and mismanagement associated with some of the public-private joint ventures.

APPENDIX E: DATA SOURCES AND DERIVATIONS

Sources of Data

The data used in the econometrics in chapter VII and the empirical analysis in chapter VIII came from a variety of sources. The sources are listed below with the variable(s) obtained from them. Note that when a variable is listed with more than one source, this means that different parts of the time series came from different sources or that series from a number of sources were cross referenced and reconciled. Note also that a "N" at the end of a variable's acronym indicates its nominal value. All indices use 1980 as the base year (1980=100).

For a general discussion of the sources of economic data in Egypt, see the statistical appendix in Mabro and Radwan.¹ For a discussion of the evolution of the measurement of capital formation in Egypt, see Radwan.² A more recent discussion of economic data in Egypt is available in Hansen.³

The sources used were the following:

Central Authority for Public Mobilization and Statistics,
Statistical Yearbook, various issues.

- consumer price index, disaggregated (CPI)

¹ Mabro, R. and S. Radwan, 1976, pp. 242-265.

² The commodity flow approach used to measure capital formation in Egypt is based on data for domestic production, imports, and exports of capital goods. See Radwan, 1974, pp. 74-81.

³ Hansen, 1988.

- wholesale price index, disaggregated (WPI)
- WPI for domestic machinery (WPIDMACH)
- WPI for construction (WPIBLDG)
- WPI for transport equipment (WPITRANS)
- gross domestic product at factor costs (GDPN)

Central Authority for Public Mobilization and Statistics,
Employment, Wages, and Hours of Work, various issues (1968-78).

- number of workers in the private sector

Commander, S., The State and Agricultural Development in Egypt since 1973, London: Ithaca Press, 1987.

- average wages in agriculture (AVGWAG)

Ikram, K. Egypt: Economic Management in a Period of Transition,
(World Bank) Baltimore: Johns Hopkins University Press, 1980.

- domestic bank financing of the government deficit (DBFGDN)
- government expenditure (GOVEX)

International Monetary Fund, International Financial Statistics,
various issues.

- domestic credit claims on the private sector (PRVCRDN)
- discount rate, end of period (DISCR)
- consumer price index (CPI)
- private unrequited transfers (FXREMITN)
- GDP deflator (GDPDEF)
- official foreign exchange rate (FXOFF)
- London interbank interest rate (LIBOR)

- world wholesale price index (WWPI)

International Monetary Fund, "Arab Republic of Egypt - Recent Economic Developments," various issues.

- private investment (PRIVIN)
- government investment (GOVIN)
- government investment in infrastructure (GVIINFN)
- government deficit (GOVDEFN)
- domestic bank financing of the government deficit (DBFGDN)
- government tax revenue (GVTXRVN)
- gross domestic product at factor prices (GDPN)

Mabro, R. and S. Radwan, The Industrialization of Egypt, 1939-73, London, 1976.

- gross domestic product at factor prices (GDPN)

Ministry of Planning, "Follow-up Report to the Five Year Plan," (in Arabic), various issues.

- private investment (PRIVIN)
- government investment (GOVIN)

National Bank of Egypt, Economic Bulletin, various issues.

- commercial bank loans (CBLOANSN)
- commercial bank deposits (CBDEPN)
- private current, time, and savings deposits
(PRVSAVN)

Pick's, World Currency Yearbook, various issues.

- nominal black market price of foreign exchange (EBM)

Shura Council, "Investment Policy during the Period 1959/60-1982/83," Arab Republic of Egypt, unpublished report, 1985 (in Arabic).

- government investment by economic activity (GOVIN)
- private investment by economic activity (PRIVIN)⁴
- number of workers by economic activity (TOTLAB)
- wages by economic activity (TOTWAGN)
- final consumption at market prices by the public sector (GOVCONN)
- government investment in agriculture and irrigation (GVIAGN)
- government investment in electricity (GVIELECN)
- government investment in construction (GVICONN)
- government investment in transportation (GVITRNN)
- government investment in communications (GVICOMN)
- government investment in utilities (GVIUTILN)
- investment costs in machinery (ICMACHN)
- investment costs in buildings (ICBLDGN)
- investment costs in transport equipment (ICTRANSN)
- investment costs in other (ICOTHERN)
- gross domestic product at factor costs disaggregated by economic activity

⁴ The Shura Council data on private and government investment by economic activity were compared with the figures given in various issues of the Ministry of Planning's Follow-up Report to the Five Year Plan. The figures were generally consistent and discrepancies could usually be explained by differences in definitions and categories used.

World Bank, "Arab Republic of Egypt: Issues of Trade Strategy and Investment Planning," January 1983.

- gross domestic product at factor prices (GDPN)
- GDP from the petroleum sector (GDPPETRN)
- government deficit (GOVDEFN)
- domestic bank financing of the government deficit (DBFGDN)
- total government tax revenue (GVTXRVN)

World Bank, "Arab Republic of Egypt: Current Economic Situation and Economic Reform Program," July 1986.

- gross domestic product at factor prices (GDPN)
- GDP from the petroleum sector (GDPPETRN)
- government investment in infrastructure (GVIINFN)
- government expenditure (GOVEX)

World Bank, "Arab Republic of Egypt: Country Economic Memorandum," September 1988.

- gross domestic product at factor prices (GDPN)
- GDP from the petroleum sector (GDPPETRN)
- government investment in infrastructure (GVIINFN)
- government expenditure (GOVEX)

United Nations, Yearbook of National Accounts Statistics, various issues.

- indirect taxes (INDTAXN)

United Nations, Monthly Bulletin of Statistics, various issues.

- export price index for machinery and equipment from the major industrialized countries (XUVKIMP)

Derivations

The derivations used for the variables included in the econometrics are as follows in alphabetical order:

$$\text{AVGWAG} = \text{TOTWAGN}/\text{TOTLAB}$$

$$\text{GDP} = \log(\text{GDPNO})$$

$$\text{GDPNO} = (\text{GDPN}-\text{GDPPE TRN})/\text{GDPDEF}$$

$$\text{GOVI} = \log[\text{GOVIN}/\text{IDEF}]$$

$$\text{GVEX} = \log[\text{GVEXN}/\text{GDPDEF}]$$

$$\text{DBFGD} = \log[\text{DBFGD}/\text{DBFGD}]$$

$$\text{GVINFN} = \text{GVIAGN}+\text{GVIELECN}+\text{GVICONN}+\text{GVITRNN}+\text{GVIUTILN}$$

$$\text{GVIINF} = \log[\text{GVINFN}/\text{IDEF}]$$

$$\text{ICOSTS} = \log[\text{IDEF}/\text{GDPDEF}]$$

$$\text{ICTOTN} = \text{ICMACHN}+\text{ICBLDGN}+\text{ICTRANSN}$$

$$\begin{aligned} \text{IDEF} = & (0.194*\text{WMACH}*\text{WPIDMACH}) + (0.0806*\text{WMACH}*\text{IMACHI}) + \\ & (\text{WBLDG}*\text{WPIBLDG}) + (\text{WTRANS}*\text{WPITRANS}) + (\text{WOTHER}*\text{WPI}) \end{aligned}$$

$$\text{IMACHI} = \text{XUVKIMP}*\text{EBM}$$

$$\text{INDTAX} = \text{INDTAXN}/\text{GDPDEF}$$

$$\text{KP} = (1-0.043)\text{KP}(-1)+\text{PRIVI}$$

$$\text{MARKUP} = \log[\text{WPI}/\text{WAGEINDX}]$$

$$\text{NIGVEX} = \text{GOVEX}-\text{GOVI}$$

$$\text{PRIVI} = \log[\text{PRIVIN}/\text{IDEF}]$$

$$\text{PROFIT} = \log(\text{GDPNO}-\text{TOTWAG}-\text{INDTAX})$$

$$\text{PVC RD} = \log[\text{PRVCREDN}/\text{GDPDEF}]$$

$$PVCRDY = \log[PRVCREDN/GDPDEF/GDPNO]$$

$$R = \log(1+DISCRATE)/(1+(WPI-WPI(-1))/WPI(-1))$$

$$R/W = \log(1+R)/(1+AVGWAG)$$

$$TOTWAG = TOTWAGN/WPI$$

$$WBLDG = ICBLDGN/ICTOTN$$

$$WMACH = ICMACHN/ICTOTN$$

$$WOTHER = ICOTHERN/ICTOTN$$

$$WTRANS = ICTRASN/ICTOTN$$

Notes

The investment deflator used above was constructed by using a weighted average of price indices that constitute investment costs. Since the weights based on the Shura Council data were only available for 1961-82, the shares of investment costs were assumed fixed before 1961 and after 1982.⁵ The price index for domestic capital goods was the WPI for machinery and equipment which only includes indigenous capital goods. The indices for construction and transport were also obtained from the disaggregated WPI. The WPI was not available in disaggregated form before 1977, therefore the aggregate WPI had to be used. The only exception was the price index for construction for which a series was available from 1970.⁶ A price index for machinery exports of the major industrial countries was used as an index of imported capital goods prices. This was multiplied by the nominal black market exchange rate to

⁵ The weights used before 1961 were: machinery-0.35; building-0.41; transport-0.15; other-0.09. The weights used after 1982 were: machinery-0.40; building-0.38; transport-0.16; and other-0.05.

⁶ Assaad constructs a Paasche index for labour, capital and materials in the construction sector. Assaad, 1989.

obtain an index of imported capital goods prices in Egypt. The black market exchange rate was used since it was the operative rate for much of the period and captures the opportunity cost of foreign exchange for the period of rationing prior to 1974. The relative shares of domestic versus imported machinery is assumed to be fixed. The weights are based on estimates from the World Bank that imported machinery constitutes 80.6% of total machinery inputs.⁷ This is a fairly plausible figure given the small size of the domestic capital goods industry and the fact that indigenous and imported machinery are far from perfect substitutes.

The index of wages used to calculate the markup proxy is based on two sources. For 1960-1981, the series for average wages in the economy calculated from the Shura Council was used. However, after 1981, data on aggregate wages are scarce since the Central Authority for Public Mobilization and Statistics is several years behind in compiling the labour force surveys. Consequently, data on agricultural wages was used for 1981-1986 to construct the wage index.⁸ This is not an implausible supposition since wages in the agricultural sector are fairly market-determined and would represent a close approximation to wages in the private sector.

The capital stock series used in chapter VIII was derived according to a modified version of that used by Radwan. Radwan used a straight-line method derived from the "Standardized Accounting System of the United Arab Republic" which is based on a survey of

⁷ World Bank, 1980.

⁸ Commander, 1987, p. 92.

actual lives of assets in Egyptian enterprises.⁹ He derived overall depreciation rates of 6.25% for machinery and 2% for buildings based on a weighted average of those recommended in the "Standardized Accounting System," for thirteen branches of Egyptian industry. Since a distinction is not being made between the capital stock in buildings versus machinery, a composite depreciation rate using a weighted average was derived for the overall capital stock of 4.3%. This use of this constant rate of depreciation is based on the standard "melting ice" argument that if the capital stock contains goods with a wide distribution of average lives, the number of machines collapsing at any point in time approaches a proportional decay regardless of cycles in investment expenditure.¹⁰

⁹ United Arab Republic of Egypt Central Auditing Organization, 1967.

¹⁰ Jorgenson, 1965, p. 59.

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