

**FINANCING DEVELOPMENT
AND
THE FINANCIAL CRISIS OF THAILAND**
An Empirical Investigation

BY

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**A Thesis
Submitted to the Faculty of Graduate Studies
in Partial fulfillment of the Requirements
for the degree of**

DOCTOR OF PHILOSOPHY

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of Manitoba in partial fulfillment of the requirements of the degree
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Doctor of Philosophy

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Abstract

This study has analysed the causes of the 1997/98 financial crisis of Thailand by examining the links between the inflow/outflow of foreign capital and the behaviour of private agents (consumers and producers) in that country during the period from 1975 to 1998. Thailand, once known as an Asian Miracle, was the fastest growing economy in the world from 1987 to 1996. Furthermore, it was the country of origin of the 1997/98 East Asian crisis, a crisis that required the largest financial bailouts in history and has generated a heated debate among economists and policymakers worldwide.

In order to unearth the causes of the crisis in Thailand, we have examined the phases of Thailand's economic development during the period from 1975 to 1998. We have also discussed and critiqued the predominant explanations of the crisis, explored probable reasons for the massive inflow/outflow of capital, and then have tested a variety of hypotheses: the pro-cyclicality of consumer spending; the crowding-out effect of foreign saving on domestic saving; and the speculative behaviours of investors. To test these hypotheses, we have used data from the Bank of Thailand's homepage and from various issues of the International Financial Statistics, and have applied several econometric techniques such as co-integration, the ordinary least squares, the instrumental variable method and the Granger causality.

Our findings indicate that the prime causes of the crisis in Thailand were as follows: the mismatching of domestic economic policies with a changed global economic climate; excessive praise of Thailand's "miracle" economy; the pro-cyclicality of consumer spending; the crowding-out effect of foreign saving; and the speculative behaviours of investors. The IMF's billion-dollar rescue package in the aftermath of the crisis failed to improve the situation because of the inappropriate conditions imposed on Thailand in return for these loans.

Based on these findings, we have suggested several important policy tools, both to prevent such a crisis from occurring, and to mitigate the impact of a crisis should one occur. First,

we would recommend pursuing a balanced growth strategy compatible with the changing global economic climate. We would further recommend economic literacy for all, short-term capital control, and a concerted effort by all quarters, both local and foreign. We trust that the analyses, findings, conclusions, and recommendations provided by this study will provide valuable assistance to policy makers in general and governments of capital-dependent nations in particular.

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Table of Contents

Abstract	i
Chapter 1: Genesis of Thailand's Financial Crisis	1
1.1 Overview of Thailand's Economy	1
1.2 Magnitude of the Crisis	7
1.3 Proposed Study	8
1.4 Format of the Study	10
 Chapter 2: Predominant Explanations for the Crisis and	
Reasons for Capital Influx	14
2.1 Introduction	14
2.2 Existing Explanations	15
2.3 Limitations of the Existing Views	22
2.4 Capital Inflows	29
i. Capital Account Liberalization	29
ii. The Cold War and Globalization	33
iii. Titles/Excessive Praise	33
2.5 Financing Development through External Debt	37
 Chapter 3 Consumer Spending Through Borrowing	42
3.1 Introduction	42
3.2 Theories of Consumption	43
i. The Absolute Income hypothesis	43
ii. The Life Cycle Theory	46
iii. The Permanent Income hypothesis	47
iv. The Random-Walk hypothesis	50
3.3 Liquidity/Borrowing Constraint	54
3.3.i. Pro-Cyclicality of Consumer Spending	59

3.4 Time Series Properties	60
i. Unit Root Test	61
ii. Cointegration Test	64
3.5 Findings	68
3.6 Concluding Remarks	72
3.7 Statistical Analysis	74

Chapter 4 Various Components of Savings and Their Interrelationships 80

4.1 Introduction	80
4.2 Measurements of Savings	81
4.3 Crowding-Out Effect	83
4.4 Ricardian-Equivalence	84
4.5 Findings	87
4.6 Savings Growth Causality	90
4.7 Concluding Remarks	93
4.8 Statistical Analysis	95

Chapter 5 Volatility of Investment 100

5.1 Introduction	100
5.2 Theories of Investment	101
i. The Simple Accelerator Model	101
ii. The Flexible Accelerator Model	103
iii. The User Cost of Capital	105
iv. The q Theory of Investment	107

v. Recent Theories of Investment	108
5.3 The Proposed Model	111
5.4 Findings	114
5.5 Conclusion	120
5.6 Statistical Analysis	121
Chapter 6 Conclusions	126
6.1 Summary of Findings	126
6.2 The IMF and the Crisis	130
6.3 Policy Implications	132
6.4 Conclusion and topics for Further Study	137
Appendix A: Country Profile	141
Appendix B: Chronology of the Crisis	142
Appendix C: Letter of Intent	145
Appendix D: Data Table	147
Bibliography	153

Chapter 1

Genesis of Thailand's Financial Crisis

1.1 Overview of Thailand's Economy

For a decade prior to the 1997/98 East Asian crisis, Thailand was the fastest growing economy in the world.¹ In fact, during the period from 1975 to 1996, the average real GDP growth rate in Thailand was 8 percent per annum, with growth fuelled by exports, high savings, and investment rates where the average savings-GDP and average investment-GDP ratios were 16 percent and 23 percent respectively [Figures 1.1, 1.2]. Thailand not only achieved growth during this period, but also raised the living standards of its people in a relatively equitable manner. Its economic successes earned Thailand the title of an 'Asian miracle';² as a matter of fact, the Asian miracles became role models for developing countries for a number of years, although, according to Loxley (1998), these countries did not qualify as models for development in terms of workers' rights and democratic governance, and performances were uneven in furthering gender equity.

Between 1990 and 1996, there was a significant influx of foreign capital into Thailand, accompanied by a very high level of economic activity, i.e. consumption and investment [Appendix D]. Nevertheless, that flow did not last long; in fact, during 1997/98 there was a huge outflow of capital accompanied by a very low level of economic activity, which led to the financial crisis of 1997/98. This crisis went beyond the country's control, and

1 From 1987 to 1996, Thailand's growth rate was 9.9 percent per annum [see Warr, 1997].

2 Thailand, Malaysia, and Indonesia were known as the Asian Miracles up until the 1997/98 East Asian crisis.

the International Monetary Fund (IMF) stepped in to bail Thailand out with billions of dollars [Appendix B].

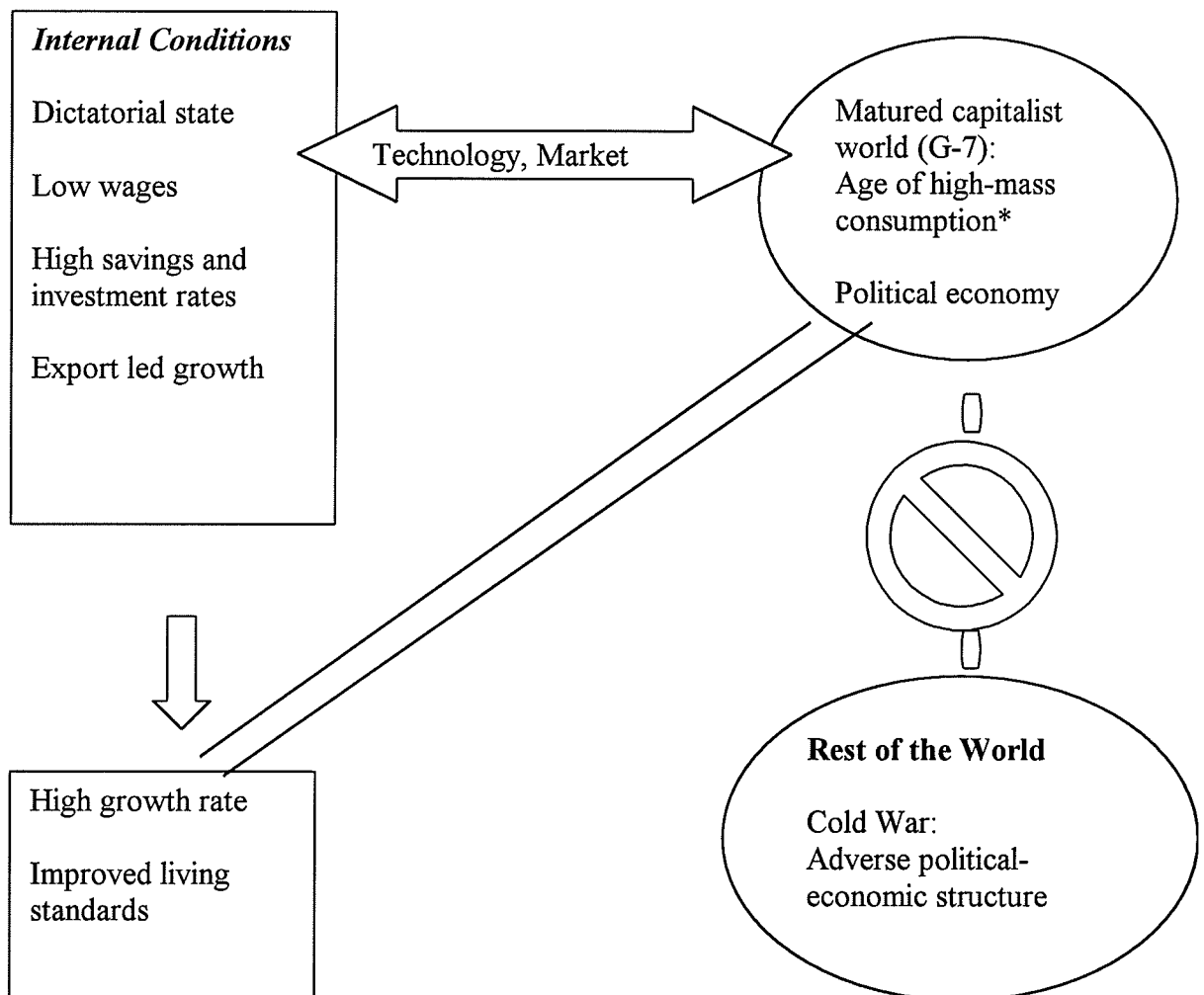
Although it had taken a long time for the country to earn the “miracle” title, during the 1997/98 financial crisis the people of Thailand lost much of their self-esteem, freedom, and even life sustenance.³ Ironically, Thailand was then considered a crony capitalist country, where corruption, nepotism, lawlessness, and widespread poverty were norms. Exhibits 1.1-1.3 provide a schematic view of the stages of Thailand’s economic development during the period from 1975 to 1998.

From 1975 to 1989, economic and political conditions, both internal and external, were conducive to Thailand’s growth. Whereas most of the less developing countries (LDCs) were pursuing import substitution policies to achieve self-sufficiency, Thailand and a few other East Asian countries were pursuing export-led growth strategies. Moreover, the hostile political relationships between socialist countries and capitalist countries had created adverse economic ties between these countries, and as a result, Thailand had easy access to foreign markets, particularly to the G7 countries. With an excess capacity in the economy, Thailand was able to grow rapidly, and this growth rate translated into a high standard of living, which led the country to a still higher level of economic development. The economy continued to grow rapidly, and expectations about the potential of Thailand’s economy were at an all time high.

³ According to Professor D. Goulet, life sustenance, self-esteem, and freedom are the three core values of development. See Denis Goulet, *The Cruel choice: A New Concept in Theory of Development* (New York: Atheneum, 1971), Chap. 2.

However, during the late 1980s, socialist countries began to experience political and economic instabilities, and in the year 1990, the global economy changed dramatically with the collapse of the Soviet Union and the dismantling of the Berlin Wall. At this point, the hostile economic-political relationships between capitalist and socialist countries started to dissipate. Furthermore, the import substitution policies pursued by most of the LDCs in the 1980's had failed to enable these countries to reach their targets of self-sufficiency. As a result, in the early 1990s, there was a growing competition among the LDCs because all of them wanted to have easy access to foreign capital and markets. Although Thailand continued to attract large amounts of foreign capital due to its long track record of growth and fiscal balance, as well as its "miracle" title, it began to face severe competition in the export market because of the entry of other LDCs. On the other hand, consumption and investment boom continued until 1996, and all of these factors contributed to a current account deficit in Thailand. However, everything changed in 1997, when the economy became unstable and plummeted into a crisis.

Exhibit 1.1: Thailand's Economic Development: 1975-1989



(N.B.: Pre-1975 data are not available for a number of series.)

* According to W. Rostow, this is the highest stage of development, and G7 countries had already achieved that. See W. W. Rostow, *The stages of Economic Growth: A Non-Communist Manifesto* (1960).

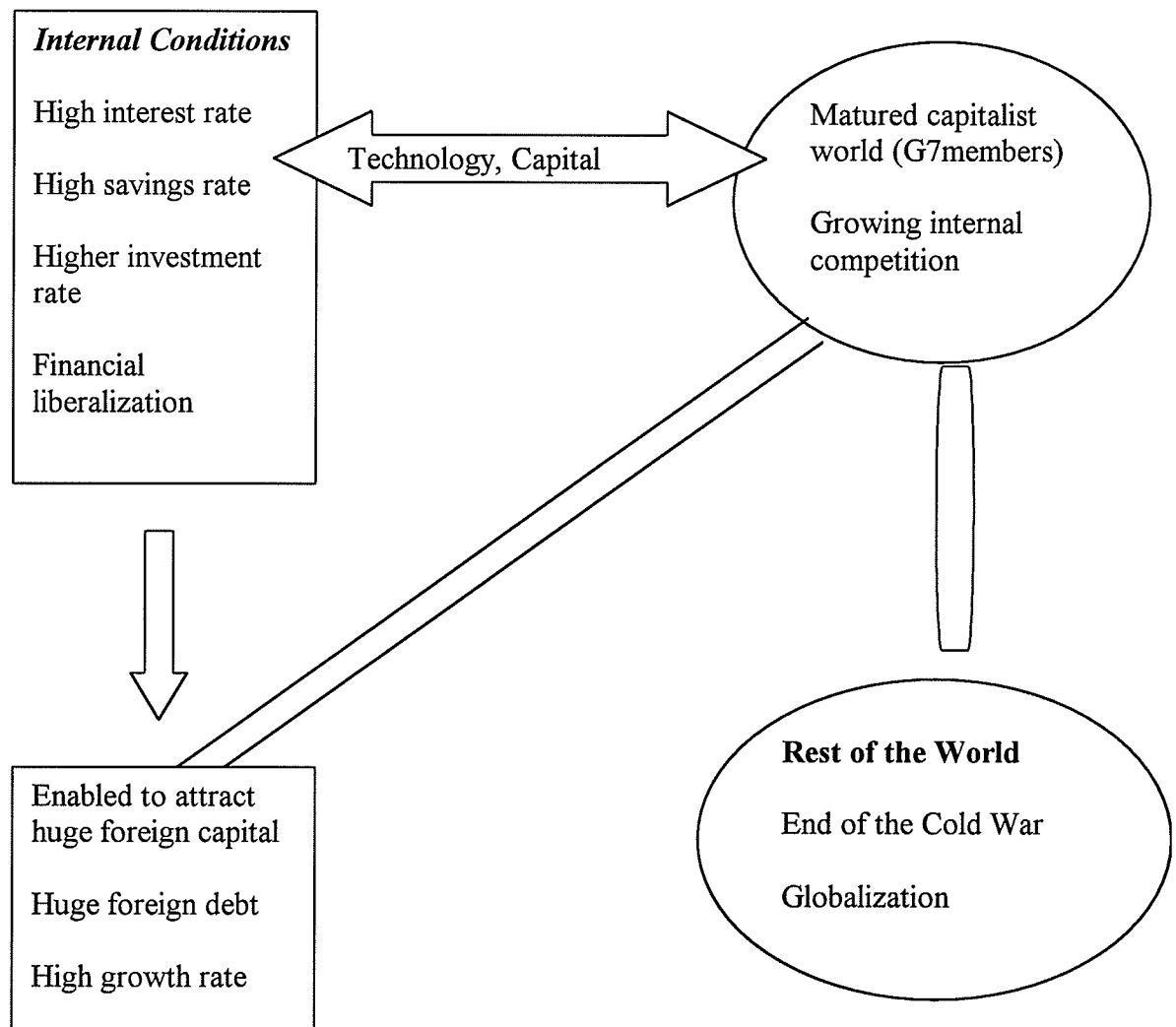
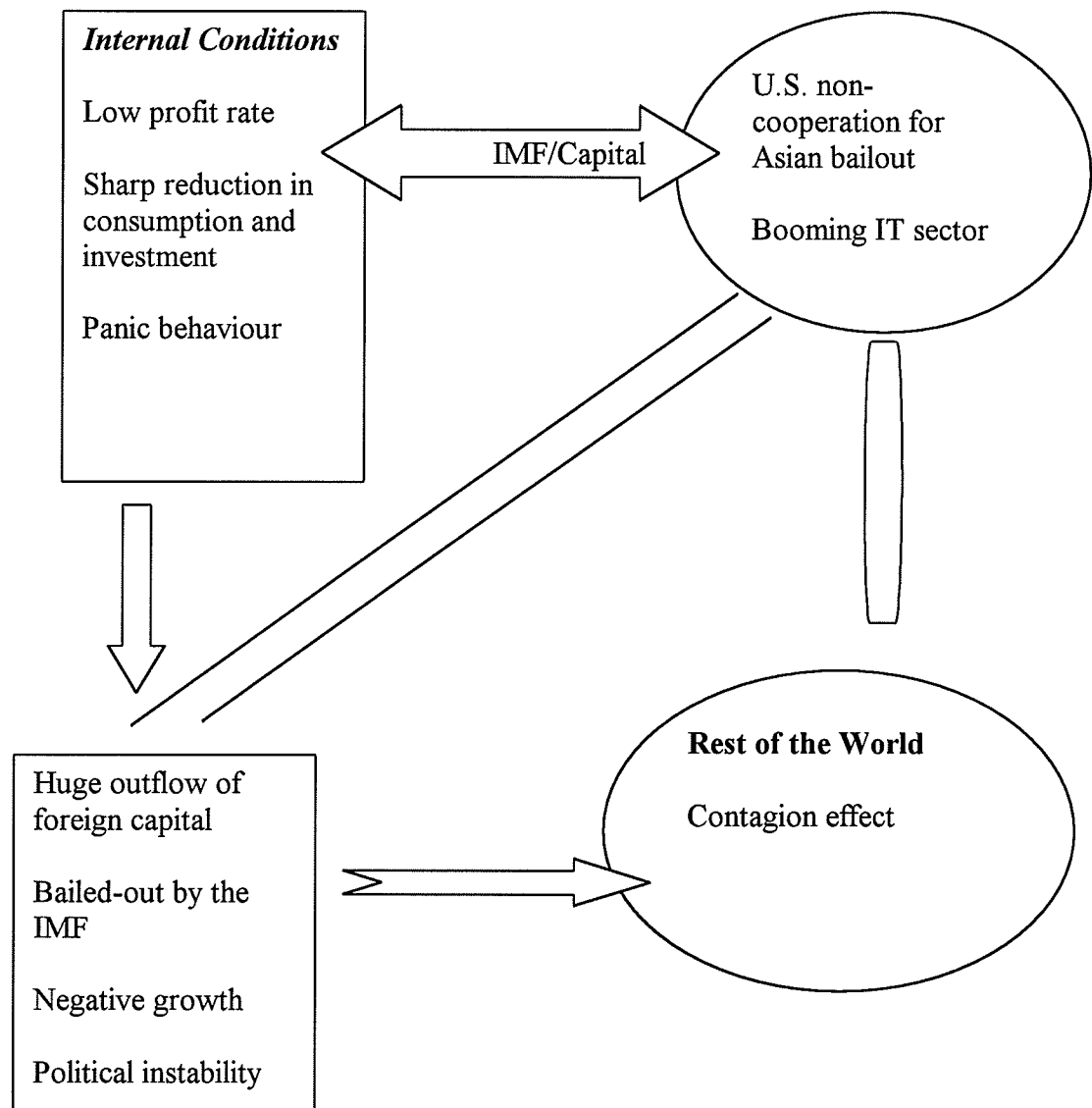
Exhibit 1.2: Thailand's Economic Development: 1990-1996

Exhibit 1.3: Thailand's Economic Crisis: 1997/98

1.2 Magnitude of the Crisis

The floating of the Thai baht on July 2, 1997 marked the onset of Thailand's financial crisis, which was characterized by a decline in export growth, substantial private external debts, a weak financial system, capital flight, a highly depreciated currency, a liquidity crunch and negative economic growth [Appendix B]. Real GDP growth rates were -1.7% and -10.2% for 1997 and 1998 respectively [Figure 1.1]. During this period, the exchange rate depreciated sharply from 26 baht per US dollar to 46 baht per US dollar [Figure 1.2]. Total outstanding debt grew rapidly throughout 1996 and amounted to \$108 billion US by year-end. These economic problems soon overwhelmed the government, creating a political crisis and forcing a change in leadership.⁴

The unemployment rate increased from an annual average rate of 1.5% in 1996 to 5.6% by 1998 [ILO, 1998], the immediate effect of which was a dramatic decrease in the income of those who lost their jobs. Provisions for the unemployed were grossly inadequate; unemployment insurance provisions were almost non-existent. Another effect of this rise in unemployment was that employees in the formal urban sector had to contribute to the maintenance of dependent family members who had suffered from reductions in transfer incomes. Furthermore, the rise in unemployment depressed the wages of those who managed to remain employed [Robb, 1998].

The East Asian financial crisis has generated a heated debate on the fundamental issues of economics, finance, and economic policy-making in general. The following

⁴ After enduring intense criticism over his failure to fix the country's economy, Thai Premier Chavalit Yongchaiyudh resigned in November 1997. He was succeeded by Chuan Leekpai.

observation by Jeffrey Sachs, director of Harvard Institute for International Development (HIID), may highlight the importance of the topic: "The East Asian financial crisis is remarkable in several ways. The crisis has hit the most rapidly growing economies in the world. It has prompted the largest financial bailouts in history. It is the sharpest financial crisis to hit the developing world since the 1982 debt crisis. It is the least anticipated financial crisis in years." [Sachs, 1998]

Although Thailand has been recovering since the second half of 1999, that does not diminish the importance of learning from the crisis, which has been enormously costly to the region. Moreover, crises have been occurring around the globe one after another, the latest being the Argentine crisis. Thus, looking for the causes of these crises and identifying effective ways to prevent them has become a critical concern for economists and policymakers worldwide.

1.3 Proposed Study

This thesis seeks to investigate the behaviour of private agents (consumers and investors) in order to shed light on the causes of the crisis in Thailand, and the remedial measures that could be taken to prevent such a crisis. This study attempts to answer several questions including the following:

- How similar/different was Thailand, as compared to Indonesia, Malaysia and South Korea, in terms of macroeconomic indicators?⁵ If differences between Thailand and the other three countries are found to be significant, then general conclusions about all four may not provide an adequate explanation for the causes of the crisis in Thailand. In that case, the need to study the case of Thailand exclusively may become essential.
- What were the factors responsible for huge inflow/outflow of capital? Could the liberalization of the capital account alone be held responsible?
- How did consumers behave over the period of rapid expansion and contraction? Did they follow the path (consumption smoothening) implied by standard macroeconomic theory?
- What was the effect of foreign saving on domestic saving? Did it play a complementary role or simply act as a substitute? What was the impact of public saving on private saving? In other words, how did private agents view government behaviour?
- How did private investors behave over the period? Which theory of investment would explain their behaviour? To what extent was there over-investment, and what was the effect of over-investment on growth and development?

⁵ Existing literature on the East Asian crisis is based, mostly, on a group of countries. Specifically, studies have been conducted using panel/pooled data for Thailand, Indonesia, Malaysia and South Korea to identify the causes of the crisis. This study is skeptical about a generalized conclusion, and therefore, considers examining this question in great depth.

- What were the consequences of the conditions imposed by the IMF in return for its assistance in the aftermath of the crisis?

1.4 Format of this Study

This thesis is organized as follows. In Chapter Two, a critical review of the existing literature on the East Asian crisis is conducted. This chapter examines the need to study the case of Thailand separately; moreover, an attempt is made to investigate the liberalization process in Thailand and other factors that may have contributed to the huge inflow of capital.

Chapter Three explores consumer behaviour, specifically the applicability of a modern version of the life cycle permanent income (LC-PI) hypothesis to Thailand during the period from 1975 to 1998. Financial liberalization and free flow of foreign capital may reduce borrowing constraints and induce a consumption boom, which may in turn contain one of the causes of the crisis. This chapter also examines the hypersensitivity of consumer spending and its implications for economic fluctuations.

Chapter Four is devoted to studying the interrelationships among various components of savings. We examine the role of foreign saving on domestic saving by extending the crowding-out hypothesis. Also, there is a study of the relationship between private and public saving by applying the Ricardian equivalence proposition (REP), which states that the government saving would have an offsetting impact on private saving.

Chapter Five discusses the behaviour of private investors. It investigates the role of fundamentals, as well as the role of belief (belief that the economy would continue to grow) on investment decisions. Investment in real estate, as well as other sectors of the economy, is closely scrutinized.

The last chapter critically analyzes the conditions imposed by the IMF for its assistance in the aftermath of the crisis. It also summarizes the findings of this study, discusses policy options, and suggests the scope of further research.

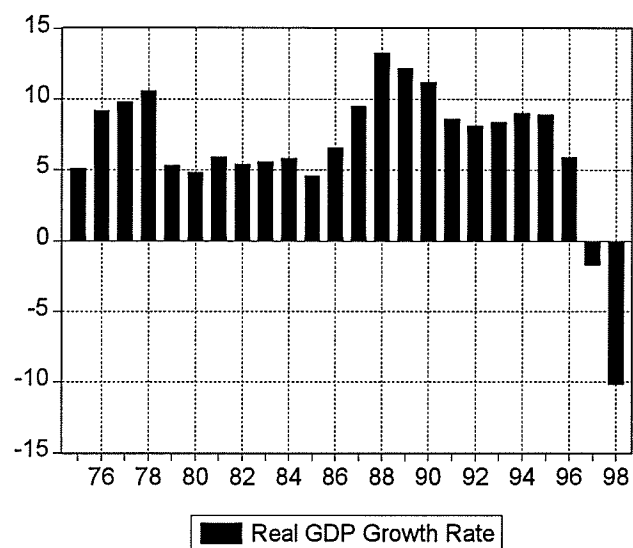
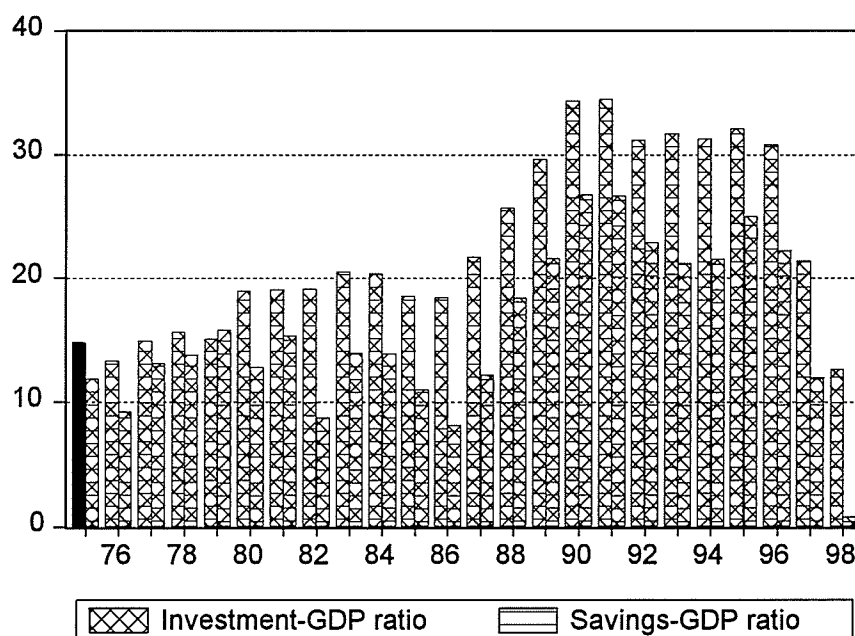
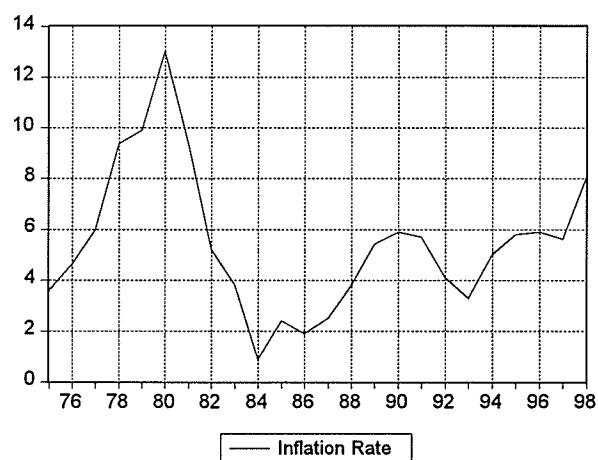
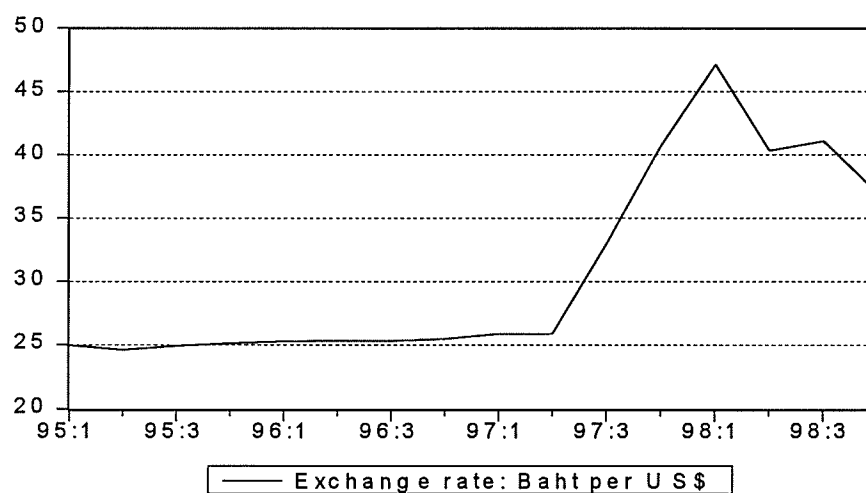
Figure 1.1: Real GDP Growth Rate**Figure 1.2: Savings and Investment (% of GDP)**

Figure 1.3: Inflation Rate**Figure 1.4: Sharp Depreciation of Baht against US \$**

Source: International Financial Statistics and Bank of Thailand's Homepage.

Chapter 2

Predominant Explanations for the Crisis

And

Reasons for Capital Influx

2.1 Introduction

Soon after the start of the East Asian crisis, economists as well as policymakers from various schools began their attempts to explain the causes, consequences, and cures for such crises. Extensive studies have been conducted by organizations such as the Harvard Institute for International Development (HIID), the International Monetary Fund (IMF), the World Bank, the Bank of International Settlement (BIS), and the Commonwealth. Several hypotheses and interpretations have been put forward to explain the crisis, including: flawed fundamentals, panic triggering and crisis mismanagement. The literature is so extensive that it is beyond the scope of this study to discuss each study individually.⁶

The chapter proceeds as follows. Section 2 briefly reviews the main hypotheses regarding the crisis. Section 3 provides a critical review of existing hypotheses and urges the need for a specific study in the case of Thailand. Section 4 looks at the reasoning behind the massive inflow of foreign capital to Thailand, and its link to economic growth.

⁶ For details, see Radlet and Sachs, 1998, Corsetti, Pesenti and Roubini, 1998, Wade and Veneroso, 1998, the IMF, 1997 and the World Bank, 1998.

2.2 Explanations for the Crisis

A group of leading economists has argued that the East Asian crisis was a result of flawed fundamentals, namely that fundamental imbalances due to excessive government intervention in the functioning of the market have triggered the crisis.⁷ The most prominent advocates of this view include Alan Greenspan, the Chairman of the US Federal Reserve, Stanley Fischer, the then Deputy-Managing Director of the IMF, Paul Krugman of MIT, Giancarlo Corsetti of Yale, Paolo Pesenti of the Federal Reserve of New York, and Nouriel Roubini of New York University [Corsetti, Pesenti, and Roubini, 1998, IMF, 1997].

According to Greenspan,

The current crisis is likely to accelerate the dismantling in many Asian countries of a system with large elements of government directed investment in which finance played a key role in carrying out state's objectives. Such a system, inevitably has led to develop the investment excesses and error which all similar endeavors seem to be prone....Government directed production, financed with directed bank loans, couldn't readily adjust to the continuously changing patterns of market demand for domestically consumed goods or exports. Gluts and shortages are inevitable.

[Greenspan, 1998]

Concerning the outcome of the East Asian crisis, Greenspan went on to argue, "What we have here is a very dramatic event towards a consensus of the type of market system we have in this country." Fischer maintained that the main causes of the crisis included failure to dampen over-heating, the maintenance of a pegged exchange rate for a long

⁷Terminologies such as "Crony Capitalism" or "Death throes of Asian Capitalism," were also used to describe the East Asian economy during the time of the crisis.

time, lax financial regulation, and insufficient political commitment. According to him basic institutional deficiencies of the East Asian economies were the principal causes of the crisis.

The IMF World Economic Outlook (1997) also cites inadequacies in the regulation and supervision of financial institutions as a major source of the weaknesses of these countries' financial systems. The IMF adds that these financial institutions had such limited experience in so many areas that they became involved in unwise lending agreements as well as corrupt practices. Furthermore, according to the IMF, these factors, matched with the inability of financial institutions to correctly price and manage risk, in conjunction with their lack of commercial awareness and knowledge, poor corporate governance, and lax internal controls produced significant instabilities in the financial system.

According to Corsetti, Pesenti, and Roubini (1998), the root cause of the Asian crisis lay within the structure of economic incentive, under which the corporate and financial sectors of these countries operated. They argue that regulatory inadequacies and close links between public and private institutions were responsible for corruption and the misallocation of resources. Moreover, they point out that the East Asian countries faced an export slump in 1996 mainly because of a real effective exchange rate appreciation, which occurred due to the appreciation of the US dollar (regional currencies were pegged to the US dollar) and the devaluation of the Chinese Yuan in 1994. For example, in Thailand the export growth rate dropped from 19% in 1995 to 1.5% in 1996, while

import growth dropped from 23% but remained above 13% in the same two years [Table 2.1]. In short, fundamental imbalances, due to structural and policy distortions, triggered the crisis.

However, the aforementioned explanations have been severely criticized by a wide range of economists. For example, according to Jeffrey Sachs (1998), the extent and depth of the crisis should not be attributed to deterioration in the fundamentals but rather to widespread panic on the part of domestic and international investors. In the 1990's, Asia's fundamentals were adequate to forestall an economic contraction; budgets were in balance or surplus, inflation was low, and private savings were high.

Furthermore, according to the World Bank, the devaluation of the Chinese Yuan in January, 1994 did not have as large a negative impact in the region as was generally perceived. China had a dual exchange rate system prior to the official devaluation (devaluation was an attempt to unify the two rates), and a large portion of Chinese exports was already based on the depreciated rate. In fact, in 1996, all Asian countries experienced declining export growth including China [Table 2.1]. Therefore, it is difficult to argue that the Yuan devaluation had any significant damaging effect on its export competitors, including Thailand [World Bank, 1997]. Instead, the principal reason for this export slump was a slowdown of demand from major importing countries, especially Japan, whose economy was experiencing growth slowdown in the 1990s. This decline in growth was further accentuated by the downturn of the semi-conductor industry in 1996.

In addition, Joseph Stiglitz, the World Bank's chief economist, has called attention to the success of the Asian economies [World Bank, 1998]. He writes, "for twenty five years East Asian economies have grown more than twice as fast as the average rate for the rest of the world.... These successes have been fostered by sound fiscal policies, low inflation, export driven growth and effective institutions which in turn helped make East Asia the world's leading recipient of foreign investment." Other critics also argue that the unanticipated nature of the crisis and the continued high levels of capital inflow into East Asia until the very brink of the crisis do not support the view that the crisis was merely a result of fundamental deficiencies. Alternatively, they have proposed the panic-triggering hypothesis.

Jeffrey Sachs argues that sudden shifts in market expectations as well as the resulting panicky behaviour of domestic and foreign investors were the key sources of the East Asian financial crisis: the crisis was triggered by dramatic swings in creditors' expectations about the behaviour of other creditors. The liquidity-insolvency model, developed by Cooper and Sachs (1985), was used to explain the crisis.⁸

The basic idea of the liquidity-insolvency model and its implications can be summarized as follows.⁹ Suppose that a borrower owes debt " D " to a large number of existing creditors, and it requires debt service of " θD " in period one. The remaining, $(D - \theta D)$, will

8 The main distinction between insolvent and illiquid borrower is that an insolvent borrower lacks the net worth to repay the outstanding debt out of future earnings, whereas an illiquid borrower lacks the ready cash to repay the current debt servicing obligations, even though it has net worth to repay debt in the long run.

9 For details, see Diamond and Dybvig (1983), Cooper and Sachs (1985).

be serviced in next period at an interest rate “ R ”, and the debtor will have to pay $(D - \theta D)(1 + R) = D(1 - \theta)(1 + R)$. The debtor owns an investment project which will pay off “ V_2 ” in the second period, where $V_2/(1 + R)$ is greater than the present value of debt service payments $[\theta D + (1 + R)(1 - \theta) D] = D + R(1 - \theta)D$. The debtor lacks the cash flow to repay “ θD ”, since the investment project only pays off in the second period. Moreover, if the debtor defaults, the loan repayments are accelerated (i.e. demanded at once by each of the individual creditors). The investment project is then scrapped, with a salvage value of $V_1 < D$; in other words, the debtor is in crisis.

In normal circumstance, this solvent but illiquid borrower would borrow a fresh loan “ L ” in the first period, use it to repay θD , and then service $(1 - \theta) D + L$ in the second period. Thus, with $L = \theta D$, the total repayment due in the second period is $[(1 + R) \theta D + (1 + R)(1 - \theta) D] = (1 + R) D$, which by assumption is less than V_2 . Suppose however, that each individual creditor can lend at most “ ω ”, where $\omega < \theta D$; if only one lender is prepared to lend in the first period, the borrower will be forced into default due to insufficient funds. The new creditor that lends in the first period would then suffer an immediate loss on his loans. Obviously, a first-period loan will require at least “ n_1 ” new lenders, where $n_1 = \theta D / \omega$, i.e. a collective action is required.

In normal cases, n_1 lenders are likely to step forward, and both the debt servicing and the investment project are carried to fruition. However, in case of panicky behaviour, the withdrawal of funds would be accelerated. Despite the fact that this action is irrational collectively, it is rational to individual creditors since each creditor expects that no other

creditor is ready to make such loans. As a result, the investment project would be scrapped with sharp economic losses, because the salvage value " V_1 " is less than $V_2/(1+r)$.

Thus, according to Sachs, the inability of the capital market to provide fresh loans to illiquid but solvent borrowers was the root cause of the problem. He argues that the sudden and unilateral withdrawal of short-term loans from the East Asian countries in 1997 created a sharp economic loss. The belief that other investors might have withdrawn worked as a catalyst to each investor, which in turn created self-fulfilling prophecies [Radelet and Sachs, 1998].

Although Sachs's argument highlights the deficiencies of the capital market and the whipsaw movements of capital flows as the main reasons for the crisis, it fails to recognize underlying reasons for the capital market deficiencies that occurred, especially, in the case of Thailand. For example, indexes such as profit rates, debt-equity ratios, and current account deficits had started to deteriorate in 1994, long before the crisis occurred, and the reaction of the capital market was in fact overdue.

Others like Robert Wade and Frank Veneroso argue that the crisis in East Asia was the result of high household saving and high corporate debt economy. They maintain that an economy with these two elements is vulnerable to systematic shocks: shocks that could take the form of high interest rates, currency devaluation, or demand contraction. A high interest rate, and/or currency devaluation increase the cost of servicing debts, while

demand contractions reduce corporate profits. When interest rates are in excess of profits, firms would have no other options but to increase total debts; nevertheless, in the context of East Asia, coping with the shocks in this fashion was almost impossible because firms were heavily indebted even before the crisis occurred [Wade and Venoroso, 1998].

Another study, conducted by the Commonwealth highlights a number of structural deficiencies, where a bubble effect in domestic financial systems, rapid growth of short-term commercial bank debt, and premature capital account liberalization are identified as the main reasons for the crisis. Furthermore, this study contends that the crisis was magnified by sudden capital reversals by global commercial banks and their contagion. In the post-crisis era, inappropriate fiscal and monetary policies prescribed by the IMF also had negative repercussions [Commonwealth Secretariat, 2000].

Thus, a wide range of issues has been identified in literature for the causes of the crisis, with each explanation offering something new and each having significant policy implications. Although this study intends to work as a complement to the existing literature, it also points out the main limitations of these explanations.

2.3: Limitations of the Predominant Explanations

The main limitation of the aforementioned explanations is that they are based on generalizations made for a group of East Asian countries (Thailand, Indonesia, Malaysia, and Korea), which differ significantly from each other.¹⁰ In particular, no other country mirrored Thailand in its consumption, investment, export, and import patterns. The differences can be seen in the following facts and figures:

- Thailand is the only country that exports foodstuff (Rice), while the rest of the countries are importers of foodstuffs. Thailand imports petroleum while Indonesia is an exporter of petroleum. Thailand imports motor vehicles while South Korea exports the same [Table 2.2]. A difference in trade pattern is also reflected in their balance of payments statistics.
- Thailand is the only country in the group that had a persistently high current account deficit (around 7% of GDP) during the period from 1990 to 1996. Indonesia and Korea's current account-GDP ratios were -2% and -3% respectively. Malaysia did have a slightly higher deficit; nevertheless, it was not consistently as high as that in Thailand [Figure 2.1].

¹⁰ Although country-specific analyses have been conducted in some cases, hypotheses that have been put forward are generalized. Some studies also incorporated the case of Philippines.

- Between 1990 and 1996, government saving in Thailand was the highest in the region (around 3% of GDP).

The rest of the countries had either negative or slightly positive government savings [Figure 2.2]. Also, Thailand was the only country that experienced negative GDP growth for two consecutive years.

- The Stock Exchange of Thailand (SET) index for the property sector experienced incredible growth during 1992 and 1993, and then completely collapsed in 1997. Although other countries in the region had similar patterns in the stock market, their holdings were much less volatile than those of Thailand [Figure 2.3]. In addition, as a percentage of GDP, bank lending to Thailand's private sector was the highest, as compared to bank lending in the rest of the countries [Figure 2.4].

Furthermore, existing explanations are, mainly, based on a short-term analysis (1990 to 1997), and seldom raise questions about the underlying assumptions regarding the behaviour of consumers and investors. It is important to analyse the movements of basic economic activities (consumption and production) in order to identify the causes of an economic/financial crisis; and clearly long/medium term analyses are more appropriate when seeking to understand the behaviour of economic agents. Finally, the crisis originated in Thailand; therefore, the issue of the contagion effect is not relevant here.

Thus, we propose to investigate Thailand's case exclusively, particularly the link between domestic economic activities and external economic forces, and especially, the impact of foreign capital on consumption and investment.

Table 2.1: Asian Economies' Export and Import Slowdown

(Percent Change relative to previous year)

Country/Territory	Exports		Imports	
	1995	1996	1995	1996
China	21	-11.8	15.3	-2.2
Hong Kong	13.3	0	4	1
Taiwan	20	3.9	21.3	-2.2
Indonesia	18.5	7.5	26.8	10.3
Japan	4.5	-8.2	17.5	3.4
Korea	25.5	4.3	28.2	4.3
Malaysia	20.4	8.7	25.3	-0.4
Philippines	20.6	24.8	18.9	38.7
Singapore	19.3	11.5	16.6	11.7
Thailand	19.4	1.5	22.8	12.8

Source: Warr (1997a), p. 17

Note: Except for Taiwan, data are taken from International Financial Statistic. Taiwan's data are obtained from the Ministry of Finance, Republic of China, Taipei. Indonesian export data relate to non-oil exports only.

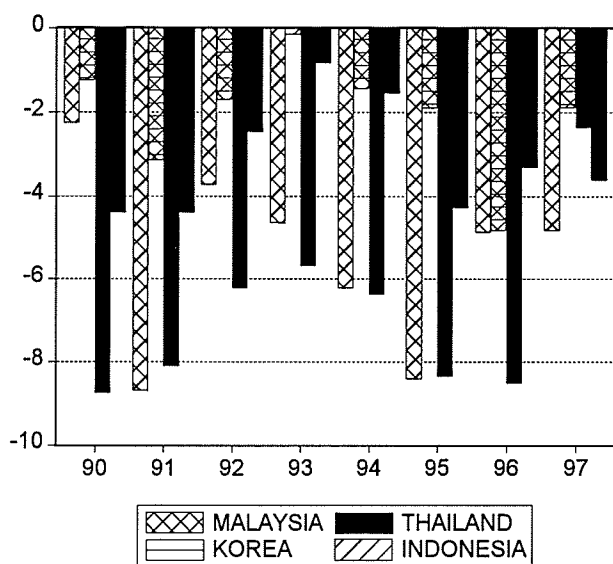
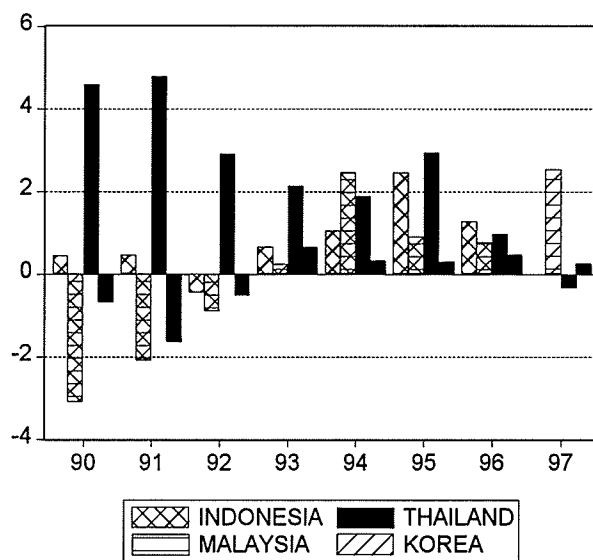
**Table 2.2: Major Trading Commodities and Partners
(Exports)**

	Thailand	Indonesia	Malaysia	South Korea
Commodities	Rice	Petroleum	Electronics	Electronics
	Integrated circuit	Wood	Natural gas	Machinery
	Textiles	Rubber	Chemicals	Automobiles
		Textiles	Palm oil	Steel
			Rubber	Ship
			Textiles	Textile
Partner Country	(% of Total Export)			
US	22	14	21	21
Japan	14	21	13	11
Singapore	9	10	18	
China				10
South Korea		7		
HongKong	5		5	6
Taiwan			4	4
Netherlands	4	3	4	
Malaysia	4			
Australia		3		

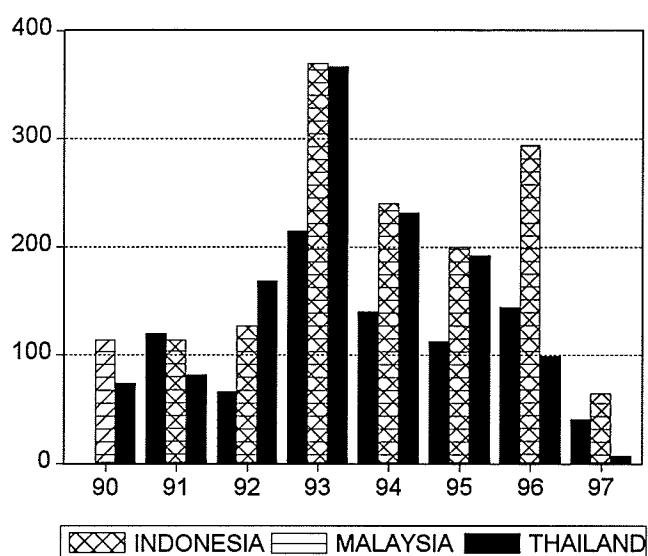
Source: <http://www.countryreports.org>

**Table 2.2: Continued
(Imports)**

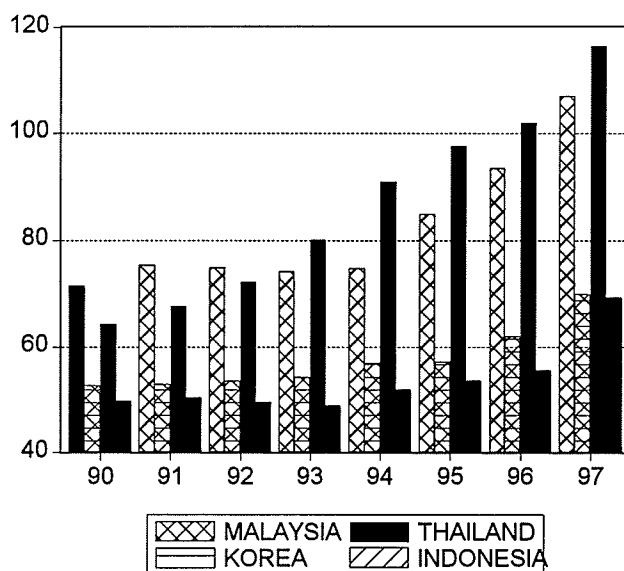
	Thailand	Indonesia	Malaysia	South Korea
Commodities	Capital goods	Capital goods	Capital goods	Electronics
	Consumer goods	Food	Chemicals	Petroleum
	Fuels	Chemicals	Food	Chemicals
			Fuels	Food
Partner Country	(% of Total Imports)			
US	26	12	17	21
Japan	14	12	21	20
Singapore	6	10	14	
China	5		4	7.5
South Korea		6	5	
HongKong	5			
Taiwan			6	
Netherlands	4			
Malaysia	4			
Australia		6		4
Germany		6		
Saudi Arabia				5
Thailand			4	

Figure 2.1: Current Account (% of GDP)**Figure 2.2: Government Finances (% of GDP)**

Source: International Financial Statistics.

Figure 2.3: Stock Indexes (property sector)

Source: JP Morgan

Figure 2.4: Bank Lending to Private Sector (% of GDP)

Source: International Financial Statistics

2.4: Capital Inflows

The striking difference between Thailand's economy and the economies of the other countries was its significant current account deficit, matched by a surplus in its capital account [Figure 2.5]. The following factors might have contributed toward the inflow of foreign capital: capital account liberalization, globalization, and excessive praise.

i. Capital Account Liberalization

Despite high domestic savings and investment rates, Thailand liberalized its financial sector (including its capital account) during the period of 1989 to 1996 to attract more foreign capital. The chronology of the major forms of financial reform in Thailand was as follows.

In June 1989, the interest rate ceiling on commercial banks' time deposits with maturity exceeding 1 year was abolished. In May 1990, commencing with the official acceptance of obligations under Article VIII of the Articles of Agreement of the International Monetary Fund, the country relaxed its foreign exchange control regulations.

In January 1992, the interest rate ceiling on savings deposits at commercial banks was abolished. In May 1992, a further relaxation of exchange control took place in the following forms: first, exporters could receive payments in baht from non-resident baht accounts in addition to foreign currencies. This reform allowed the use of such foreign currency receipts either to pay for imports or to reduce foreign liabilities to non-residents. It also allowed residents to withdraw from their foreign currency accounts to repay debt

on behalf of their subsidiaries or to transfer to creditors' foreign currency from accounts at commercial banks in Thailand.

Second, expatriates working temporarily in Thailand were allowed to purchase foreign currencies to deposit into their foreign currency accounts at commercial banks in Thailand. Government departments, government organizations, and state enterprises were permitted to purchase, exchange, borrow, or withdraw from their foreign currency accounts in all cases. These measures enabled them to deposit an unlimited amount of foreign notes and coins into their foreign currency accounts (the limit had formerly been set at US\$2,000 per day).

In March 1992, commercial banks were permitted to act as selling agents for public debt instruments. This change meant that they could act as arrangers, underwriters, and dealers in debt instruments; furthermore, they could play the role of financial advisers in mergers, acquisition, and take-over cases. Finance companies were permitted to operate leasing services, act as selling agents for public debt instruments, and act as mutual fund supervisors. In June 1992, ceilings on lending and borrowing rates of banks and credit companies were removed.

In March 1993, permission was given to 46 commercial banks to operate international banking businesses known as Bangkok International Banking Facilities (BIBF) [Appendix D]. This move was a significant step in the liberalization process, and may

have accelerated the pace of foreign capital inflow by the removal of institutional barriers.

In February 1994, further liberalization of foreign exchange controls took place. The limit on the amount of baht that could be transferred to countries sharing a contiguous border with Thailand and Vietnam was increased from baht 250,000 to 500,000. The limit on the amount of foreign currency that could be taken out when traveling abroad was abolished, and the limit on the amount of foreign investment by Thai residents without seeking prior approval was increased from US\$ 5 million to 10 million. Residents were allowed to use foreign exchange, originating from abroad, to service external obligations without surrendering or depositing their funds in domestic accounts.

In June 1994, commercial banks were allowed to invest more than 20% of their total capital in equity. In November 1994, the ceiling of commercial banks' net position of foreign assets and liabilities of capital was reduced to 20% and 15% respectively, and in January 1995, permission was granted for the establishment of the Provincial International Banking Facilities (PIBFs).

In March 1995, the maximum amount of bidding on 3- to 6-month maturity bonds was increased from 500 million baht to 1 billion baht per bid. In February 1996, the Bank of Thailand's loan window with the Intraday Liquidity Facilities was replaced with a new agreement whereby commercial banks, finance companies, and finance and securities companies were allowed to sell government, state enterprise, and Bank of Thailand bonds

to the Bank of Thailand under a repurchase contract. However, it stipulated that the seller was required to repurchase the bonds in an amount not exceeding 90% of the face value or the amount of intraday liquidity.

In April 1996, there was a second round of granting BIBF licenses to foreign banks. In May 1996, the requirement for commercial banks to hold government bonds to fulfill the branch-opening requirement was lifted, and in August 1996, branches of foreign banks were allowed to upgrade to full operation. In October 1996, there was an improvement in trading in the repurchase market by introducing continuous matching and real time disclosure of trading information and indicating interest rate movements and highest offer and lowest bid via Reuters news and BIS news [Source: Bank of Thailand, 1995, 1996, 1998].

These liberalization measures removed many of the barriers that had been set to prevent the inflow of foreign capital; however, the liberalization process was not a sudden one, as shown in the chronology of significant events. It was a process that took place over a seven-year period. Therefore, liberalization alone should not be blamed for the massive inflow of foreign capital that started in 1990.

ii. Cold War and Globalization

During the Soviet era, many investors, local and foreign, were afraid of nationalization in the developing economies of the world because both political and economic arguments were used to justify tighter government control. With the collapse of the Berlin Wall in

1989 and the dismantling of Soviet Union in 1991, the world was left with a single free market economic system only, and the economic and political climate became favourable to substantial foreign investment. Moreover, with the advancement of information technology, the world appeared to be much smaller than before, and mobility of capital became instantaneous, where a few keystrokes could send billions of dollars to any part of the world.

iii. Titles/Excessive Praise

Perhaps the least discussed, yet still very important reason for capital inflow was the exaggerated titles, which created a “stereotype” expectation that certain countries would grow for indefinite periods of time. Thailand, along with Malaysia and Indonesia, became known as the Miracle Economies, Newly Industrialized Economies (NIEs), High-Performing Asian Economies (HPAEs), or Emerging Market Economies. Investors and policymakers alike, both domestic and foreign, assumed, contrary to all historical knowledge about growth rates, that this fast growth (four times the OECD average) would continue, and that the exchange rate would remain stable [Wade 1998]. This belief in continued growth might be one of the reasons for the high levels of capital inflows, inflow levels that continued until the very brink of the crisis. Therefore, it is plausible that the combination of liberalization, globalization, and excessive praise contributed to the inflow of hot money.

Figure 2.5 shows that the current account deficit rose substantially and was mirrored by surpluses in the capital account, and that the huge influx of capital created a large debt

burden. For example, in 1997, the foreign debt-GDP ratio stood at 60%. Although in relative terms that ratio does not seem high, in absolute terms it is huge because of rapid growth in the economy. Figure 2.6 shows that there was an alarming increase in the share of short-term debt to total foreign debt, with the ratio increasing from 30% in 1990 to 72% in 1995 [Figure 2.6]. This increase was mainly generated by the private sector, whose debt was primarily short term in nature [Appendix D].¹¹ The implication of foreign debt for economic development is discussed in the next section.

¹¹ Short-term external debt is defined as debt that has an original maturity of one year or less.

Figure 2.5: Balance of Payments
(Million US \$)

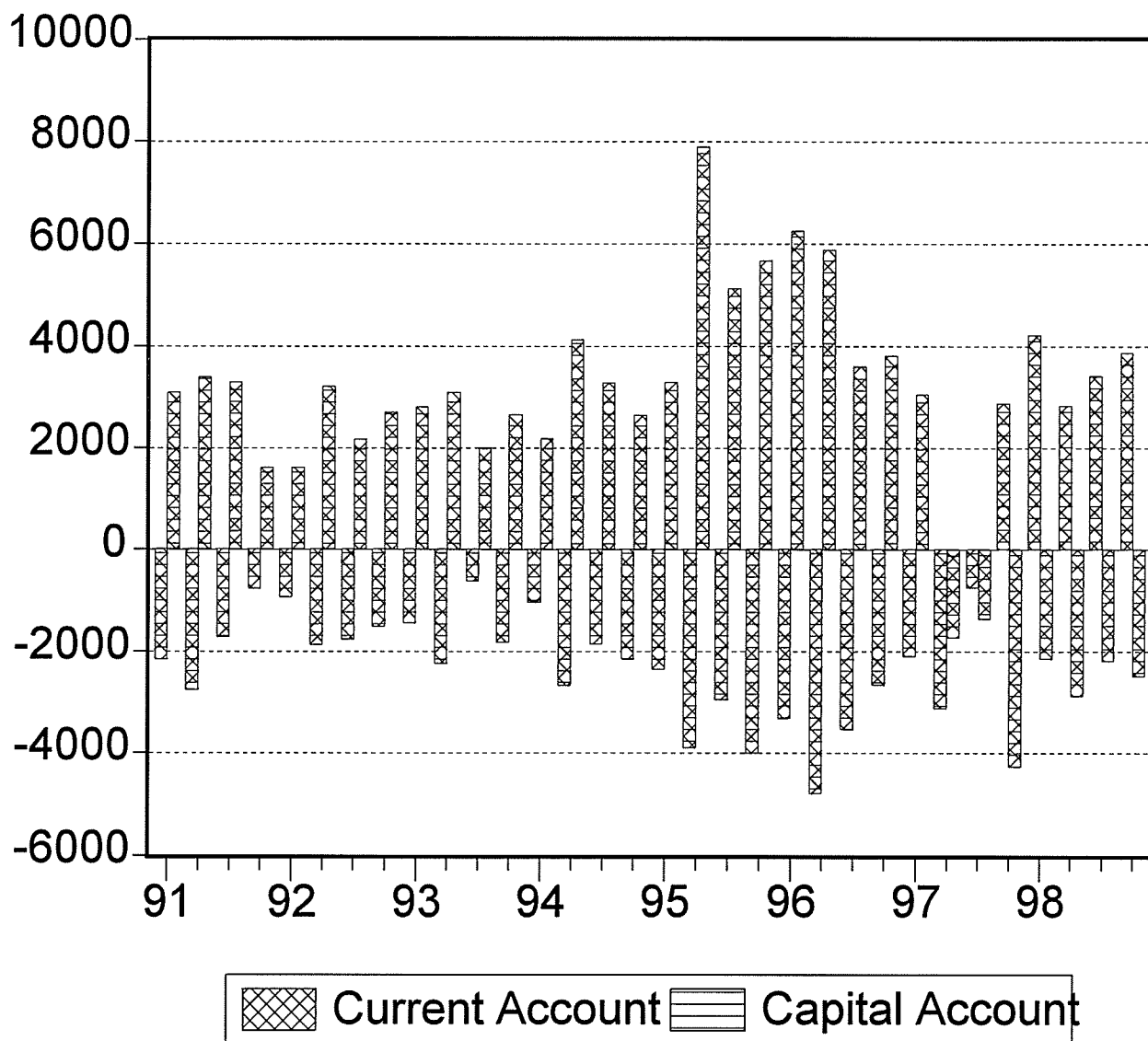
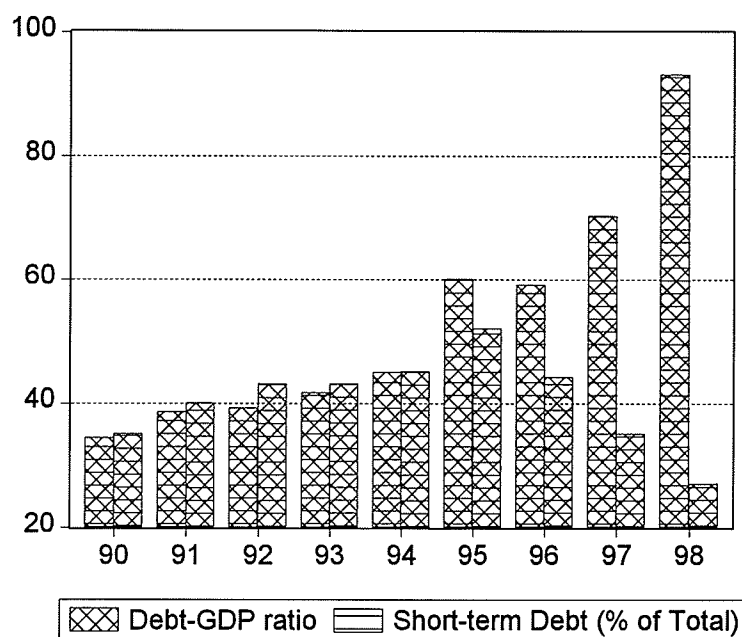


Figure 2.6: External Debt**Source: Bank of Thailand**

2.5 Financing Development Through External Debt

The role of foreign resources in economic development is a debatable issue. The dual gap model is often used to justify how a debtor country could become a net creditor country.¹² The basic idea of this model is based on national income accounting, where withdrawal equals injection determines equilibrium income.¹³ Withdrawal for an open economy includes saving and import, whereas injection includes investment and export; therefore, the equilibrium condition can be written as:

$$\text{Investment} + \text{Export} = \text{Saving} + \text{Import}$$

or

$$\text{Investment} - \text{Saving} = \text{Import} - \text{Export}$$

The above equation implies that an import surplus, financed by foreign borrowing, can supplement domestic saving directly or indirectly by providing foreign exchange to buy imports. In accounting terms, the amount of foreign borrowing to supplement domestic saving is the same, whether the need for more resources is for capital formation, or for consumer goods import. In other words, an excess of imports over exports implies an excess of resources used by an economy over the resources supplied by the economy.

12 See Hollis B. Chenery and Allan M. Stuart, "Foreign assistance and economic development," *American Economic Review* 56 (September 1966), Pp. 680-733.

13 With the inclusion of government, the identity would be, Investment + Government spending + Export = Saving + Tax + Import, which would provide a tri gap. However, the idea still remains fundamentally the same.

Figure 2.7: Debtor to Creditor

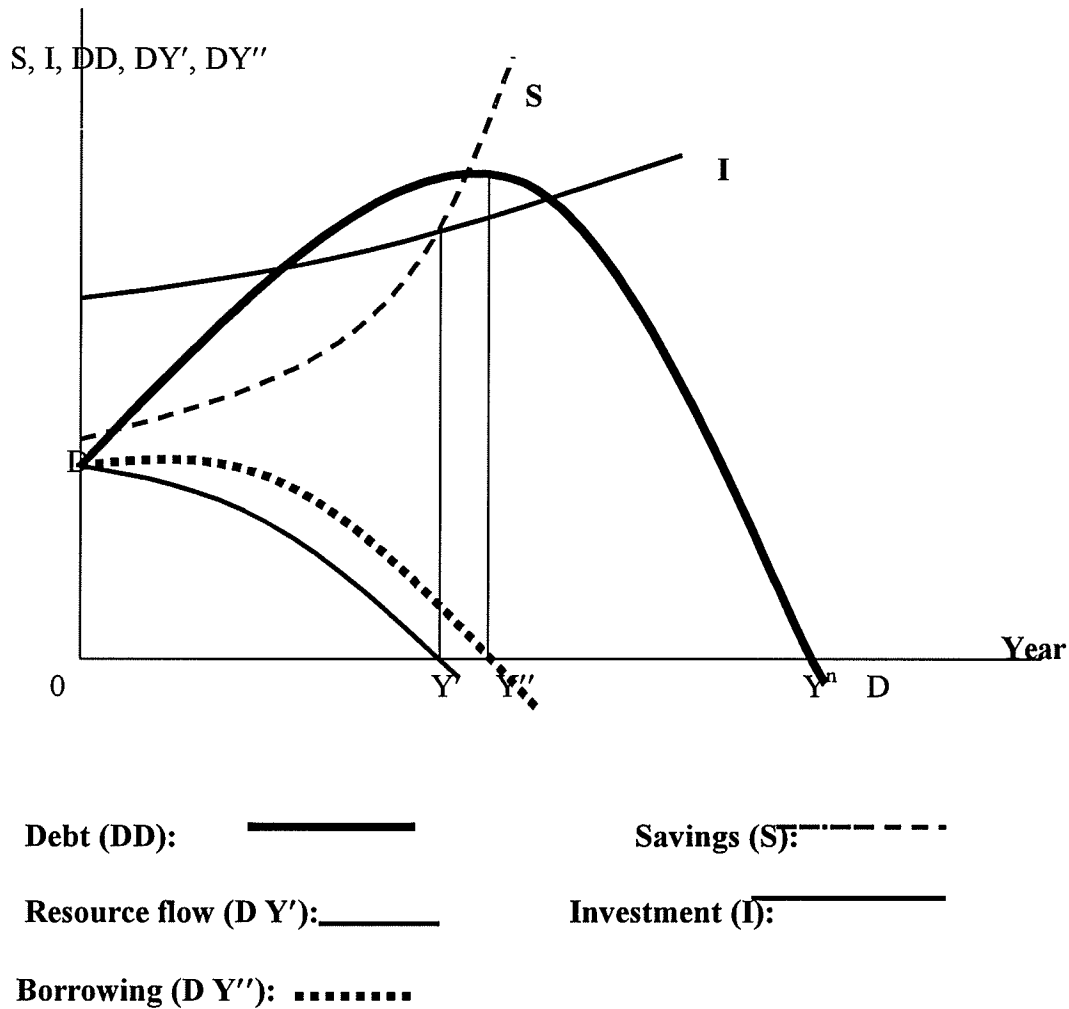


Figure 2.7 depicts the sequence of events that may lead a country from being a net debtor to being a net creditor. The net resource flow, (DY') , is required to bridge the savings investment gap to maintain a target rate of growth, and the flow is expected to decline steadily and to reverse after " Y' " years; however, borrowing would continue a little longer in order to cover interest charges on debt. Net borrowing is zero after " Y'' " years and at this point, debt " DD " starts to decline from its peak. Debt repayment, in

theory, takes place by converting excess savings over investments into a balance of payment surplus, and the debt is paid in full, by the “Y^m” year. Thus, from then on the country becomes a net creditor, i.e. an exporter of capital.

Although this model looks attractive in theory, it has limited applicability for various reasons. It ignores the fact that exports of developing countries are price and income inelastic and that imports are income elastic, which mainly follows from the Prebisch hypothesis. This hypothesis states that the terms of trade (TOT) often move against primary commodity producers, and as a result, a primary commodity exporter typically faces a chronic balance of payments deficit, and fails to get rid of foreign debt.¹⁴

Furthermore, for a country such as Thailand, where the domestic savings rate was high, the need for foreign savings requires serious investigation. There is no guarantee that these borrowed resources would be used for productive purposes; however, it is important that such an assurance be made in order for a country to make the transition from a debtor nation to a creditor nation. Because the bulk of the foreign resources were given to the private sector, we need to examine how private agents (consumers and investors) in Thailand used these resources.

Due to market imperfection, consumers in developing countries typically face a higher degree of borrowing constraint than those in developed countries. Moreover, East Asian societies have a much longer history than do Western countries. These older societies

¹⁴ The terms of trade go against the primary commodity exporter for a number of reasons. First, the income elasticity of demand for primary goods is highly inelastic. Moreover, the market for primary goods is more competitive than that for manufacturing goods, which also adversely affects terms of trade. For details, see M.J. Flanders, “Prebisch on Protectionism: An Evaluation,” *Economic Journal* [June 1964].

tend to be less diversified (demographically, culturally), with a higher density of population; they also have a monarchical/dictatorial system where social prestige and hierarchy play significant roles in their utility function. Because of these characteristics, the demonstration effect is relatively higher in LDCs than it is in developed countries. In LDCs, consumption of a luxury good by a neighbour makes that good necessary for others merely because it influences their social status. As a result, consumer behaviour in East Asian LDCs may not be adequately explained by the standard theories of consumer behaviour, which are based on the lifestyle of Western consumers. The standard life-cycle-permanent income hypotheses in particular have been developed by observing consumer behaviour in the US. These theories advocate for a free flow of capital because they assume that consumer behaviour would be driven by individual's ability rather than by social status. Moreover, if access to foreign resources affects consumer spending, it could also influence domestic savings. Therefore, investigation of consumer behaviour in Thailand may provide vital information about the causes of the crisis.

Second, if foreign resources are used for investment purposes, we need to examine whether investment was driven by short-term profit or by long-term economic growth. In order to be a creditor nation from a debtor nation, a country must attain a high and sustainable growth rate as implied by the above theory. Profits earned by foreign investors can be pulled out instantly if regulations are not in place, and, in the case of short-term investment, the entire capital may even be subject to outflow. Because foreign resources may not be subject to domestic planning authorities, whether or not they are directed to a balanced or unbalanced growth strategy would depend on profit rather than social need. Thus, how consumers and investors utilized foreign resources in Thailand deserves serious attention from both theoretical and empirical standpoints.

Chapter 3

Consumer Spending Through Borrowing

3.1 Introduction

The single largest component of aggregate demand, in an economy, is personal spending on consumer goods and services, a component that tends to be rather stable. Thus, we would expect large short-term fluctuations of income to be accompanied by modest responses in consumer spending; in other words, consumer spending is expected to be counter-cyclical.

However, in the presence of a borrowing/liquidity constraint, consumers may not follow this typical pattern of consumption.¹⁵ Specifically, a drastic relaxation/tightening of this constraint might create a consumption boom/slump in an economy, thus making it procyclical. Moreover, consumer spending on imported goods might affect a country's current account. Thus, an investigation of these issues in relation to Thailand's economy might shed light on the causes of the 1997/98 financial crisis.

This chapter is organized as follows: Section 2 briefly reviews the main theories of consumption; Section 3 modifies the random walk hypothesis (a modern theory of consumption) in order to incorporate the reality of Thailand; Section 4 discusses time series properties of the data; Section 5 provides an empirical examination of various hypotheses and their implications.

¹⁵ A liquidity constraint may occur when a consumer is unable to borrow (adequate amount) against his/her future income at market interest rate. The constraint could be binding when a consumer fails to borrow even a small amount, and non-binding when borrowing could be done at a premium over market

3.2 Theories of Consumption

Several theoretical explanations have been advanced to explain consumer behaviour. This section briefly discusses, first, Keynes's original absolute income hypothesis (AIH), second, Franco Modigliani's life-cycle hypothesis (LCH), third, Friedman's permanent income hypothesis (PIH), and finally, Hall's formulation of life-cycle permanent income (LC-PI) hypothesis.¹⁶

i. The absolute income hypothesis (AIH)

In his theory of the propensity to consume, Keynes argues that the absolute level of current income is the prime determinant of current consumption spending, hence the label "absolute income hypothesis." Although Keynes was aware of the potential influence on consumption of non-income factors, his explanation concludes that these factors had little or no effect on current consumption.¹⁷ He postulates that the relationship between consumption and income is characterized by two properties. First, a fundamental psychological law governs the propensity of people to consume: people tend to increase their consumption as their income increases, but not by as much as the underlying

rate. These situations may arise due to an imperfect capital market or lack of collateral. For details, see Romer, 2001.

¹⁶ Duesenberry's relative income hypothesis also provides an explanation of consumer behaviour. The model developed by Duesenberry in 1949 differs considerably from the life-cycle-permanent income hypothesis in that it is not based on intertemporal approach. See J.S. Duesenberry, "Income Consumption relations and their Implications," in M.G. Muller, ed., *Readings in Macroeconomics* [New York: Holt, Reinhart and Winston 1971]. Modern literature, however, seldom refers to the relative income hypothesis.

¹⁷ See John Maynard Keynes, *The General Theory of employment Interest and Money* (1936). Keynes divided the determinants of consumption spending into two categories: (a) subjective factors relating to psychological, social, and institutional characteristics (General Theory, Ch. 9), and (b) objective factors such as capital gains and losses, the rate of interest, expected future income, fiscal policy (General theory, Ch. 8). Of these, all except fiscal policy were expected to be of little practical consequence.

increases of income. The implied relationship between a change in consumption due to a change in income is known as marginal propensity to consume, where “ $MPC=\beta$ ” is less than unity.

The second property stipulates that as the absolute level of income grows over time, the gap between income and consumption spending widens. This implies that the ratio of consumption to income, the average propensity to consume (ϕ), is greater than the marginal propensity to consume (β), and therefore APC falls as income rises. Based on the Keynesian formulation, the relationship between income and consumption can be shown as follows:

$$C = \alpha + \beta Y \dots\dots\dots 1c$$

$$0 < \beta < 1$$

$$\text{where } \beta = MPC = \Delta C / \Delta Y$$

$$\phi = APC = C / Y$$

Equation 1c simply states that current income is the main determinant of current consumption.

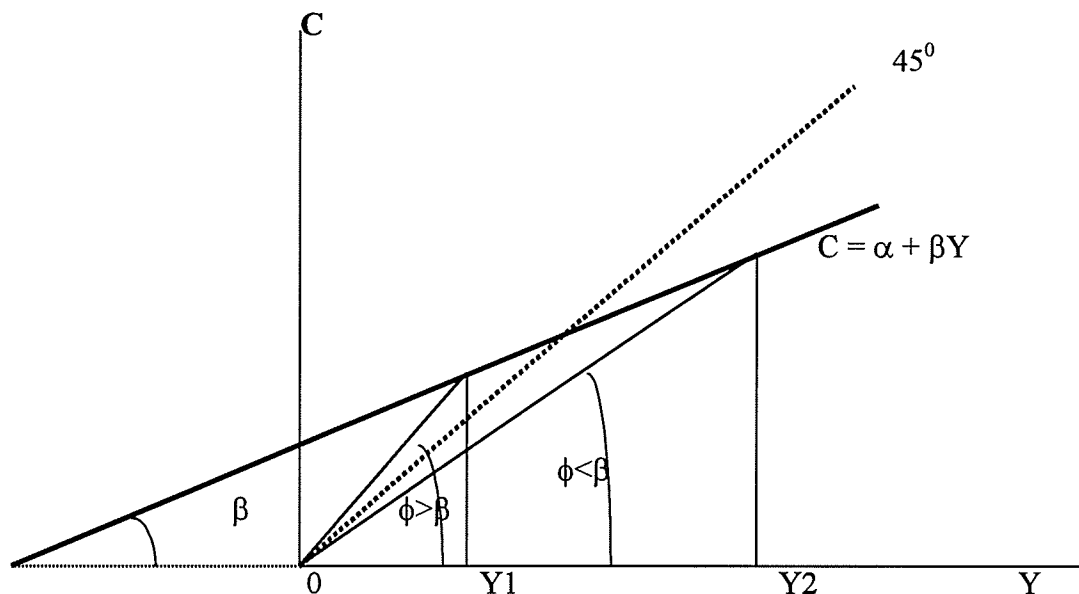


Figure 3.1: The absolute income hypothesis (AIH)

Figure 3.1 depicts the relationship between income and consumption in the short run: at the income level “ Y_1 ”, APC (ϕ) is greater than the MPC (β), while at the income level “ Y_2 ”, APC (ϕ) is less than the MPC (β). Early empirical efforts to verify the AIH revealed that it was consistent with historical budget studies describing the disposition of household income between consumption and saving. This conclusion was subsequently supported by time-series estimates of the consumption function itself [Cherneff 1993].

However, research results and actual experience during the late 1940s led to a re-evaluation of the absolute income hypothesis. New evidence surfaced from the work of Simon Kuznets, who pioneered research in the United States national income accounting. Kuznet’s discoveries suggest that consumption spending is driven by factors other than

current income, and his results recognize the need for a more advanced consumption theory, a theory capable of reconciling the co-existence of a long-term proportional consumption-income relationship and a short-term non-proportional relationship, while also explaining observed anomalies in actual consumption behaviour [Kuznets, 1946]. Two major theories of consumption that were advanced to address Kuznet's concern are: the life-cycle, and the permanent income hypotheses.

ii. The Life-Cycle Theory

Ando and Modigliani advocate a life cycle hypothesis of consumption, which states that consumption choices made in each period are part of an intertemporal utility maximizing strategy. They stipulate that intertemporal consumption allocation is strongly influenced by the demographic characteristics of consumers: an individual would normally attempt to achieve a standard of consumption that is proportional to his/her lifetime wealth and would dislike a deviation from this standard.¹⁸ The key assumption of this theory is that most people choose a stable life-style, and therefore would not amass significant savings in one period in order to have a huge spending spree in the next.

¹⁸ The life-cycle hypothesis was developed in two papers; see Franco Modigliani and Richard Brumberg, "Utility analysis and the Consumption Function: An interpretation of Cross section data," in K.K. Kurihara. *Post-Keynesian Economics* (1954). Also Albert Ando and Franco Modigliani, "The lifecycle hypothesis of savings." *American Economic Review*, vol. 53, (March 1963), pp 55-84.

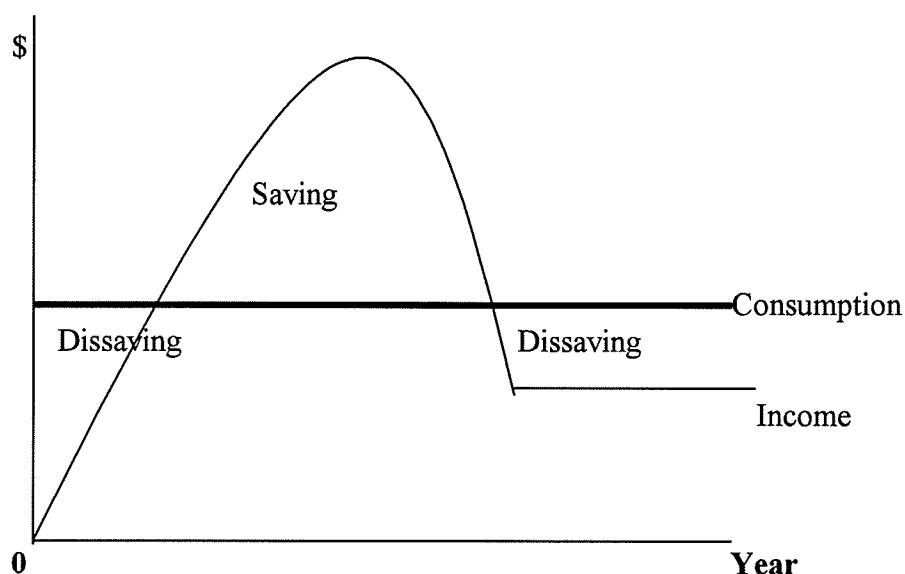


Figure 3.2: Life-Cycle hypothesis

Figure 3.2 shows that at the early stage of his/her life, an individual borrows/dissaves, tries to save during middle age and consumes what remains of accumulated savings at the later stage. In other words, an individual maintains a stable consumption function. A similar conclusion stems from the permanent-income hypothesis.

iii. The Permanent-Income Hypothesis (PIH)

The permanent income hypothesis, proposed by Nobel Laureate Milton Friedman, stipulates that consumers maximize utility over a long period and do not base their consumption plans on current income. Instead they base it on a long-term measure of income known as permanent income.¹⁹ The permanent income hypothesis is constructed

¹⁹ Milton Friedman, *A Theory of consumption function* [Princeton University Press, 1957].

using three correlation assumptions and a postulated behavioural relationship which links consumption and permanent income.

First, the PIH assumes that permanent income is uncorrelated with transitory income, i.e. $\rho(Y^t, Y^p) = 0$, where “ ρ ” denotes the correlation coefficient. The PIH also assumes that the transitory and permanent components of consumption are independent of each other, i.e. $\rho(C^t, C^p) = 0$. Finally, it contends that because of the uncertain nature of the events responsible for transitory variations in income and consumption, transitory consumption and transitory income are unrelated, i.e. $\rho(C^t, Y^t) = 0$.

Based on the above assumptions, Friedman proposed the idea that an individual consumes a constant fraction of his expected income, which Friedman called permanent income:

$$C_t^p = \beta Y_t^p \dots\dots\dots 2c$$

$$Y_t^p = a_1 Y_t + a_2 Y_{t-1} + a_3 Y_{t-2} + \dots$$

$$\text{where } \sum a_1 + a_2 + a_3 + \dots = 1$$

Equation 2c states that both the APC and MPC are equal to β ; and therefore this removes the short-term long-term inconsistencies highlighted by Kuznet. However, this model is based on the adaptive expectation hypothesis, where permanent income is considered to be a weighted average of current and past periods' income. In contrast, modern macroeconomic theory, both new classical and new Keynesian, relies a great deal on

rational/forward looking expectations, where agents are considered to form expectations based on the latest available information. Using a forward-looking expectation, Robert Hall advances an extreme version of the life-cycle-permanent income (LC-PI) hypothesis known as the random-walk hypothesis.

iv. The Random Walk hypothesis

According to Hall, the basic consumer problem can be formalized using a representative agent model, where the representative agent maximizes the following time-separable utility function:²⁰

$$U = E_t \sum_{t=0}^T \left(\frac{1}{1+\rho} \right)^t U(C_t) \dots \dots \dots 3c$$

$$U'(\bullet) > 0, \quad U''(\bullet) < 0,$$

such that

$$\sum_{t=0}^T \left(\frac{1}{1+r} \right)^t (C_t - Y_t) \leq A_0$$

where

E_t = mathematical expectation,²¹

ρ = rate of subjective time preference,

r = real rate of interest ($r \geq \rho$), assumed constant over time,

$U(\bullet)$ = one-period utility function, strictly concave,

C_t = consumption in period t ,

A_0 = assets apart from human capital,

Y_t = earnings that are the only source of uncertainty.

20 See, Hall, Robert 1978. "Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence." *Journal of Political Economy* 86 (December), pp: 971-987.

21 Also, known as rational or forward-looking expectation where, expectation is based on all information available at time t .

The aforementioned model assumes that marginal utility of consumption, $U'(\bullet) > 0$, is always positive, and therefore the individual satisfies the budget constraint with equality. Furthermore, the model assumes that the individual can save or borrow at an exogenous interest rate, subject to the constraint that any outstanding debt must be repaid at the end of his or her life. Therefore, the Lagrangian for the representative agent's maximization problem can be written as:

$$L = E_t \sum_{t=0}^T \left(\frac{1}{1+\rho} \right)^t U(C_t) + \mu \left(A_0 + \sum_{t=0}^T \left(\frac{1}{1+r} \right)^t (Y_t - C_t) \right) \dots\dots\dots 4c$$

For simplicity, one can assume that the subjective discount rate ρ and the real interest rate r both are equal to zero.²² In this case, the above equation can be rewritten as:

$$L = E_t \sum_{t=0}^T U(C_t) + \mu \left(A_0 + \sum_{t=0}^T Y_t - \sum_{t=0}^T C_t \right)$$

Therefore, the household's problem is to choose the path optimum path of $C(t)$ at each time period, which can be done by using the conventional maximization technique

[Romer, 2001].²³

22 Assuming that the interest rate and the discount rate are equal but not necessarily zero would have almost no effect on the analysis. The first-order condition would remain the same.

23 Sophisticated techniques like the Euler equation, calculus of variations would yield the same result; see Hall [1978, pp. 971-980], Blanchard and Fischer [1989, pp. 38-43].

The first-order condition for C_t can be obtained by differentiating the previous expression with respect to C_t

$$E_t U'(C_t) - \mu = 0$$

$$\therefore E_t U'(C_t) = \mu$$

where $\mu = \text{marginal utility of income}$

Since the prior condition holds in every period, the marginal utility of consumption is constant. Moreover, since the level of consumption uniquely determines its marginal utility, this means that consumption must be constant. In other words, it implies that in each period, the expected next period's consumption equals current consumption. By definition of expectation one can write,

$$C_t = E_{t-1}[C_t] + \varepsilon_t$$

$$E_{t-1}[C_t] = C_{t-1}$$

$$\therefore C_t = C_{t-1} + \varepsilon_t$$

$$\therefore \Delta C_t = \varepsilon_t \dots\dots\dots 5c$$

with ε being white noise

This is Hall's famous result, which implies that consumption follows a random walk " ε " [Hall, 1978]. In other words, there is no present variable that can predict future

consumption; the change in consumption is unpredictable. Intuitively this result implies that an individual adjusts his or her current consumption to the point where consumption is not expected to change. Thus, a forward-looking/far-sighted consumer who can borrow against future income will smooth his/her consumption to maximize intertemporal utility: current consumption is part of a long-term consumption plan rather than a short-term/myopic one. Indeed, this forward-looking view of consumers works as a basis of new classical theory, which advocates a laissez faire policy domestically and free flow of capital internationally.²⁴

Thus, the applicability of the mainstream theories of consumer behaviour needs to be investigated in order to understand what might have gone wrong in Thailand, which experienced a huge inflow of foreign capital during the period from 1990-96, and a dramatic outflow of these previously borrowed funds in 1997/98. Thus, we will examine the predictive power of current income on current consumption in Thailand. We will also examine the applicability of the random-walk hypothesis by using Mankiw's liquidity constraint hypothesis [Mankiw, 1989]. Finally, we will propose the pro-cyclicality hypothesis to examine whether consumer spending in Thailand was counter-cyclical or pro-cyclical while there was inflow/outflow of foreign capital.

²⁴ In the 1980s a group of economists (Robert Barro, Robert Lucas, Thomas Sargent, Nelson Plosser and others known as new-classical economist) emerged who reformulated old classical theory using rational expectations, which has the implication of laissez faire policy.

3.3: Liquidity/Borrowing Constraint

The capital markets of developing countries are typically imperfect, either because of scarcity of funds/collateral or because of institutional limitations (monopolistic nature of financial institutions). As a result, a significant proportion of households in these countries faces some degree of borrowing constraint. Numerous empirical studies of this issue have been conducted, by using direct estimation, or indirectly, by discussing stylized evidence. These studies have found that the proportion of liquidity constrained consumers in developing countries is quite high: ranging from 0.40 to 0.65 [Copelman, 1994; Edwards, 1995; Reinhart, 1995; Schmidt-Hebbel and Servén, 1998].

In order to examine the proportion of liquidity-constrained consumers in Thailand, we start with an intertemporal model of consumption. Suppose that a typical consumer wants to maximize his/her two-period utility function.

$$U = U(C_1, C_2)$$

$$U'(\bullet) > 0$$

subject to the following budget constraint

$$C_1 + \frac{C_2}{1+R} = Y_1 + \frac{Y_2}{1+R}$$

where

Y_1 = current income,

Y_2 = next period's income,

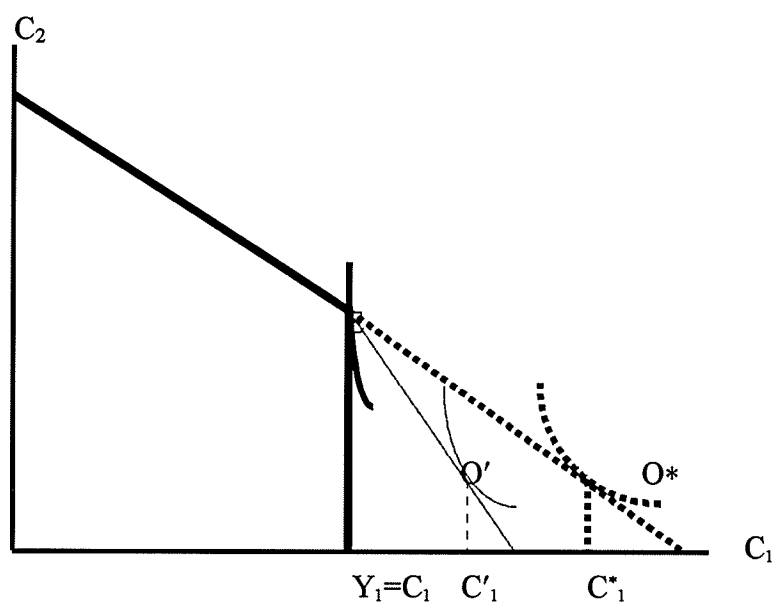
C_1 = current consumption,

C_2 = next period's consumption,

R = real interest rate,

then the optimum consumption requires a tangency between the indifference curve and the budget constraint; however, in the presence of a borrowing constraint, this objective may not be achieved.

Figure 3.3: Borrowing Constraint and Consumption



E = initial endowment²⁵

Y_1 = current Income

C_1^* = optimum consumption in period one

C'_1 = consumption level with imperfect borrowing constraint

C_1 = consumption level with binding borrowing constraint

O^* = equilibrium without borrowing constraint

²⁵ Initial endowment means the original amount of wealth/assets a consumer possesses, and in an intertemporal analysis, it refers to the point that represents the amount of current income and next period's income.

O' = equilibrium under imperfect borrowing constraint

Figure 3.3 depicts the impact of the borrowing constraint on consumption. Suppose an individual is endowed with " Y_1 " in period 1 and is facing a binding liquidity constraint. In such a case, he/she cannot consume more than $C_1 = Y_1$: the individual is faced with a corner solution.²⁶ In the absence of a borrowing constraint, the individual would have consumed at O^* ($C_1^* > Y_1$) by borrowing an amount ($Y_1 - C_1^*$) against his/her future income. Therefore, a complete relaxation of the borrowing constraint is likely to induce consumption.

Moreover, current consumption is likely to increase even if the borrowing constraint is partially relaxed. In other words, if the consumer can borrow some amount by paying a higher interest rate than the market rate, the lower portion of the budget line would then be steeper than the upper portion.²⁷ As a result, current consumption (C'_1) would be less than optimum (C_1^*) in period 1, but more than C_1 . Thus, a greater availability of credit is likely to induce consumption, either if consumers are faced with some degree of borrowing constraint or if a section of consumers in a society face a borrowing constraint.

Therefore, we can conclude that if a substantial inflow of foreign capital takes the form of private sector credit, and if the credit is given for consumption purposes or even if it is given for investment purposes but used for consumption purposes, it may create a private

26 Due to a kink in the budget constraint, equilibrium occurred at a corner of the budget line. For details, see Robert Frank (1991), P 82.

27 Lack of collateral often requires a consumer to pay a higher interest rate. For instance, the interest rate charged by a credit card company is often higher than the rate charged by a bank.

consumption boom in the economy. Conversely, a significant outflow of such funds may create a consumption slump. Thus, we need to investigate what proportion of consumers was facing a borrowing/liquidity constraint during the sample period (1975-98).

Liquidity-Constrained Hypothesis

In order to examine the magnitude of liquidity-constrained consumers empirically, we follow Campbell and Mankiw's (1989) line of modeling.²⁸ Let us consider that in Thailand there was a fraction " λ " of liquidity-constrained consumers, and that the remainder " $(1-\lambda)$ " behaved according to Hall's theory (they did not face the constraint). Therefore, an aggregate consumption for the economy can be expressed as:

$$c_t = \lambda c_t^c + (1 - \lambda) c_t^u$$

where aggregate consumption c , is the weighted average of unconstrained and constrained household consumption, denoted by superscripts u and c respectively. Consumption by the constrained consumer is subject to current level of income; therefore, for this group any variation in current consumption depends on variation in current income. On the other hand, for the unconstrained group, any variation in current

²⁸ We use liquidity and borrowing constraint interchangeably, as mentioned before.

consumption follows Hall's random walk hypothesis. Thus, the aggregate consumption function for the economy can be written as

$$c_t - c_{t-1} = \lambda(y_t - y_{t-1}) + (1 - \lambda)e_t$$

$$\Delta c_t = \lambda \Delta y_t + v_t \dots\dots\dots 6c$$

$$H_0 : \lambda = 0 \quad \text{and} \quad H_1 : \lambda > 0$$

where

c = log of real private consumption

y = log of real GDP

H_0 = null hypothesis

H_1 = alternative hypothesis.

We thus hypothesize that in the presence of liquidity-constrained consumers, the coefficient " λ " would be significantly different from zero. We also hypothesize that if the proportion of liquidity-constrained consumers (value of " λ ") is high, then in the event of drastic relaxation/tightening of the borrowing constraint, consumer spending may become pro-cyclical. We next formulate a model to test this new hypothesis in the case of Thailand.

i. Pro-Cyclical of Consumption

In order to examine whether or not consumer spending was counter-cyclical in Thailand during the period of huge inflow/outflow of capital (1990-98), we propose a pro-cyclical hypothesis, where pro-cyclical would mean that consumer spending is not merely sensitive to income but that it also follows a boom-bust cycle for a country that heavily relies on foreign capital.²⁹ If consumer spending in Thailand were pro-cyclical, then we would expect an additional variation in consumption due to change in income during the period from 1990 to 1998. In order to examine the applicability of this hypothesis, equation 6c is modified as follows:

$$\Delta c_t = \alpha + \lambda_0 \Delta y_t + \lambda_1 D_{1t} \Delta y_t + \lambda_2 D_{2t} \Delta y_t + \varepsilon_t \dots \dots \dots 7c$$

where

$D_{1t} = 1$ during 1990 to 1996, and 0 otherwise

$D_{2t} = 1$ during 1997 to 1998, and 0 otherwise

λ_0 = average rate of non-cyclical variation during 1975-1998

λ_1 = average rate of cyclical variation during 1990-1996

λ_2 = average rate of cyclical variation during 1997-1998

²⁹ We are examining the hypersensitivity of consumer spending and not the hypersensitivity of consumption. Only the service of durable good consumption should be taken for the hypersensitivity of consumption analysis; data for that is unavailable.

$$H_0 : \lambda_1 < 0, \text{ and } \lambda_2 < 0$$

Typically, the variation in consumer spending due to the variation in income should be negative, i.e. counter-cyclical. Prior to examining the proposed hypotheses (liquidity constrained/ hypersensitivity), using time series data, we need to examine the time series properties of the data by conducting several tests that are required in order to proceed further empirically. Because these tests will also be applied in subsequent chapters, a brief description of them is provided here.

3.4 Time Series Properties

In a seminal paper, Granger and Newbold (1974) argue that, as a rule, macroeconomic data are integrated, and that in regressions involving the levels of such data, standard significance tests are usually misleading. In other words, most time series data are non-stationary, and as a result, the estimated t-value and R^2 often become very high even though there may not be a meaningful relationship between these variables. In order to avoid a spurious relationship, both unit root and cointegration tests need to be performed.

i. Unit Root Tests

The two most widely used unit root tests are the Augmented Dickey-Fuller (ADF) test, and the Phillips-Perron (PP) test. The basic model for the ADF tests for any series $\{y_t\}$ is as follows:

$$y_t = \gamma + \beta t + \rho y_{t-1} + \sum_{i=1}^k \eta_i \Delta y_{t-i} + \vartheta_t$$

Subtracting y_{t-1} from the both sides

$$y_t - y_{t-1} = \gamma + \beta t + \rho y_{t-1} - y_{t-1} + \sum_{i=1}^k \eta_i \Delta y_{t-i} + \vartheta_t$$

$$\text{or, } \Delta y_t = \gamma + \beta t + (\rho - 1)y_{t-1} + \sum_{i=1}^k \eta_i \Delta y_{t-i} + \vartheta_t$$

$$\Delta y_t = \gamma + \beta t + \alpha y_{t-1} + \sum_{i=1}^k \eta_i \Delta y_{t-i} + \vartheta_t \dots\dots\dots 8c$$

where,

$$H_0 : \alpha = 0 \quad \text{or} \quad \rho = 1$$

$$H_1 : \alpha < 0$$

$\sum_{i=1}^k \eta_i \Delta y_{t-i}$ is used to control higher order serial correlation

One of the major problems with the unit root test is that it is very sensitive to the assumption that the process of generating data has been stable over the entire sample

period. Perron (1989) shows that the power of unit root tests is dramatically reduced if the level or trend of a series has changed exogenously at any time during the sample period. He therefore suggests that, in order to solve this problem, the ADF model can be modified by adding dummy variables in the regression function.³⁰ As a result, the following model will be considered for the ADF test.

$$\Delta y_t = \gamma + \beta t + \theta_1 D_{1t} + \theta_2 D_{2t} + \alpha y_{t-1} + \sum_{i=1}^k \eta_i \Delta y_{t-i} + \vartheta_t \dots\dots\dots 9c$$

$$H_0 : \alpha = 0$$

$$H_1 : \alpha < 0$$

$$D_{1t} = 1 \text{ during } 1990 \text{ to } 1996, \text{ and } 0 \text{ otherwise}$$

$$D_{2t} = 1 \text{ during } 1997 \text{ to } 1998, \text{ and } 0 \text{ otherwise}$$

If the null hypothesis $\alpha = 0$ ($\rho = 1$) is rejected, then we conclude that the series is stationary. In other words, the series does not have a unit root, i.e. the series is integrated of order zero, $I(0)$. However, if $\alpha = 0$ is not rejected, then the second-difference of the series will be used as a dependent variable, and the first-difference will be used as an independent variable. This process will continue until the null hypothesis gets rejected. . If we find that the first-differenced series is stationary, we will consider the original series to be $I(1)$; in other words, each additional differencing will indicate the order of integration, i.e. $[I(1), I(2)]$.

³⁰ See, Perron, Pierre (1989). The Great Crash, the Oil Price Shock, and the Unit Root Hypothesis, *Econometrica*, Volume 57, Issue 6 (Nov., 1989), 1361-1401.

The basic framework of the Phillips Perron (PP) test is similar to that of the ADF test, the only difference being that in the case of a PP test, the effect of higher-order serial correlation ($\sum_{i=1}^k \eta_i \Delta y_{t-i}$) is controlled by a nonparametric method. It is possible to add dummy variables in a PP test; however, it has the limitation of imposing several restrictions, including a one period lag [Perron, 1989]. Therefore, equation similar to 8c will be used to conduct a PP test.

If series of a model are found to be integrated of the same order, then a cointegration test is required to determine whether these series can be used together to derive any meaningful relationship.

ii. Cointegration Tests

A cointegration test provides a formal framework to test and estimate long-run equilibrium relationships among variables. If two or more variables are co-integrated, they must obey an equilibrium relationship in the long run, although they may diverge substantially from equilibrium in the short run [Davidson, 1993]. There are two broad approaches for testing for cointegration: the Engle-Granger (1987) method, and Johansen's technique [Johansen, 1988, Stock and Watson, 1988].

The Engle-Granger method is based on an assessment of the stationarity of equilibrium errors. Suppose,

$$y_t = \beta x_t + \varepsilon_t$$

is a regression model, where disturbances ε are white noise.³¹ If the series $\{x_t\}$ and $\{y_t\}$ are both $I(1)$, then there may be a β such that

$$\varepsilon_t = y_t - \beta x_t \dots\dots\dots 10c$$

is $I(0)$. In fact, if the variables (x & y) are cointegrated, the true equilibrium error term must be $I(0)$; otherwise, it must be $I(1)$ [Davidson, 1993]. Therefore, a null hypothesis of non-cointegration could be tested against the alternative of cointegration by performing a unit root test on the equilibrium error term.

The Johansen cointegration test (1988, 1991), based on the vector autoregression (VAR) model, is used not only to examine the cointegrating relationship, but also to check for the identification problem.³² Suppose the data generating process of a vector variable Y_t can be expressed as:

$$Y_t = \Pi_1 Y_{t-1} + \Pi_2 Y_{t-2} + \dots + \Pi_k Y_{t-k} + \varepsilon_t \dots \dots \dots 11c$$

$$t = 1, \dots, T$$

where Y_t is an n -vector of $I(1)$ variables; and $\Pi_1, \Pi_2, \dots, \Pi_k$ are $n \times n$ matrices of unknown parameters. The above system can be written in error correction form as:

$$\Delta Y_t = \Omega_1 Y_{t-1} + \Omega_2 \Delta Y_{t-1} + \dots + \Omega_k \Delta Y_{t-k+1} + \varepsilon_t \dots \dots \dots 12c$$

$$t = 1, \dots, T$$

where

$$\Omega_1 = -I + \sum_{i=1}^k \Pi_i$$

and

$$\Omega_j = -\sum_{i=j}^k \Pi_i$$

$$j = 2, \dots, k$$

Since $\Delta Y_t, \dots, \Delta Y_{t-k+1}$ are all $I(0)$ but Y_{t-1} is $I(1)$, for consistency Ω_1 should not be of full rank, i.e., the rank, r should be less than the number of variables, n . In such a case, there would exist matrices α and β of dimension $n \times r$ such that $\Omega_1 = \alpha\beta'$ with α and β being of full rank. The columns of matrix β are the r distinct cointegrating vectors, and α has the interpretation of matrix or error correction terms.

31 Should an autocorrelation problem arise in the model, it is assumed that it will be adjusted through an appropriate transformation.

32 For details, see Johansen (1991).

To apply Johansens's test, we first regress ΔY_t on $\Delta Y_{t-1}, \dots, \Delta Y_{t-k+1}$ and save the residuals (U_{0t}). We then regress Y_{t-1} on these same variables and save the residuals (U_{1t}).

Using these residuals, a reduced form of regression equation can be written as

$$U_{0t} = \alpha\beta'U_{1t} + \varepsilon_t$$

which can be used to construct a likelihood function. By taking partial derivatives of the likelihood function with respect to α and β and setting them equal to zero, we can find estimators of α and β . To do so, we need to solve a system of equations, by using the determinant algebra.

$$\left| \lambda S_{kk} - S_{k0} S_{00}^{-1} S_{0k} \right| = 0$$

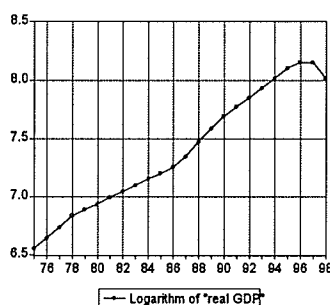
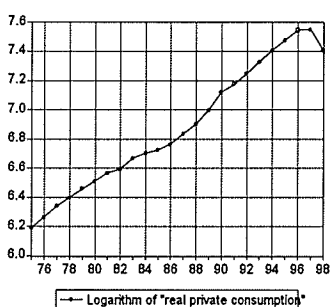
where $S_{kk}, S_{k0}, S_{00}^{-1}$, and S_{0k} are components of the variance-covariance matrix of the residuals (U_{0t}, U_{1t}), and λ 's are characteristic roots, or eigenvalues.

This system will provide the n estimated eigenvalues $(\lambda_1, \dots, \lambda_n)$ and the n estimated eigenvectors (V_1, \dots, V_n) , which are normalized such that $(V'S_{kk}V = I)$. In order to find the number of cointegrating vectors, Johansen proposes two tests: the trace test (λ_{trace}) and the maximum eigenvalue test (λ_{max}). The trace test involves testing the hypothesis that there are at most r cointegrating vectors against a general alternative of more than r

vectors, whereas the maximum eigenvalue test, using the likelihood ratio, tests the hypothesis that there are r cointegrating vectors against the alternative $r+1$ cointegrating vectors. Johansen and Juselius (1990) suggest that the maximum eigenvalue test performs better than the trace test; thus we will apply the former to examine cointegrating relationship between variables.

3.5 Empirical Findings

Theoretically, consumption should exclude the purchasing of durables and include the imputed services of the stock of consumer durables. However, due to the non-availability of data for consumer durables for the sample period (1975-1998), the data used for consumption is total real private consumption expenditure. The nominal GDP and consumption series are adjusted using the Consumer Price Index (CPI), which is then converted into logarithmic form for estimation purposes.



Unless otherwise stated, the sources of all data in this study are: the Bank of Thailand's home page (www.bot.or.th) and various issues of the International Financial Statistics (IFS) Yearbook. Time series properties of the data are presented in Tables 3.1-3.3, and Tables 3.4-3.7 report results obtained by testing various hypotheses regarding consumer behaviour developed earlier.

Table 3.1 reports the ADF test results for the consumption and GDP series: the values of $t_{\hat{\alpha}}$ for consumption and real GDP are -0.66 and -0.16 respectively. Both of these statistics lie well below the critical values at the 5% (approximately -2.99) and the 10% (approximately -2.63) level of significance; in other words, both income and consumption are non-stationary at their levels.³³ The first-difference of consumption is found to be stationary at the 5% level, while the income series is found to be stationary at the 10% level. The results obtained using the PP test are similar to those from the ADF test: both variables proved to be stationary after the first-difference [Table 3.2]. Therefore, both income and consumption series are integrated of order 1, i.e., $I[1]$, and consequently there is a need to perform cointegration tests.

Equation 8c presents the result of the Engle-Granger test, where the estimated coefficient of the lagged error and its t-value are -0.55 and -2.30 respectively. On the other hand, the Engle-Granger 5% and 10% critical values for the τ (t statistic) are -1.957 and -1.623 respectively. Thus, according to this test, the series are cointegrated; that is, a long run equilibrium relationship between income and consumption existed in the case of Thailand.

Table 3.3 presents Johansen's cointegration test, which enables us to examine the identification problem. The likelihood ratio for the null hypothesis having no cointegration is 28.93 , which is higher than the critical value (25.32), at the 5% level of significance; in other words, the null hypothesis of no co-integration is rejected for the

³³ Absolute values are considered, and the test is a left-tailed one.

variables income and consumption at the 5% level. The likelihood ratio of having one cointegrating relationship is 12.05, which is less than the critical value (12.25), at the 5% level of significance. Hence, according to this test consumption and income series are not only cointegrated but also identified due to the fact that there is one cointegrating relationship. Thus, a long run equilibrium relationship between income and consumption existed for Thai data for the sample period, and we can proceed to examine various hypotheses regarding consumer behaviour developed in the previous section.

Table 3.4 shows the Vector Error Correction (VEC) model; the signs are reversed, as compared to a standard consumption function, because in the cointegrating equation, all variables are on the same side of the equation. The result implies that the income elasticity of consumption is not only significant at the 1% level but also quite high (0.82), which is also supported by standard estimations [Equation 7c].

In order to test the liquidity-constrained hypothesis we have applied the Instrumental Variable (IV) method³⁴, because an application of the OLS method may lead to estimates of coefficients that are both biased and inconsistent. In other words, the right hand side variables and residual terms in equation 6c are likely to be correlated because during periods of time when there are large increases in income, households usually receive favorable news about their total lifetime incomes as well.

34 The first-difference of the estimated value of consumption is used as an instrument.

Table 3.6 presents the test results, which reject the null hypothesis (stipulated in model 6c) that the coefficient of variation in consumption due to variation in income is indistinguishable from zero at the 1% level. Moreover, the result indicates that the proportion of liquidity-constrained consumers for the entire sample period was (λ -estimated = 0.84) above 84%, which is quite high.³⁵ Therefore, the empirical results indicate that during the period analyzed, the validity of the random walk hypothesis could not be upheld in the case of Thailand.

Finally, Table 3.7 presents the results of analysing the pro-cyclical hypothesis as it applies to Thailand; it shows the proportions of liquidity-constrained consumers that were pro-cyclical during the 1990-98 period. Between 1990 and 1996, the index indicating the variation in the proportion of liquidity constrained consumers in Thailand dropped significantly (estimated $\lambda_1 = 0.20$), thereby contributing to a consumption boom.

Conversely, during the crisis period, 1997-98, the same index increased dramatically (estimated- $\lambda_2 = 64\%$), thereby contributing to a consumption slump.³⁶ Although previous studies of developing countries have indicated that the proportion of liquidity constrained consumers in a developing countries is quite high [Section 3.3], what was critical in the case of Thailand was the dramatic fluctuation in that proportion during the period from 1990 to 1998, as manifested in the estimated values of λ_1 and λ_2 . Therefore, this analysis

35 The value of λ in works as an index of liquidity constrained consumer. The higher the value of λ , the higher would be the proportion of liquidity constrained consumers and vice versa.

36 The value of λ_1 and λ_2 indicate the variation of liquidity constrained consumers rather than the exact proportion, which is evident from our pro-cyclical hypothesis formulation: λ_1 is the co-efficient of $D_{1t}\Delta y_t$ and λ_2 is the coefficient of $D_{2t}\Delta y_t$ [Equation 7c].

clearly indicates that the consumer spending in Thailand was pro-cyclical during that period.

Several reasons for the pro-cyclicality may be found by analyzing consumer spending on durable and luxury goods.³⁷ Figure 7c shows that consumer spending on imported goods was very high until the crisis: the quarterly-growth of spending on imported goods averaged 4.5 percent for the period 1990 to 1996. This spending boom implies that a huge amount of foreign capital was used for consumption instead of investment, and this spending on imports clearly contributed to the current account deficit. Obviously, during 1997/98, the level of spending on imported goods decreased drastically due to the massive outflow of capital.

Figure 8c depicts average quarterly sales of passenger cars and motorcycles: the quarterly growth of passenger cars and motorcycles from 1990 to 1996 averaged 4.69% and 2.09% respectively; those figures fell drastically during 1997/98 (-15% and -5.6% respectively). In any developing country, a passenger car is a luxury good; furthermore, if it is financed through foreign capital and if it is an imported good, it works like a double negative for growth and development.³⁸

3.6: Concluding Remarks

In Thailand, the proportion of liquidity/borrowing-constrained consumers was significant; moreover, this proportion of consumers differed significantly during the

³⁷ Unfortunately, data is not available for the full sample period; as a result a rigorous statistical analysis could not be performed.

periods of huge inflow and outflow of capital. The boom in consumer spending might have occurred due to the relaxation of the borrowing constraint during the 1990-96 period. Financial liberalization as well as the inflow of foreign capital had a link to the relaxation of the borrowing constraint. In addition, the short-term planning horizon (myopic view) of consumers and their over-confidence about the prospect of growth and earnings may have played a role in the level of consumption during the 1990-96 period. On the other hand, the slump might have occurred due to the joint effects of capital outflow and the use of the contractionary fiscal and monetary policies that were pursued in the aftermath of the crisis.³⁹ In addition, views like crony capitalism may have depressed consumer confidence further after the crisis. The highly cyclical nature of the consumption of foreign and luxury goods was noticeable.

According to established theory, consumer spending is supposed to be counter-cyclical; however, in the case of Thailand from 1990 to 1998, it became pro-cyclical. Although one might logically argue that this apparent contradiction is due to the violations of assumptions (borrowing constraint), the fact remains that consumer spending became cyclical in Thailand during the 1990-98 period and thus induced the crisis.

³⁸ First, the multiplier value would be small due to high marginal propensity to import. Second, according to Dusenberry's relative income hypothesis, the demonstration effect would also be high, which would encourage others to follow.

³⁹ Some of these policies will be discussed in Chapter 6, Section 1.

3.7: Statistical Results

Table 3.1: ADF Test

Statistics Series	$\hat{\alpha}$	$t_{\hat{\alpha}}$	*5%	*10%
C	-0.03	-0.66	-2.99	-2.63
Δc	-1.55	-4.24	-3.00	-2.64
y	-0.00	-0.16	-2.99	-2.63
Δy	-1.02	-2.96	-3.00	-2.64

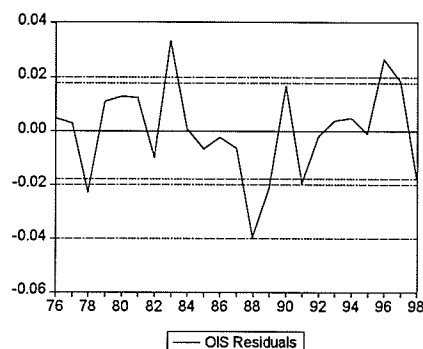
Table 3.2: PP Test

Statistics Series	$\hat{\alpha}$	PP test Statistic	*5%	*10%
C	-0.034	-1.318	-2.990	-2.634
Δc	-0.649	-3.162	-2.996	-2.638
y	-0.038	-1.541	-2.990	-2.634
Δy	-0.034	-2.640	-2.996	-2.638

*MacKinnon critical values for rejection of the hypothesis of a unit root at 5% and 10% levels of significance

Cointegration Test

a. Engle-Granger Test



Relevant Portion of the ADF Test on the Residual Series:

$$\Delta \hat{\varepsilon}_t = -0.5514 \hat{\varepsilon}_{t-1} \dots \dots \dots 8c$$

$$t = -2.302$$

$$r^2 = 0.288$$

Table 3.3: Johansen's Test

Series: c, y

Eigenvalue	Likelihood	5 Percent	1 Percent	Hypothesized
	Ratio	Critical Value	Critical Value	Critical Value
0.520580	28.93432	25.32	30.45	None *
0.407163	12.02521	12.25	16.26	At most 1

** Indicates that the corresponding null hypothesis is rejected at the 5% level of significance

Table 3.4: Johansen's Cointegrating Vector

Consumption C	Income Y	Constant
1.000000	-0.822384 (0.00727)	-0.802703
Log likelihood	107.1179	

Figure in parenthesis represents the asymptotic standard error.

Table 3.5: Consumption Function

Statistics Model	Const.	η^{40}	AR (1)	R^2 <i>adjuste</i>	D.W.	Method	Instrument
c=f(y)	0.6231	0.8468	0.6072	0.997	1.99	OLS	
t-statistic	3.4490	35.360	2.9296				
c=f(y)	0.5734	0.8534	0.6340	0.997	D-h ⁴¹	IV	c_{t-1}
t-statistic	(2.5697)	(28.92)	2.9066		= -0.04		

40 η = Income elasticity of consumption, i.e. $\eta = \frac{\Delta(\ln c)}{\Delta(\ln y)} = \frac{\frac{1}{c}(dc)}{\frac{1}{y}(dy)}$.

41 Durbin-h, defined as: $h \doteq \left(1 - \frac{DW}{2}\right) \sqrt{\frac{n}{1 - n[\text{var}(\hat{\eta})]}}$, is a valid test for serial correlation for a

model that contains a lagged dependent variable. With the inclusion of an AR (1) variable, which takes care of first-order serial correlation, the D-h test does not show evidence of higher-order serial correlation because the estimated value of D-h is less than critical value (1.96) at the 5% level.

Table 3.6: Liquidity Constraint Hypothesis

Statistics Model	$\hat{\alpha}$	$\hat{\lambda}$	R^2 <i>adjusted</i>	D.W.	Method	Instrument
$\Delta c = f(\Delta y)$ t-statistic	0.0001 0.0171	0.8523 10.533	0.827	2.355	OLS	
$\Delta c = f(\Delta y)$ t-statistic	-0.0067 -0.8100	0.9656 8.2369	0.811	D-h = -0.101	IV	Δc_{t-1}

Table 3.7: Pro-Cyclicality Hypothesis

Statistics	$\hat{\alpha}$	$\hat{\lambda}_0$	$\hat{\lambda}_1$	$\hat{\lambda}_2$	R^2 - <i>adjusted</i>	Method
t-statistic	0.020 2.446	0.497 4.263	0.218 2.348	0.723 3.362	0.890	OLS
t-statistic	0.018 1.181	0.212 2.339	0.216 2.013	0.634 2.587	0.843	IV Δc_{t-1}

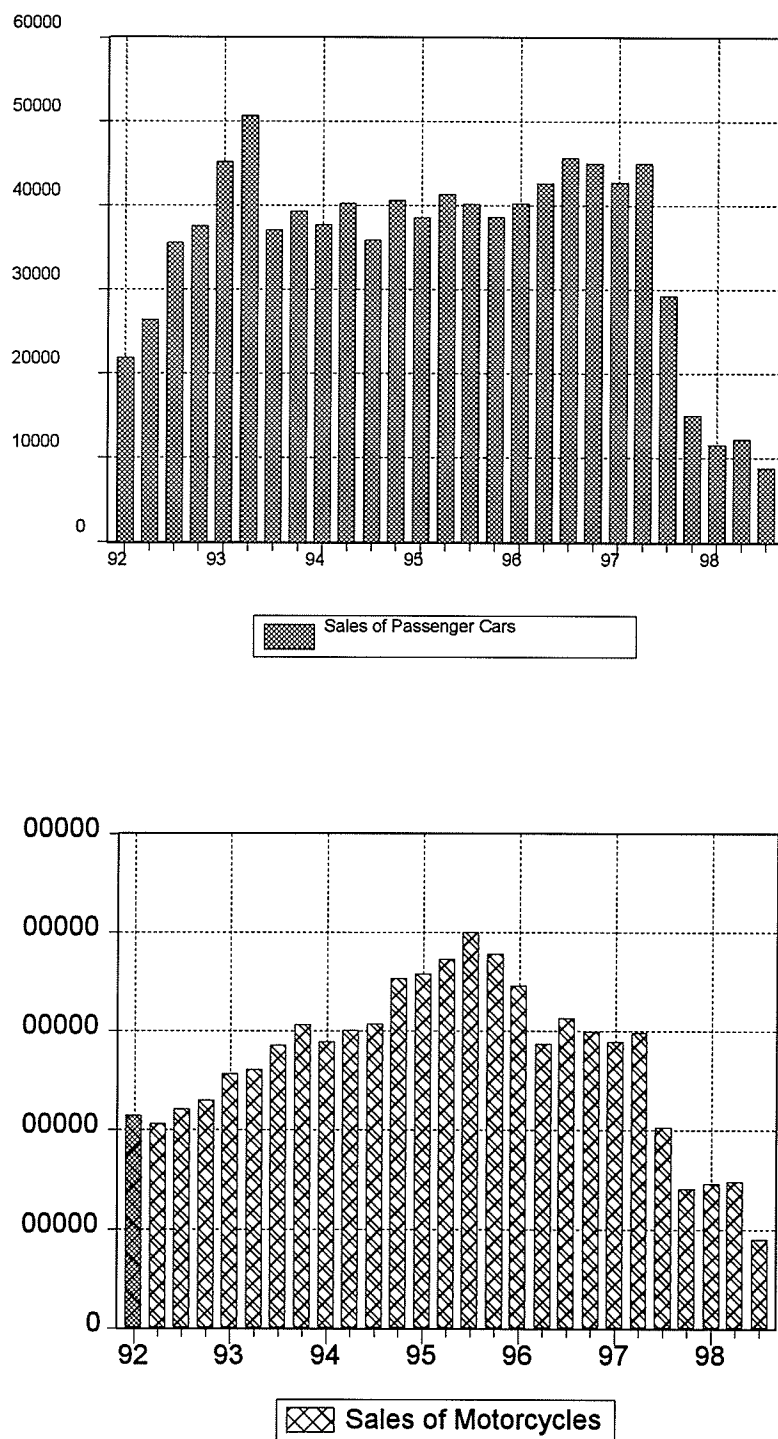


Figure 3.5: Conspicuous Consumption

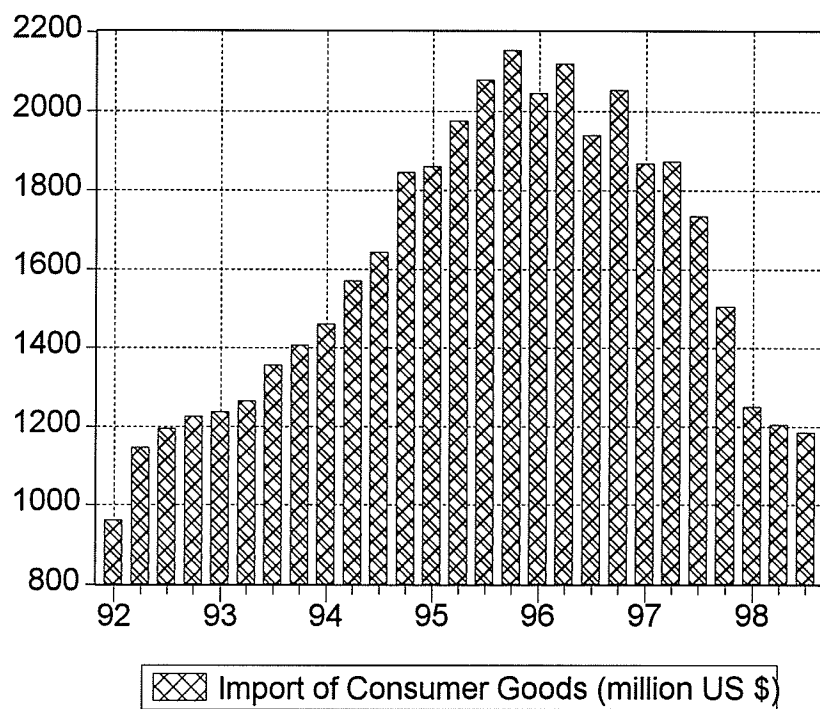


Figure 3.6: Consumption of Foreign Goods

Chapter 4

Various Components of Saving

And Their Interrelationships

4.1 Introduction

We have found that consumer spending in Thailand differed significantly during the periods of huge capital inflow and outflow: a boom occurred during (1990-96) whereas a slump occurred during 1997/98. In other words, movements of foreign savings did affect domestic consumption, and thus savings. Therefore, examining the movements of various components of savings might shed further light on the causes of the crisis. This chapter examines the interrelationships among various components of savings: between domestic and foreign savings; between private and public savings.

The crowding-out effect hypotheses will be applied to study the impacts of foreign savings on domestic savings.⁴² This hypothesis, in general, refers to the possibility that increased public expenditures, financed through taxation or borrowing (bond sales), reduces, or crowds out, an equivalent amount of private sector spending. In this case, crowding out would mean suppression of other components of saving by an expansion of foreign saving. In addition, the Ricardian equivalence hypotheses will be used to study the relationship between private and government savings. In general the Ricardian

⁴² This concept is used by monetarists, led by Milton Friedman, to highlight one of the limitations of expansionary fiscal policy in stimulating aggregate demand. For more information, see Friedman (1968).

equivalence hypothesis implies that private decisions are unaffected by the quantity of government budget deficit/surplus.⁴³

This chapter is organized as follows: the second section defines the various components of saving; the third section applies the crowding-out effect hypothesis using domestic and foreign savings; the fourth section examines the interrelationship between private and public savings in light of the Ricardian equivalence hypothesis, and the last section investigates the causal connection between saving and growth, with concluding remarks.

4.2: Measurement of Savings

In order to examine the interrelationships between components of savings, we define⁴⁴ some of the key variables using the national income identity:

⁴³ The nineteenth-century economist David Ricardo proposed the idea of the Ricardian Equivalence hypothesis. Although it is a plausible theoretical proposition, Ricardo was doubtful about its practical

$$Y = C + I + G + (X - M)$$

or

$$Y = C + S + T$$

therefore,

$$C + I + G + (X - M) = C + S + T$$

or

$$I = S + (T - G) + (M - X)$$

or

$$I_t^p + I_t^g = (Y_t - T_t - C_t) + (T_t - G_t) + (M_t - X_t)$$

or

$$I_t^p + I_t^g = S_t^p + S_t^g + S_t^f$$

where I^p = gross private investment

I^g = gross public investment

S^p = private saving

S^g = government saving

S^f = foreign saving

T = net tax

G = government expenditures

X = Export

M = Import

$$S^d = S^p + S^g$$

S^d = domestic saving

relevance. More recently, the concept has been analyzed and advocated by Harvard economist Robert Barro [see Barro, 1974].

44 Definitions are used for a conceptual framework. Data used for empirical analysis, taken from the Bank of Thailand's home page and various issues of International Financial Statistics (IFS), may not necessarily follow these definitions.

4.3 Crowding-Out Effect

Using an intertemporal model of consumption, we have argued that relaxation of the borrowing constraint may induce current consumption, and thus can have a negative impact on domestic saving [Figure 3.4]. In other words, foreign saving may crowd-out domestic saving in the presence of liquidity-constrained consumers. In order to examine this hypothesis, we need to incorporate other determinants of domestic saving. Both theoretical and empirical studies suggest that the main determinant of saving is income [Edward, 1995, Sala-i-Martin, 1995]. Intertemporal analysis provides inconclusive results regarding the effects of the interest rate on saving because of the opposite movements of the income effect and substitution effect, which are often found. For example, an increase in the interest rate will have a positive impact on saving through the substitution effect, while it may have a negative impact through the income effect.⁴⁵ Thus, we propose the following model to examine the effect of foreign saving on domestic saving.

$$S^d = f(Y, S^f, D_2, \varepsilon) \dots \dots \dots 1s$$

$$H_0 : f_{sf} = 0$$

where

Y = real GDP

S^f = real foreign saving

$D_2 = 1$ during 1997 to 1998, and 0 otherwise

The relationship between domestic saving and foreign saving in equation 1s would be examined under the null hypothesis that domestic saving is independent of foreign saving.

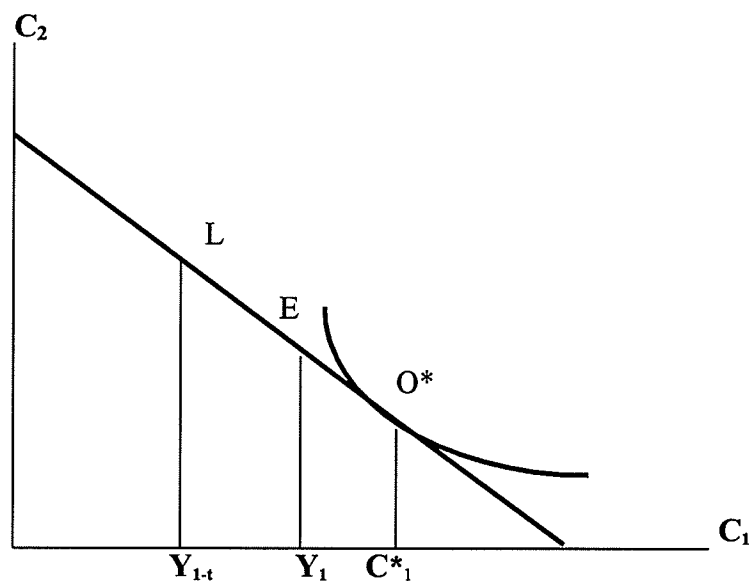
4.4: Ricardian-Equivalence Hypothesis

The idea that the government's budget (deficit/surplus) will have no effect on private decisions is known as the Ricardian Equivalence hypothesis. This proposition is based on the following assumptions: individuals behave as if they have an infinite horizon because they care about their offspring; the capital market is perfect; consumers are rational and farsighted; and future income and taxes are certain. Under these assumptions, a farsighted rational economic agent would internalize any government decision and would

⁴⁵ For details, see Romer [2001]. We also found that when the interest rate variable is included, the model fails to show a cointegrating relationship.

realize that any gain in disposable wealth due to a tax cut would be offset by a reduction in wealth implied by a higher future tax.

Figure 4.2: Ricardian Equivalence



where

E = initial endowment

L = after tax endowment point

Y_1 = current income

Y_{1-t} = income after tax

C^*_1 = optimum consumption in period one

Figure 4.2 indicates the optimum consumption by a household at point O^* , where the consumer is borrowing against future income to permit current consumption to exceed current income. Should the government raise taxes today, the endowment point for the agent would change from point E to point L . However, the present value of the overall

stream of income (the position of the intertemporal budget constraint) would not be affected. Even with the higher taxes, an agent would continue to choose to consume the amounts given by point O^* , by borrowing more than he/she did before the increase in present period taxes. The agent would regard the government's budgetary policy as one of substituting current taxes for future taxes of the same present value. As a result, one would expect a symmetrical opposite behaviour of private saving to public saving.

However, the prevalence of exact Ricardian equivalence is open to objection on both theoretical and empirical grounds, specifically because it assumes that no agent is constrained by liquidity [Romer, 2001, Scarth, 1988]. Nevertheless, in spite of its limitations, the concept has been used to study the relationship between private and government savings [Schmidt-Hebbel, 1998, Jappelli and Pagano, 1994, Seater and Mariano, 1985]. Thus, we propose the following model to examine the applicability of the Ricardian equivalence hypotheses to Thailand during the period from 1975 to 1998.

$$S^p = f(Y, S^g, D_2, \varepsilon) \dots \dots \dots 2s$$

$$H_0 : f_{sg} = 0$$

where

Y = real GDP

S^g = real government saving

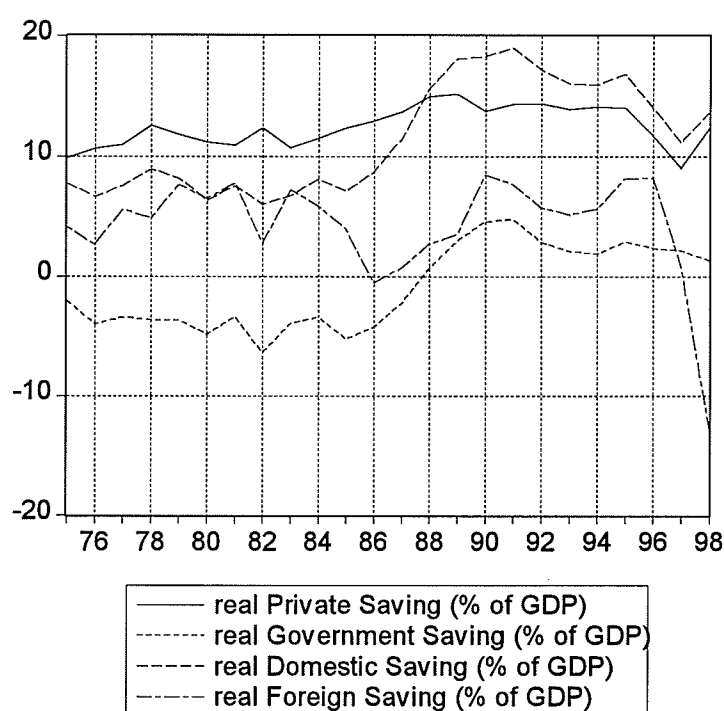
D_2 = dummy variable as specified earlier.

Even if the hypothesis is partly true, then a negative coefficient of public saving should be expected in equation 2s.

4.5 Findings

Data on various components of nominal savings are adjusted using the Consumer Price Index (CPI). Some observations of foreign and public savings are negative; as a result, a non-log form of the variables is considered to analyse interrelationships between components of savings.

Various components of Savings



Unless otherwise stated, the sources of all data in this section are: Bank of Thailand's home page (www.bot.or.th) and various issues of International Financial Statistics (IFS) Yearbook. Time series properties of the data are presented in Tables 4.1-4.3, and Tables 4.4-4.7 report results obtained by testing various hypotheses developed in this chapter.

i. Time series properties

a. Unit Root Test

The results of the ADF test (Table 4.1) indicate that the series are nonstationary: the values of $t_{\hat{\alpha}}$ for private, domestic, government and foreign savings are -0.563 , -1.250 , -2.653 and -1.337 respectively. The first-differences of all these variables are found to be stationary at the 5% level. Similarly, the PP test results show that each of the variables is non-stationary at its level (Table 4.2). However, the first-differences of all these variables are found to be stationary at the 5% level of significance. Since the variables of the proposed models are found to be integrated of order 1, $I(1)$, cointegration tests are performed.

b. Cointegration Test

Johansen's eigenvalue test for domestic saving, foreign saving, and income indicates that the likelihood ratio for the null hypothesis having no cointegration is 51.59 and that this value is higher than the critical value (34.55) at the 5% level of significance. Similarly, the possibility of having two cointegrating relationships is also ruled out because the likelihood ratio (6.60) is higher than the specified critical value, both at the 5% level. However, the likelihood ratio of having one cointegrating relationship is 15.637, which is less than the critical value (18.17) at the 5% level of significance. The Engle-Granger tests also indicate that the variables of the models are cointegrated (equation 3s). Therefore, domestic saving, foreign saving, and income are found to be cointegrated, and we can proceed to examine the crowding out effect hypothesis in the case of Thailand.

Like those in Table 4.3, results reported in Table 4.4 indicate that according to Johansen's eigenvalue test, private saving, foreign saving, and income are uniquely cointegrated; that is, we cannot reject the null hypothesis of having one cointegration although the other two null hypotheses (no cointegration, two cointegration) are rejected. Furthermore, the Engle-Granger tests indicate that the variables of the models are cointegrated (Equation 4s). Therefore, the Ricardian equivalence hypotheses can be tested.

Table 4.4 presents the results of crowding out hypothesis: equation 1s shows that foreign saving had an offsetting impact on domestic saving where the co-efficient of foreign saving is -0.189 , which is significant at the 6% level. Both the income and the dummy variables are also highly significant with expected signs. The negative sign of the dummy variable has captured the impact of massive outflow. Thus, one can conclude that foreign saving had negative impacts on domestic saving in Thailand during the period from 1975 to 1998.

Results presented in Table 4.5 indicate that the co-efficient of government saving is 0.379 which is significant at the 10% level. Interestingly, the plus sign implies not only that the Ricardian-equivalence hypothesis is rejected but also that government saving worked as a complement to domestic saving. Implications of these findings for Thailand are discussed in the concluding section of this chapter.

4.7 Saving Growth Causality

Savings play a vital role in capital formation and, thus, in economic growth. Earlier literature on links between savings and growth stressed the need for countries to boost their savings and promoted financial liberalization to achieve this target, assuming that liberalization will raise the rate of interest and thus savings rates. In turn, a higher savings rate would finance higher levels of investment and fuel economic growth [McKinnon, 1973, Shaw, 1973]. However, recent studies suggest that while financial liberalization does, more often than not, result in a higher interest rate, it has failed to produce the anticipated positive effects on savings [Galbis 1993, Ostroy and Reinhart 1995].

Furthermore, even when saving increases in response to higher interest rates, these recent studies have questioned the accepted chain of causations. Evidence presented in Carroll and Weill (1993) suggests that growth drives the savings rate and not the other way around. Therefore, it is important to examine the causal connection of savings growth and GDP growth rates in Thailand to see where the emphasis should be placed.

Following Carroll and Weil (1993), the most common approach is to rely on a Granger causality test, which can be modeled as follows:⁴⁶

$$\Delta y_t = \sum_{j=1}^n \alpha_j \Delta s_{t-j} + \sum_{j=1}^n \beta_j \Delta y_{t-j} + v_{1t} \dots\dots\dots 6s$$

$$\Delta s_t = \sum_{j=1}^n \gamma_j \Delta s_{t-j} + \sum_{j=1}^n \theta_j \Delta y_{t-j} + v_{2t} \dots\dots\dots 7s$$

$$H_0 : \sum \alpha_j = 0, \quad \sum \theta_j = 0$$

where

s = log of real aggregate savings

y = log of real GDP

Equation 6s postulates that the current GDP growth rate is related to past values of the GDP growth rate itself as well as to the growth rates of savings, and equation 7s postulates a similar behaviour for savings growth rate.

If the estimated coefficient on the lagged Δs in equation 6s are statistically different from

zero as a group, $\sum_{j=1}^n \alpha_j \neq 0$, and the set of estimated coefficients on the lagged GDP

growth rate in 7s is not statistically different from zero, $\sum_{j=1}^n \theta_j = 0$, then we conclude that

46 For details see C.W.J. Granger, "Investigating Casual Relations by Econometric Models and Cross-Spectral Methods," *Econometrica*, July 1969, pp. 424-438.

there is a unidirectional causality from savings growth to GDP growth. Conversely, unidirectional causality from GDP growth rate to savings growth rate exists if the statistical results indicate that $\sum_{j=1}^n \theta_j \neq 0$ while $\sum_{j=1}^n \alpha_j = 0$. If both the sets of coefficients are found to be different from zero then there would be a bilateral causality, while independence is implied if both the sets are found not to be significantly different from zero.

To apply the Granger causality test, we first regress current Δy on all lagged Δy terms but not lagged Δs , and save the residual sum of squares RSS_r .⁴⁷ Then we run a regression including lagged Δs , obtain residual sum of squares, and save it as RSS_u . To test the null hypothesis that $\sum_{j=1}^n \alpha_j = 0$, we apply the F-test

$$F = \frac{(RSS_r - RSS_u) / m}{RSS_u / (n - k)}$$

where

m = number of lagged Δs terms

k = the number of parameters estimated

In other words, the test statistic would follow an F-distribution with m and $(n-k)$ degrees of freedom. Similarly, the F-statistic can be used to test the other null hypothesis,

⁴⁷ Also known as restricted sum of squares, because the model is restricted not to include lagged Δs variable specified in equation 6s. If lagged Δs is included, then the regression equation becomes an unrestricted one.

Table 4.9 reports the Granger causality test, and the results indicate that both the F-statistics are significant at the 2% level. Therefore, we can conclude that there was a bilateral causality between the saving growth rate and the GDP growth rate, which confirms there was a high level of interdependence between these growth rates in Thailand from 1975 to 1998. Thus, a balanced approach should be taken while promoting savings growth and GDP growth instead of policies favouring one over the other.

4.8 Concluding Remarks

Although the average aggregate savings rate in Thailand was high from 1975-1998, the various components, specifically the foreign savings rate during the period from 1990-98, were very volatile. The evidence presented above suggests that foreign saving acted as a substitute for domestic saving instead of being a complement. The high savings rate was swamped by a huge outflow of foreign savings and by negative economic growth during the years 1997 and 1998.

Interestingly, government saving did not hinder private saving as the Ricardian equivalence hypothesis would have us believe. Standard new classical macroeconomics often claims private agents are far-sighted [Lucas (1985), Sargent (1982)] and thus would counteract government attempts to save/borrow. This position also supports free inflow/outflow of capital, because it assumes that a far-sighted rational agent would make

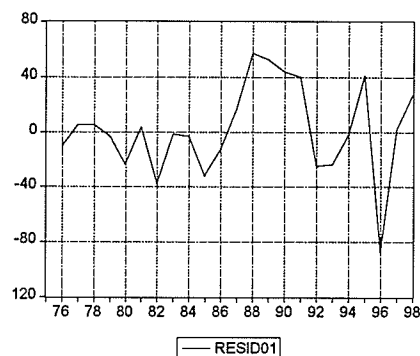
the best use of capital. However, the evidence presented above raises doubt about the assumption of the far-sightedness of private agents in Thailand, as well as the efficacy of laissez faire policy in Thailand during the period. The government of Thailand could have saved more during the boom period without significantly affecting private saving. These savings could have dampened economic activity during the boom period and, later, during the crisis period, the excess saving may have been quite useful as an anti-cyclical tool. Since foreign saving is potentially more volatile than its domestic counterpart, these results call into question the desirability of too much foreign saving through capital account liberalization for a country like Thailand, where domestic savings rate was very high [Figure 1.2].

4.6: Test Results

Table 4.1: Unit Root Tests

	ADF test		PP test	
	$\hat{\alpha}$	$t_{\hat{\alpha}}$	$\hat{\alpha}$	PP test statistic
S^p	-0.062	-0.563	-0.073	-1.692
ΔS^p	-2.051	-4.654	-0.852	-2.997
S^d	-0.065	-1.250	-0.049	-1.007
ΔS^d	-0.588	-2.362	-0.644	-2.943
S^f	-1.074	-2.612	-0.197	-1.653
ΔS^f	-1.498	-5.199	-0.756	-3.510
S^g	-0.116	-1.337	-0.083	-0.963
ΔS^g	-0.703	-2.567	-0.750	-3.598

i. Engle-Granger test

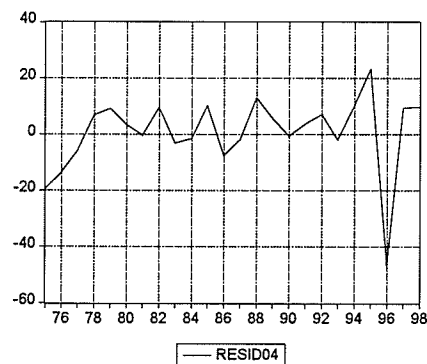


OLS residual based on equation 1s

$$\Delta \hat{\varepsilon}_t = -0.6024 \hat{\varepsilon}_{t-1} \dots \dots \dots 3s$$

$$t = -2.393$$

$$r^2 = 0.282$$



OLS residual based on equation 2s

$$\Delta \hat{\varepsilon}_t = -0.894 \hat{\varepsilon}_{t-1} \dots \dots \dots 4s$$

$$t = -2.981$$

$$r^2 = 0.395$$

Table 4.2: Johansen's testSeries: real Domestic Saving (S^d), real Foreign Saving (S^f), and real GDP (Y)

EIGENVALUE	LIKELIHOOD RATIO	5 PERCENT CRITICAL VALUE	1 PERCENT CRITICAL VALUE	HYPOTHESIZED NO. OF CE(S)
0.790577	51.59547	34.55	40.49	None **
0.324640	15.63726	18.17	23.46	At most 1
0.249768	6.609559	3.74	6.40	At most 2 **

Table 4.3: Johansen's TestSeries: real Private Saving (S^p), real Public Saving (S^g), and real GDP (Y)

EIGENVALUE	LIKELIHOOD RATIO	5 PERCENT CRITICAL VALUE	1 PERCENT CRITICAL VALUE	HYPOTHESIZED NO. OF CE(S)
0.838685	56.55013	34.55	40.49	None **
0.344447	14.58904	18.17	23.46	At most 1
0.191059	4.876677	3.74	6.40	At most 2 **

** Indicates that the corresponding null hypothesis is rejected at the 5% level of significance.

Table 4.4: Crowding-out Effect

Statistics Model	Const. Term	Y	S^f	D_2	R^2 <i>adjusted</i>	D.W.
1s	-113.35	0.202	-0.189	-162.095	0.957	1.712
t-statistic	(-1.45)	(5.409)	(-1.965)	(-3.090)		

Table 4.5: Ricardian Equivalence

Equation ⇒ Variable	2s OLS	2s Instrumental Variable (IV)
Constant term	43.172 (1.029)	-14.385 (-0.403)
S^g	0.217 (1.195)	0.379 (1.693)
Y	0.100 (9.946)	-----
Z^{48}	—	0.238 (6.844)
D_2	-89.056 (-4.156)	-87.603 (-3.032)
R^2 adjusted	0.948	0.942
AR (1)	0.148 (0.571)	0.091 (0.360)
DW	1.94	D-h = 0.13

(t-statistics appear in parentheses)

48 A high R^2 and a low t-value of S^g in equation 2s may indicate the presence of some degree of multicollinearity. Thus, we have also applied an instrumental variable, where private consumption is used as an instrument because of its high correlation with GDP and relatively low correlation with governments saving.

Table 4.6: Saving-growth causality

DIRECTION OF CAUSALITY	F-STATISTIC	PROBABILITY	DECISION
$\Delta y \rightarrow \Delta s$	5.658	0.012	Do not reject
$\Delta s \rightarrow \Delta y$	4.626	0.023	Do not reject

Chapter 5

Volatility of Investment

5.1 Introduction

The investment rate in Thailand was remarkably high up until the crisis [Figure 1.2]. Investment serves two purposes: on the one hand, it works as a component of aggregate demand, and on the other hand, it determines the amount of capital and thus helps determine long term growth. Moreover, investment spending, as compared to any other component of aggregate spending, fluctuates sharply over the business cycle; it falls during recessions and rises during booms. Theories of investment, based on the Keynesian approach, single out investment as a reason for fluctuation in an economy, and advocate the use of an active government to stabilize the economy.⁴⁹

However, new classical theory downplays the role of investment in generating fluctuations in an economy.⁵⁰ While investment decisions do depend on business's expectations, these expectations are based on calculated estimates of what that business is likely to face in terms of changes in demand and prices (Hall, 1990). In other words, investment's behaviour is driven by fundamentals rather than by irrational expectation or animal spirit as suggested by Keynes. Therefore, we will examine the applicability of theories of investment to Thailand in an attempt to shed further light on the causes of the crisis.

49 Keynesian, neo Keynesian, and post Keynesian economics consider investment spending to be the most volatile components of aggregate expenditure. See, for more information, Keynes (1936), Gordon (1990), Minsky (1993).

50 A Supply shock is the root cause of fluctuations in output. See, Kydland and Plosser (1983).

Section 2 briefly reviews the main theories of investment; Section 3 provides a theoretical framework for the investment function based on micro-foundations, and Section 4 presents empirical findings with concluding remarks.

5.2 Theories of Investment

The literature providing theoretical explanations of what determines investment is quite diverse. Theories of investment behaviour typically differ in terms of the economic variables that are emphasized as playing the key roles in investment decision-making. Some theories focus on expected profits; others on interest costs and financial considerations; and still others on the relationship between desired output level and the utilization of existing capital capacity. This section briefly discusses the main theories of investment: the simple accelerator model; the flexible accelerator model; the user cost of capital, and Tobin's q theory.⁵¹ It also provides a brief overview of several recent theories of investment.

i. The Simple Accelerator Model

The accelerator theory of investment was formulated when J.M. Clark, in 1917, noticed a regular relationship between the level of boxcar production and the change in railroad

⁵¹ For a more detailed review of the theoretical literature on investment, see Jorgenson 1971, Helliwell 1976, Precious 1987, Abel 1982, and Summer 1981.

traffic in the U.S.A.⁵² The model states that investment spending depends on the rate of output growth, where an increase in the rate of output growth (acceleration) will lead to an increase in the level of investment. The theory is based on the assumption that a specific amount of capital is needed to produce a given amount of output, i.e. fixed capital-output ratio. Specifically,

$$K_t = \kappa Y_t$$

$$K_{t-1} = \kappa Y_{t-1}$$

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

$$I_t = \kappa \Delta Y_t \dots\dots\dots (1i)$$

$$\text{where, } \kappa = \frac{K}{Y}$$

K = Capital stock

Y = output

I = net investment.

Equation 1i represents the accelerator theory of investment, which states that investment spending is proportional to the rate of change of output. However, the underlying assumptions of this model are stringent and are subject to harsh criticism. In the first place, the assumption of a fixed capital-output ratio is an unrealistic one, because it implies that firms employ capital and labour in fixed proportions, irrespective of factor

⁵² See, J.M. Clark, "Business acceleration and the law of demand," *Journal of Political Economy*, vol 25 (March 1917), pp. 217-235.

prices. Furthermore, the assumption that firms attain optimum capital stock in each time period implies the absence of excess capacity and the infinite elasticity of the supply of capital goods. The flexible accelerator model addresses some of these limitations.

ii. The Flexible Accelerator Model

In contrast to the simple accelerator model, the flexible accelerator model assumes lags in the adjustment process. The discrepancy between the desired and the actual capital stock is eliminated over a number of periods instead of being eliminated in a single period. Modifying equation 1i, using Koyck's transformation, the flexible accelerator model can be written as follows:⁵³

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

$$I_t = \Delta K_t = \kappa\lambda \sum (1-\lambda)^i \Delta Y_{t-i} \dots\dots\dots (2i)$$

where

$$0 < \lambda < 1$$

The above equation implies that ΔK is only a fraction of the desired investment. If $\lambda = 1$, then equation 2i reduces to a simple accelerator equation 1i. The flexible accelerator model does have some attractive features: it provides an explanation of how a small percentage change in output may lead to a large percentage change in net investment; it implies that aggregate demand may be temporarily unstable due to volatile fluctuations in

investment. However, from the new classical perspective, both simple and flexible accelerator models lack microfoundations, and even more importantly, do not incorporate the profit maximization objective of investors.

⁵³ See L.M. Koyck, *Distributed Lags and Investment Analysis*, Amsterdam: North Holland Publishing Company, 1954.

iii. The User Cost of Capital

This concept is based on the idea of derived demand; that is, a factor of production (labour/capital) by itself is not purchased by the firm. The firm buys or rents its services and pays wages or interest. Firms desire to add capital until the marginal return of the last unit added drops to user cost (rental cost) of capital.⁵⁴ Assuming that the marginal product of capital is diminishing and the capital market is competitive,⁵⁵ the relationship between rental cost and the desired capital stock is shown in the following figure:

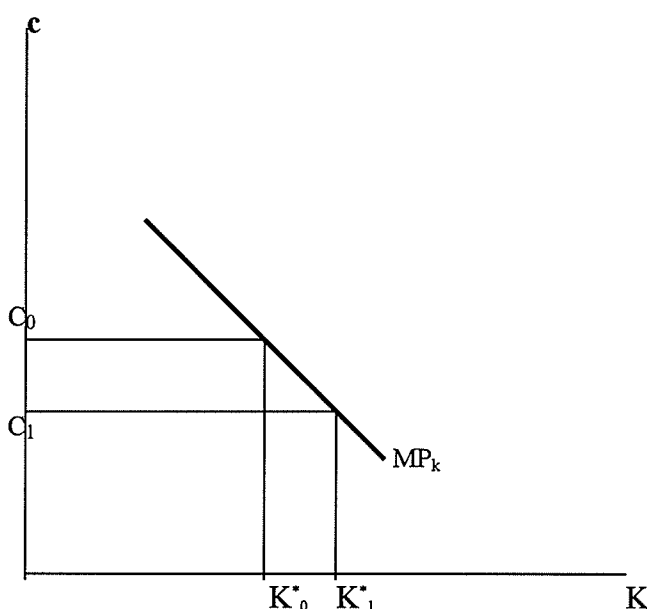


Figure 5.1: User Cost of Capital

Figure 5.1 depicts the inverse relationship between the cost of capital and the desired capital stock. This relationship implies that the change in desired capital stock

⁵⁴ The user or rental cost of capital is the dollar cost or price of using the services of capital goods in production per unit of time. Whether a firm actually buys its own capital or leases it, the rental cost is the right measure of the opportunity cost.

⁵⁵ A competitive capital market implies that the user cost of capital is highly elastic; therefore, there would be a given rate for a firm.

(investment) primarily depends on the user cost of capital. The relationship between investment and user cost of capital can be written as follows:

$$I_t = \Delta K_t^* = \phi(c) \cdot \dots \dots \dots (3i)$$

and

$$c = r + \delta = i - \pi^e + \delta$$

where

K^* = desired capital stock

c = user cost of capital

i = nominal interest rate

π^e = expected inflation rate

δ = depreciation cost

The main problem with the User Cost of Capital model is that it does not identify any mechanism through which expectations affect investment demand. The model implies that firms equate the current marginal revenue product of capital with their current user costs, without regard for what they expect future marginal revenue products or user costs to be. In reality, expectations about demand and costs are central to investment decisions. Firms expand their capital stocks when they expect their sales to grow and the cost of capital to be low, and they reduce capital stocks when they expect their sales to fall and the cost of capital to be high [Romer, 2001].

iv. The q Theory of Investment

James Tobin, a Nobel Laureate, has proposed an investment decision rule based on the performance of a company's share in the stock market.⁵⁶ Tobin assumes that the managers of business firms try to maximize the value of shareholders' equity rather than current profits. Presumably, a higher share price reflects the market's belief that the firm offers profitable investment opportunities. Tobin suggests a measure of these incentives, called Tobin's q.⁵⁷ Tobin's q can be written as:

$$q = \frac{SMV}{P_k} \dots\dots\dots 4i$$

where SMV = stock market value of a firm

P_k = the price of capital i.e., the replacement cost of a firm's assets.

At equilibrium, q equals unity, which implies that the stock market value of the firm equals the cost of buying the firm's assets. In such a situation, the firm's capital stock is at its desired level. When $q < 1$, the firm's stock market value is less than the cost of buying its capital assets. Such a firm is too big, and it will pay the firm to sell some of its capital assets. If $q > 1$, investors would value the firm more than the sum of the cost of these assets, i.e. investors must be anticipating relative profitability. As long as this condition holds, the firm's manager has an incentive to try to raise the market value of the firm's share by purchasing more capital.

⁵⁶ Tobin's q theory first appeared in "A General Equilibrium Approach to Monetary Theory," *Journal of Money Credit, and Banking*, 1969, pp. 15-29.

From a theoretical standpoint, the q model is a very attractive one; the q summarizes all information about the future that is relevant to a firm's investment decisions. The observable value of the firm contains market expectations about future risk and return adjustments, where specific assumptions about expectations do not have to be made. The market value of the firm would also reflect the problems of lags and adjustment costs of investment. However, the empirical performance of Tobin's q theory is poor, which may be due to the volatile nature of stock prices. The theory is useful in explaining events *ex post*, but does an unsatisfactory job in predicting the level of investment. Finally, in countries like Thailand, where financial markets are weak, the explanatory power of the model is difficult to test.

v. Recent Theories of Investment

A significant number of contemporary economists investigate the effects of asymmetric information, irreversibility, fixed costs, and beliefs on investment.⁵⁸

⁵⁷ There are two versions of q : marginal and average q . For details, see Abel (1982) and Hayashi (1982).

⁵⁸ Recent works include Abel and Eberly (1984); Dixit and Pyndick (1994); Caballero, Engel, and Haltiwanger (1995); Abel, Dixit, Eberly, and Pyndick (1996) and Cooper, Haltiwanger, and Power (1999). See Caballero (1999) for a survey.

According to asymmetric information theory, when firms and investors are equally well informed, financial markets function efficiently; however, in reality, firms are much better informed about their investment projects than potential outside investors are. Because of this asymmetric information the presence of intermediaries also becomes noticeable [Diamond, 1984]. Asymmetric information hinders the desired level of an investment through an increase in adverse selection and moral hazard.

Recently, new-Keynesian economists (Shleifer, 1986, Cooper, 1988, Farmer, 1993) have emphasized the role of beliefs in investment decisions. All investment decisions are based on taking a view of the future: those who undertake investment decisions make the best forecast they can and assess the likely return of an investment project as thoroughly as possible. However, due to the inherent uncertainty involved in an investment decision, some investors may simply follow the footsteps of others without a look at fundamentals. Should most investors believe that the economy is about to embark on a period of rapid expansion and prosperity and if they act based on that assumption, the chances are they will be proven right. If most investors are skeptical about the economy, believing that it is on the brink of a recession and act on that basis, again, they will likely be right. In other words, belief alone is enough to generate an impact on the real economy; this scenario is referred to as animal spirits, sunspots or self-fulfilling prophecies. Sorting out the possible influences of animal spirits on a country's economy is a difficult task.⁵⁹

⁵⁹ Keynes referred to the term "animal spirits" to describe the entrepreneur's behaviour under uncertainty. Uncertainty here implies a state where the probability of sales revenue cannot be as reliably predicted as a coin toss.

Empirical works on investment in developing countries have included a wide range of variables [Blejer and Khan, 1984, Wai and Wong, 1982]. According to Jorgenson (1971), the number of explanations and determinants of investment are limited only by the imagination of the researcher. However, recent developments in time series analysis discourage the use of additional variables unless they are cointegrated. In order to analyze investors' behaviour in Thailand during the period of 1975-1998, we will first consider an aggregate investment model that identifies the main determinants of investment. Furthermore, we analyze specific issues such as the extent of unproductive investment, and over-investment to shed light on causes of the financial crisis in Thailand.

5.3 Proposed Investment Model

Based on discussions in the previous section, we consider an investment function that has micro underpinnings and one that can be examined empirically. Scarth's formulation fulfills most of these conditions; therefore, we follow his line of modeling (Scarth, 1988). The model starts with a simple production function:

$$Y = \phi(L, K)$$

The model assumes that both marginal products are positive ($\phi_L, \phi_K > 0$), but at a diminishing rate ($\phi_{LL}, \phi_{KK} < 0$). To ensure that the two factors are complements, they are subject to the following restriction: $\phi_{LK} = \phi_{KL} > 0$. A perfectly competitive firm wishes to maximize the present value of net revenues for its owners:

$$PV = \sum_{t=0}^{\infty} \left(\frac{1}{1+R} \right)^t [P Y_t - W L_t - P_I I_t - a P_I I_t^2] \dots \dots \dots 5i$$

subject to the accumulation identity,

$$I_t = (K_{t+1} - K_t) + \sigma K_t$$

where I = Gross Investment

P = output price

R = real interest rate

Y = real output

W = wage rate

t = time period

σ = depreciation rate

P_I = price of investment good

At each point in time, net revenue, $[PY_t - WL_t - P_I I_t - aP_I I_t^2]$, equals sales (PY), minus the wage bill (WL), minus the purchase cost of investment goods ($P_I I$), minus the installation costs for capital ($aP_I I^2$). Profit maximizing behaviour can be derived by differentiating with respect to labour (L) and capital (K) and setting these derivatives to zero. The necessary conditions are

$$\frac{\delta PV}{\delta L_t} = \left(\frac{1}{1+R} \right)^t (PF_t - W) = 0$$

$$\frac{\delta PV}{\delta K_t} = \left(\frac{1}{1+R} \right)^t [PF_k + P_I (1-\sigma) + 2aP_I (1-\sigma)I_t] + \left(\frac{1}{1+R} \right)^{t-1} (-P_I - 2aP_I I_{t-1}) = 0$$

By solving these two first-order conditions, one can derive a standard investment function; one that states that investment is positively related to output and inversely related to the real rate of interest.

$$I = I(Y, R) \dots \dots \dots 6i$$

$$I_Y > 0, \quad I_R < 0$$

Equation 6i assumes no inflation; however, in the presence of inflation (π), the investment function can be re-written as

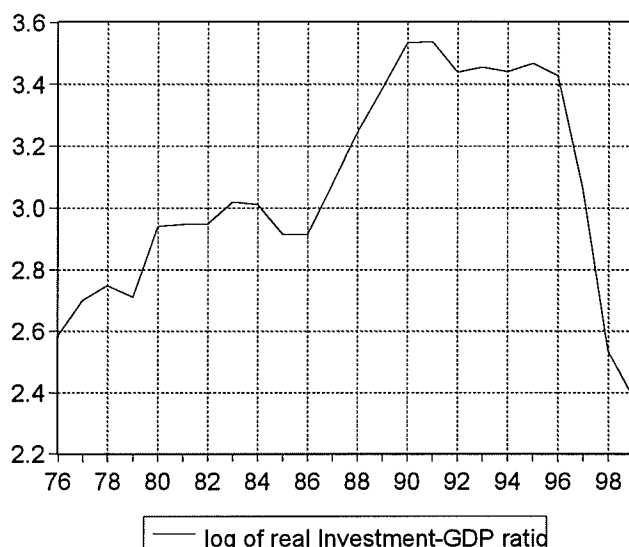
$$I = I(Y, R, \pi) \dots \dots \dots 7i$$

$$I_{\pi} < 0$$

The above model has some alluring features. First, the model is based on a micro foundation. Second, it assumes substitutability between capital and labour and therefore abandons the assumption of fixed-capital output ratio. Third, it assumes adjustment costs and recognizes the gradual adjustment of desired and actual capital stock. Therefore, equation 7i incorporates both new classical (micro foundation) and new Keynesian concerns (gradual adjustment) regarding investment; hence we apply this model to determine the impact of each explanatory variable on investment, and their implications for the causes of the crisis. In testing this model, our starting point is to examine the time series properties of the data, followed by an estimation of the model.

5.4: Findings

Data used for investment are gross real private investment, real GDP, real interest rate (lending rate) and inflation rate. The nominal GDP and investment series are adjusted using the Consumer Price Index (CPI), and the inflation rate is calculated using the CPI index where the year 1990 is considered as the base year.



Unless otherwise stated, the sources of all data in this study are the Bank of Thailand's home page (www.bot.or.th) and various issues of International Financial Statistics (IFS) *Yearbook*. A non-log form of the variables is used for estimating models that contain an inflation rate variable because of the presence of negative observations in this variable.⁶⁰

⁶⁰ Although negative observations of the inflation rate could be made positive by adding 1 with the original series, our experiment does not show any cointegrating relationship among the variables.

Table 5.1: Correlation Matrix

	I^p Real Private Investment	π Inflation Rate	Y Real GDP	R Real Rate of Interest
I^p	1.000000	-0.155894	0.854234	0.058028
π	-0.155894	1.000000	-0.199088	-0.685623
Y	0.854234	-0.199088	1.000000	-0.059860
R	0.058028	-0.685623	-0.059860	1.000000

The results shown in Table 5.1 indicate that there is a strong positive correlation between income and investment (0.85), and that there is a negative correlation between inflation and investment. In addition, the correlation coefficient (0.05) between investment and the interest rate is not only relatively low but also positive. Our experiment also indicates that the variables of the above correlation matrix do not have a co-integrating relationship [Table 5.2]. Furthermore, an OLS estimation of equation 7i also provides a positive and statistically insignificant (at the 5% level) coefficient of the interest rate variable.⁶¹ Thus, we are skeptical about the applicability of the user cost of capital theory to Thailand, and the implications of this analysis will be discussed in the next section after further examination of the investment function.

61 Although the co-integration test (non-cointegration among the variables) nullifies the validity of interpreting such regression results, the OLS result reemphasizes the insignificant role of the interest rate variable in determining the level of investment in case of Thailand during the period from 1975 to 1998.

i. Time Series Properties:

Table 5.2 reports the stationarity test conducted using the ADF test on the private investment, the inflation rate and the interest rate, as is evident from the test, for the level of the series, the test does not reject the null hypothesis of non-stationarity (i.e., the existence of unit root) at the 5% or even 10% level of significance. Values of $\hat{\alpha}$ and $t_{\hat{\alpha}}$ for private investment are -0.462 and -3.195 respectively. However, the critical value at the 5% significance level is -3.62. The inflation and interest rates are also found to be nonstationary at its level at the 5% level. Nevertheless, after differencing each series once, the null hypothesis of non-stationarity is rejected. The PP test results (Table 3i) reconfirms that the variables (investment, GDP and inflation rate) are integrated of order 1, i.e. I (1). Therefore, we proceed to conduct cointegration tests.

Table 5.2 reports the cointegration test result for the inflation, interest rate, investment and real GDP. Unfortunately, no unique cointegration relationship is found among the variables at the 5% level.

Table 5.3 reports the cointegration test result for the inflation, investment and real GDP. Unfortunately, no unique cointegration relationship is found among the variables at the 5% level. The possibility of more than one cointegrating relationship could not be ruled out, which again leads to the problem of over identification. In other words, in the presence of more than one cointegrating relationship, without out-of-sample, exact information, it is not possible to estimate behavioral relationships as cointegrating vectors [Greene 2000, P 791]. The result, however, is not surprising in the sense that we already

observed a positive correlation between investment and interest rate.⁶² Thus, we proceed to examine the cointegration relationship between logarithmic values of real private investment and real GDP.

Table 5.4 presents the results of the Johansen's cointegration test for private investment and income. The likelihood ratio for the null hypothesis having no cointegration is 37.12, which is higher than the critical value (12.53) at the 5% level. The likelihood ratio of having one cointegrating relationship is 3.145, which is less than the critical value (3.84) at the 5% level of significance. Thus, we can conclude that a cointegrating relationship exists between the variables, a conclusion that is also supported by the results of the Engle-Granger test [equation 8i]. Therefore, we proceed to estimate the investment function for Thailand using the following model:

$$i^p = i^p(y, D_2, \varepsilon) \dots \dots \dots 6i$$

$$i_y^p > 0, \quad i_{D_2}^p < 0$$

where

i^p = log of real private investment

y = log of real GDP

D_2 = 1 during 1997 to 1998, and 0 during 1975 to 1996

⁶² Moreover, an OLS estimate of inflation rate becomes insignificant.

Equation 8i reports the aggregate investment function for Thailand for the period of 1975-1998. The result shows that the income elasticity of investment (1.58) is significant at the 1% level, implying that in Thailand, the private investment was highly sensitive to output. Moreover, the dummy variable, which captures the fall in investment due to the crisis in 1997/98, is quite high and significant at the 1% level. The variation in output and the dummy variable accounted for 96% ($R^2 = 0.958$) of the variation in private investment. This finding further indicates the volatile nature of private investment in Thailand. Reasons for this volatility might be further explored by examining indexes such as SET index, profit rates, and capacity utilization of vital sectors of the economy.⁶³

Figure 5.4 depicts the index of the SET; it jumped from 612 in 1990, to 1682 in 1993, almost tripling in three years. It declined steadily beginning in 1994 and then plummeted to 372 in 1997. The boom of the indexes was not justifiable given the low rates of profit of the listed companies [Figure 5.2]. The property sector took the most notable drop in the SET index, which fell drastically from 367 in 1993, to just 7 in 1997. The collapse of the SET index for the property sector was unprecedented; it was the largest drop among the East Asian countries [Figure 2.3]. The cause of this collapse may have been that a significant portion of lending performed by financial institutions in Thailand was collateral based, and the most common forms of collateral were land and real estate. When land prices were rising in Thailand, investment in land and real estate paid off in terms of the ability to float more loans [Siamwalla, 1997]. According to the Bank of

⁶³ Unfortunately, long-term data is not available for most of these indexes; therefore, rigorous statistical analysis could not be performed.

Thailand, greater access to funding prompted many real estate companies to invest in speculative and unproductive purchases.

In addition to real estate, several other industries encountered excess-supply during the mid-1990s: the percentages of excess supply in the steel bar industry, private hospital beds, and petrochemicals were 150%, 300%, and 195% respectively [Vajragupta and Vichyanond, 1998]. In fact, the extent of over-investment was widespread, which is also reflected in capacity utilization statistics by major industries [Appendix D].

Excess-supply in all these industries was partly attributed to the misallocation of loans. Table 5.5 illustrates seven sectors of listed companies with the highest debt-equity ratios during the years leading up to the crisis.⁶⁴ The average debt/equity ratio of listed non-financial companies rose from 1.58 to 1.98 between 1994 and 1996.

Figures 5.2 and 5.3 provide an interesting contrast: between 1994 and 1996 despite the falling SET index, the falling/negative rates of profit, and over-investment in major sectors, bank lending to the private sector grew rapidly, and by the end of 1995, the lending GDP ratio exceeded 1. In fact, from 1993 until the crisis, this ratio was the highest in the region. The huge inflow of foreign capital to Thailand and over-confidence about the prospect of the economy might be the reasons for this occurrence, while, as mentioned earlier, this large inflow was a result of several factors, including the establishment of the Bangkok International Banking Facility (BIBF) in 1993 [Appendix

D]. All of the above factors contributed to the build-up of a pyramid of debt, a debt that could continue only so long as the growth rate of the economy continued.

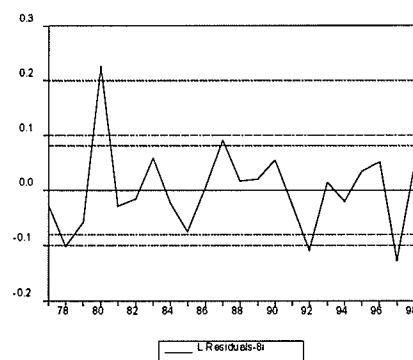
5.5: Conclusion

The prior analysis clearly indicates that a significant portion of investment became a liability for Thailand's economy. Rejection of the user cost of capital theory also indicates that the level of investment was insensitive to the interest rate in Thailand. Furthermore, it is evident that the profit rates neither justified the boom-bust in the SET index nor the amount of bank lending to the private sector. In other words, the bulk of the investment was not based on fundamentals such as interest rate, inflation rate, or even profit rate. Thus, the investors' behaviour in Thailand did not follow the path suggested by those who advocate uninterrupted flow of capital (IMF, new classical economists).

In fact, aggregate investment functions as well as sectoral analysis support the Keynesian view regarding the volatile nature of investment in Thailand. Perhaps the investors' belief that Thailand's economy would remain the fastest growing economy in the world, and the liberalization of capital account also played a role. These findings emphasize the importance of an active stabilization policy for a country like Thailand, which was not self-reliant but instead borrowed foreign funds heavily for its growth and development.

Table 5.1: Unit Root test

Statistics	$\hat{\alpha}$	$t_{\hat{\alpha}}$	$\hat{\alpha}$	PP test
Series				statistic
i^p	-0.462	-2.023	-0.089	-1.178
ΔI^p	-0.816	-4.237	-0.387	-2.370
π	-0.111	-1.047		
$\Delta \pi$	-1.420	-3.441	-0.126	-1.205
r	-0.50	-2.03	-1.315	-4.640
			-0.339	-2.209
Δr	-1.36	-3.94	-1.053	-3.166

a. The Engle-Granger test

$$\Delta \hat{\varepsilon}_t = -1.034 \hat{\varepsilon}_{t-1} \dots \dots \dots 8i$$

$$t = -3.259$$

$$r^2 = 0.397$$

Table 5.2: Series: I^p , Y , r , π

LIKELIHOOD		5 PERCENT	1 PERCENT	HYPOTHESIZED
Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.773421	75.60442	47.21	54.46	None **
0.636078	42.94190	29.68	35.65	At most 1 **
0.484823	20.70396	15.41	20.04	At most 2 **
0.242585	6.112575	3.76	6.65	At most 3 *

Table 5.3: Series: I^p , Y , π

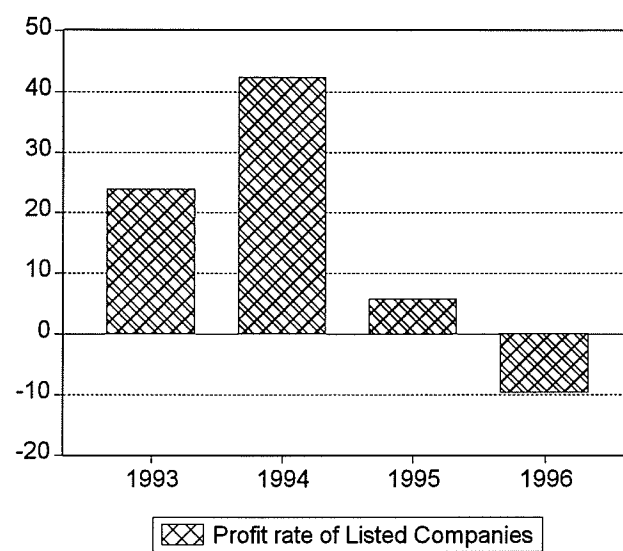
Likelihood		5 Percent	1 Percent	Hypothesized
Eigenvalue	Ratio	Critical Value	Critical Value	No. of CE(s)
0.668456	44.53768	29.68	35.65	None **
0.519750	20.24982	15.41	20.04	At most 1 **
0.170555	4.113968	3.76	6.65	At most 2 *

Table 5.4: Series: i^p , y

EIGENVALUE	LIKELIHOOD	5 PERCENT	1 PERCENT	HYPOTHESIZED
	RATIO	CRITICAL VALUE	CRITICAL VALUE	NO. OF CE(S)
0.771799	37.12895	12.53	16.31	None**
0.127833	3.145814	3.84	6.51	At Most 1

Table 5.5: Investment Function

Statistics	Const.	y	D ₂	R^2	D-h	
Model	Term			<i>adjusted</i>		Method
$i^p = f(y)$	-6.129	1.580	-0.814	0.958	0.35	OLS
t-statistic	(-1.02)	(10.729)	(-6.459)			

Figure 5.2: Profit Rate (%)

Source: Bank of Thailand 1998

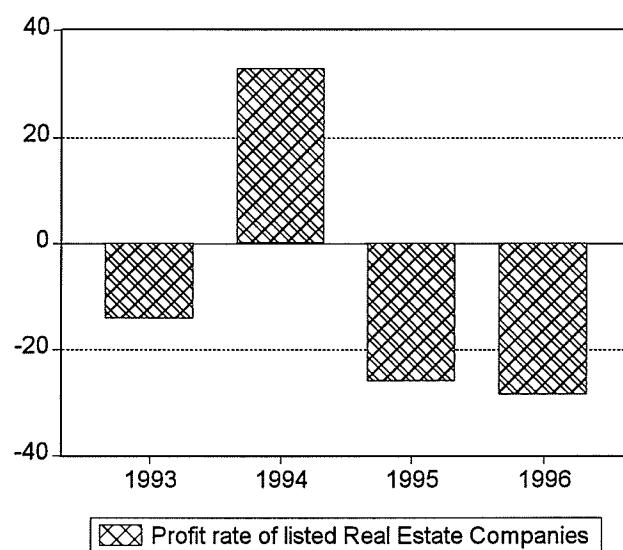
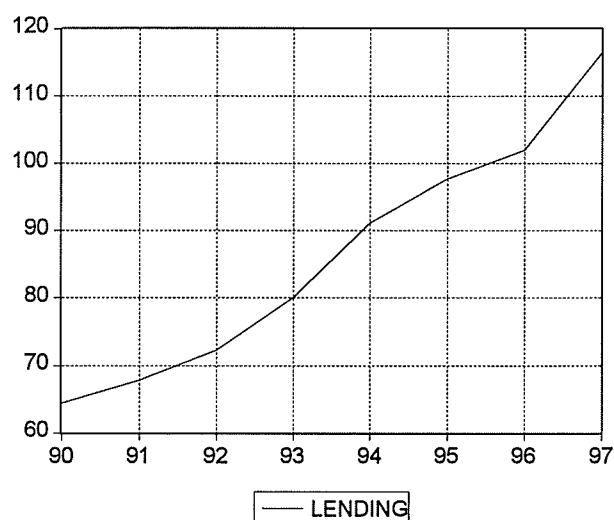
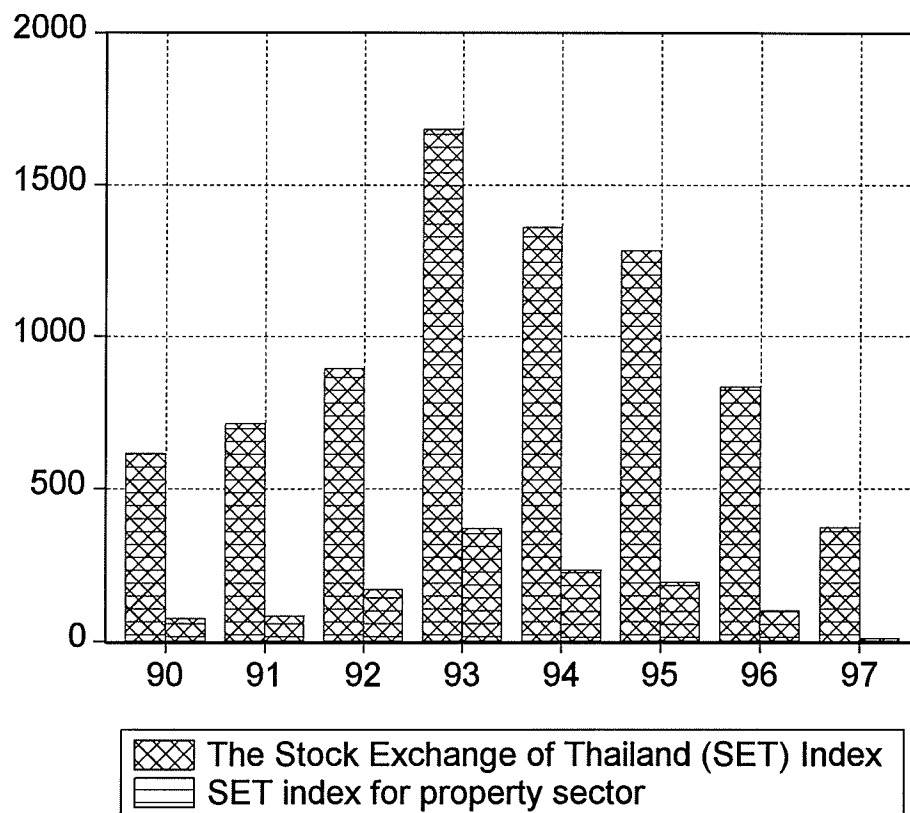


Figure 5.3: Bank lending to Private Sector (% of GDP)**Table 5.5: Debt-equity ratio of major corporations**

Sector	1992	1993	1994	1995	1996	1997
Building & Furnishing materials	1.78	1.99	1.95	2.10	2.73	6.71
Chemicals & Plastics	2.07	1.88	1.07	1.32	1.79	2.87
Communications	0.61	0.78	1.03	1.28	1.85	3.11
Electrical Products and Computer	2.30	2.04	1.89	2.36	2.38	4.90
Energy	1.15	1.46	1.24	1.40	1.51	2.49
Property and Development	1.32	1.56	1.76	1.81	1.91	2.79
Pulp and paper	2.26	2.33	1.78	1.90	2.65	8.42

Figure 5.4: Stock Indexes

Chapter 6

Findings, Policy Implications and Conclusions

In our long-term investigation of Thailand's economy during the period from 1975 to 1998, we have critically discussed the predominant explanations of the 1997/98 East Asian financial crisis, and have argued why the case of Thailand should be studied exclusively. We have linked economic climates, both domestic and external, to the inflows of hot money; then we have investigated the influence of hot money on consumers and investors by examining a variety of hypotheses: liquidity-constrained, pro-cyclicality of consumer spending, Ricardian Equivalence, the user cost of capital hypothesis. Through examining these hypotheses, we have obtained important information concerning the causes of the financial crisis in Thailand.

6.1: Summary of Findings

Our empirical examinations have revealed that the causes of the crisis have several important dimensions, which can be summarized as follows:

- Economic development of a capital-dependent nation and the global economic climate are heavily interdependent. The global economic climate is a dynamic one to which capital dependent countries must adjust. They cannot afford to pursue the same economic policies year after year. Thailand's financial crisis was, in some measure, a result of the mismatching of domestic economic policies with the changing external economic

climate. In the aftermath of the Soviet era, Thailand continued to pursue the same economic policies (over-investment in certain sectors, liberalisation of capital accounts) at an even higher scale, while the outside world was becoming more fragile and unstable.

- Although generalized explanations of financial crisis are important, this study emphasizes the necessity for a country specific investigation, especially for the country where the crisis originates. The root causes of crisis for such a country appear to lay heavily on domestic economic agents (private and public), and their policies. Perhaps countries that suffer from a contagion effect can take a more generalized view.

- A huge inflow and outflow of capital took place in Thailand for a number of reasons, some of which were capital account liberalization and changes in the global economic climate. The sharp increase in the ratios of debt-GDP and short to long-term debts was alarming, especially in a country with such a high savings rate (higher than many other countries in the world). It is conceivable that Thailand did not need foreign savings for the purpose of productive investment.

- Various titles such as Asian Miracles, Highly Potential Asian Economies, accorded to Thailand (and other East Asian countries) created a magnified expectation that worked as an illusion and may have provided investors with the misguided notion that the economy of Thailand would continue to grow. Conversely, the title, "Crony Capitalism" created a negative perception of Thailand's economy, thereby lowering investors' expectations in the aftermath of the crisis. These swings in perception accelerated the cyclical behaviour of investors.

- In Chapter 3, we have observed that a significant proportion of consumers were faced with a liquidity/borrowing constraint. Moreover, during the massive inflow of foreign capital, that constraint was drastically relaxed, and contributed to a consumption boom led by huge consumer spending on imported goods and widespread conspicuous consumption. Consumer spending was pro-cyclical in Thailand during the period from 1990 to 1998, which contradicts the view that the consumers are far-sighted. In a word, consumer spending was destabilizing in the case of Thailand.

- In Chapter 4, we have found that the foreign saving had a dampening effect on domestic saving, while government saving did not have any negative impact on private saving. This finding reinforces the idea that consumers lacked far-sightedness, and violates new classical assumptions regarding the behaviour of private agents in a capital receiving country like Thailand.

- In Chapter 5, we have noted that the interest rate had little or no effect on private investment, which was highly volatile. Private investment in the mid 1990s was driven by beliefs rather than fundamentals: a high rate of investment continued until the very brink of the crisis despite a very low rate of profit and over-investment in various sectors. Despite a significant percentage of capacity underutilization in the major sectors of the economy, over-investment continued in those sectors through borrowed resources, and these investments became a serious liability for the economy. They created massive external debt as well as unbalanced growth between sectors of the economy. In the aftermath of the crisis, Thailand had to borrow billions of dollars from the IMF to repay

that debt. In return, the IMF played a leading role in designing Thailand's fiscal and monetary policy through the conditions it set for its bailout plan.

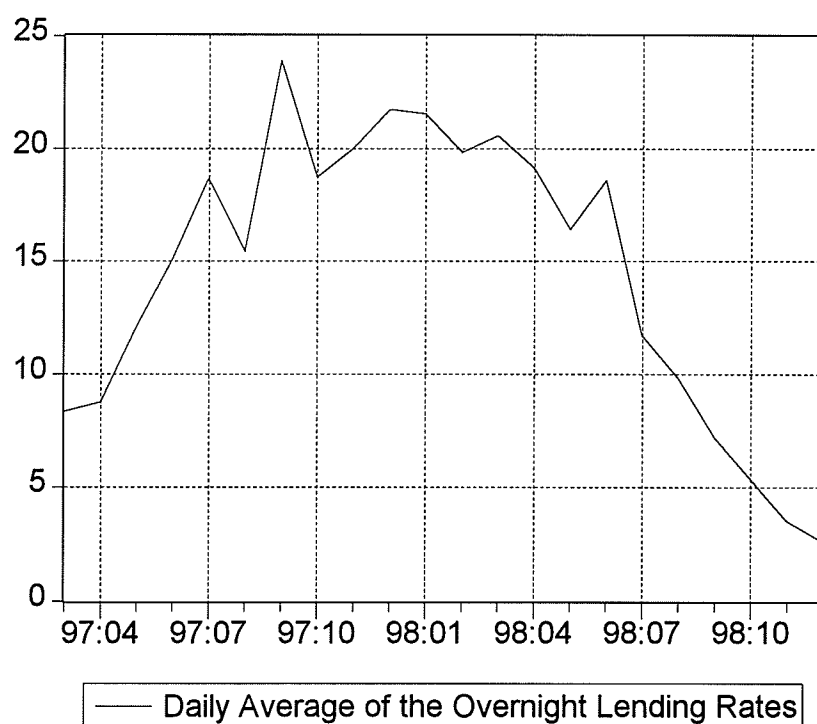
6.2 The IMF and the Crisis in the Light of this Study

On August 20, 1997, Thailand accepted financial assistance from the International Monetary Fund (IMF): a package of 17.2 billion US dollars in bilateral and multilateral assistance. This loan was granted on the condition that Thailand would accept the austerity program put forward by the IMF, which involved the implementation of "appropriate" monetary and fiscal policies. These policy expectations were reflected in the seven Letters of Intent (LOI), outlining the direction of an appropriate policy program to restore both internal and external stability [Appendix C].

The main objective of the first, second, and third LOIs was geared towards stabilizing the baht and inflation. Very tight monetary and fiscal policies were pursued to achieve these targets, but this policy resulted in higher short-term interest rates [Figure 6.1]. Due to the preservation of high interest rates and high debt to equity ratios, which were a structural feature of Asian economies, many firms became insolvent, resulting in the rise of non-performing loans by financial institutions as well as a liquidity crunch. The conditions attached to the IMF's original assistance to Thailand required the Thai government to budget a surplus of 1 percent of the GDP [Appendix C]. The fiscal surplus magnified the effects of contractionary monetary policy by shrinking domestic demand further. Indeed all of these elements further destabilized the economy, which was

already in the midst of a recession. However, what Thailand needed instead was a counter-cyclical fiscal policy, i.e. a budget deficit to fight against economic downturn.

Due to the adverse impact of its original conditions, the IMF was bitterly criticized; and subsequently the stringent conditions were relaxed in the fourth LOIs, as of May 1998, and in subsequent LOIs. The public sector balance was changed from a surplus to a deficit of 3.5 percent and 6 percent of GDP in the fifth and seventh LOIs respectively. Even though some of the initial IMF conditions were reversed, their negative impacts had already taken effect and caused irreparable damage to the economy. Thus, it is important that policymakers of an institution like the IMF recognise the far-reaching consequences of one-sided policies. It would be preferable for them to devise policies in advance by asking a series of questions and by examining alternative ideas put forward by their critics. Thus, in the event of a crisis, they can avoid experimentation.

Figure 6.1: Interest Rate (%)

6.3: Policy Implications

Economic policies of a capital-dependent country like Thailand should be focussed on the dynamics of the global economic climate and geared towards fine-tuning domestic policies to face this changing economic climate. A far-sighted view of the nature of this kind of climate is essential to attaining sustainable growth. Therefore understanding these dynamics in order to develop appropriate policies should be a major concern for development strategists in particular and economic agents in general. The following policy implications can be drawn from this particular study.

First, foreign resources may play a vital role in economic growth at the take-off stage of a nation, if they reflect import demand for investments. However, investment must yield returns high enough to repay the funds that financed them, a point that highlights the fact that the level of investment is not as important as the quality of investment. Therefore, government of the capital receiving country should constantly monitor the usage of foreign funds, and it may be wise to channel resources for productive investment.

Second, a current account deficit caused by a consumption boom should be carefully monitored. In such a case, governments could impose a higher tax rate on imported durables and luxury goods, a measure that would dampen the consumption boom on the one hand, and increase government savings on the other. These savings could be used during the period of economic slowdown.

Third, disclosure of information is vital for informed decisions because without full disclosure of information, capital is often misallocated. Moreover, the importance of economic literacy cannot be overemphasized, especially in a country where dependence on a foreign market and capital is significant. Citizens can be given the necessary knowledge regarding externality and how the market works, all of which can be propagated by using the media and by improving/changing school curricula. These forms of education can be seen as preventive measures, to ensure that both consumers and investors make prudent decisions. Availability of information alone is not sufficient for agents to make an informed decision; moral suasion should also be used to prevent agents from taking a short-term view of the economy.

Fourth, financial as well as capital account liberalization should --as preventive measures-- be implemented gradually. Perhaps a country should wait and observe the consequences of each step before taking further steps towards liberalization. Moreover, currency trading, the most volatile component of international transactions, can be partially controlled to minimize speculative transactions. James Tobin first proposed a tax on all foreign exchange transactions as a means of throwing "sands in the wheels" of international speculation.⁶⁵ The Tobin tax is aimed at providing a greater control over short-term capital movements and militating against excessive exchange rate volatility. It involves the imposition of a tax on foreign exchange transactions, particularly on the core currencies of the floating exchange rate system: the dollar, the euro and the Yen. An estimate shows that 80 percent of all transactions on currency markets are unravelled within a week or less: day traders have a decision-making horizon of only a few hours. Moreover, trading volumes on currency markets are 60 times higher than the level required for international commerce to take place [Jetting, 2000]. In such an environment, the Tobin tax would have the immediate impact of reducing the profits that speculators are hoping to make out of currency markets without penalizing long-term financial transactions, which are a necessary attribute of international trade and productive foreign investment.

There are two main arguments against the economic feasibility of the Tobin tax. The first is that it could not be implemented unless every country adopts it simultaneously; because of the great mobility of financial capital, there would be a massive inflow of

⁶⁵ For details, see Tobin, 1978, Kruger 1986, Michael 1986, Little, Scitovsky, and Scott 1970, Loxley, 2000.

capital towards those countries that did not adopt the tax. Second, it would be very difficult to implement by a nation due to the nature of currency trade: as opposed to the trade of physical commodities, currency trade can be implemented from various locations across the world. In reply to the first criticism, Tobin has pointed out that if that is the case then why is it that the international financial community has not already massively migrated towards the Bahamas or Cayman Islands, which are known as tax havens.

According to Schmidt (2000), a solution to the second limitation is now available due to recently established settlement technology. It is feasible to collect tax on payments made to settle inter-bank foreign exchange payments because of technological and institutional developments over the years. Gross payments can be matched automatically and electronically to their originating individual foreign exchange transactions, and both onshore and offshore transactions can be taxed regardless of the financial instrument used to define the terms of the transaction or the location of the parties to the transaction. The advancement of information technology and the development of settlement systems--the communication system and protocols implemented by the society for worldwide Inter-bank Financial Telecommunications (SWIFT) and the Real time gross settlement system (RTGS)--have made co-ordination easy [Schmidt, 2000]. Thus, it is only necessary to identify gross payments made to settle individual foreign exchange transactions in order to enforce taxation of offshore payment netting systems and taxation of implicit payments underlying derivative payments.

The Tobin tax should be supplemented by other measures aimed at reducing the power of international financial markets because it would not stop major speculative attacks on a given currency. A country could consider the experience of Chile, where foreign investors' are required to keep a portion of the inflow, without interest, with the central bank for a specified period of time. Other features include: a diversified financial system, large direct foreign investment, and a gradual process. Foreign direct investment, in contrast to debt-creating inflows, is often regarded as providing a safer and more stable way to finance development because it refers to ownership and control of plant, equipment, and infrastructure. In the event of a crisis, investors can divest themselves of domestic securities, and banks can refuse to roll over loans; however, owners of physical capital cannot easily find buyers.

Fifth, in the presence of a potential huge capital outflow, a country could consider some degree of capital control, because temporary capital controls may bring positive net benefits in those circumstances. As Loxley (1999) pointed out, the costs of a serious crisis like Thailand's crisis of 1997/98 may be higher than the costs of any resulting distortions due to capital control. In fact, the capital control policy pursued by Malaysia in the aftermath of the crisis can be taken as an example, should such a crisis occur. It should be noted that Malaysia was the only country that did not borrow from the IMF, perhaps because of its timely decision on capital control.

Sixth, a social safety net playing a "built-in" stability role is more important for a country that relies on foreign capital than for one that relies on domestic resources. In other

words, when the economy faces a downturn, transfer payments should go up and taxes should decrease. A capital receiving country can easily pursue a counter-cyclical fiscal policy because the government should be able to save more during a boom period without affecting private sector saving, and consumers may spend a bit less than they otherwise would.⁶⁶ These savings would dampen economic activity during the boom period and, the excess saving may be used during the period of economic slowdown.

Finally, the applicability of new classical tools such as “laissez faire” may not be a good idea for a capital dependent country in the long-term. In other words, financing economic growth through foreign capital requires careful monitoring by all quarters, including private agents, domestic authorities, and international institutions.

6.4 Conclusions and Topics for Further Study

Growth strategies, balanced versus unbalanced,⁶⁷ play a central role in the economic development of a developing country, where markets, particularly the capital market, is far from perfect for various reasons: immature capital market, asymmetric information, and lack of economic literacy. This study argues that a balanced strategy is superior to its unbalanced counterpart for a developing country like Thailand, where the domestic savings rate was quite high.

⁶⁶ This policy proposal is a bit more specific to our analysis (in Chapter 4) regarding Thailand; a country should first examine the applicability of the Ricardian equivalence hypothesis before pursuing this policy.

In other words, a balance should be made between the various sectors of the economy: agriculture, manufacturing, service and information, between long and short-term goals, and between domestic and international economic climate in order to achieve sustainable growth. Although an unbalanced growth strategy may lead to a higher short term growth rate by over-investing in directly productive activities (DPA) over social overhead capital (SOC) or otherwise, much of its success would depend on the external economic climate. Because an external climate may not be favourable to national development and often depends on political conditions elsewhere, policymakers of dependent capitalist countries should not rely on such an approach. Moreover, a low and sustainable growth rate appears to be better than a rapid but volatile one in terms of various development indexes such as income distribution and poverty alleviation. The only viable alternative to a balanced growth strategy for a national economy is the pursuance of a balanced growth approach by the global economy, because over-investment in a certain sector of a country can be supplemented by an under-investment by another country. This study argues that a balanced approach should be made across countries not only regarding economic growth but also regarding issues such as self-esteem, freedom, status, or title. For this kind of global co-operation to take place, a concerted effort will be needed from all quarters.

Furthermore, the mainstream economic theories (monetarists/rational expectation) should be applied carefully because these theories consider speculation as a factor of stabilization. In other words, assuming financial markets work like a Walrasian market, where unique, stable and competitive equilibrium exists, one can show that speculators work like a stabilizer: they sell when the existing price is higher than the equilibrium

67 For details, see Mahtur (1966), Hirschman (1956), Nurkse (1953) and Fleming (1955).

price, and they buy when the existing price is lower than the equilibrium price. However, empirical evidence and the theoretical literature based on multiple equilibriums do not support this view; in fact, in the presence of multiple equilibriums speculative acts can be highly destabilizing. Imperfect markets and incomplete markets, characteristics of developing countries, often create the scope for multiple equilibriums [Farmer, 2000].

Like global warming and climate change, a financial crisis has a global dimension, which should not be ignored. A crisis in one country may bring positive impacts to the economy of another country in the short run (booming US economy in the aftermath of the crisis); however, in the long run everyone may suffer economically, socially, and politically.

Keeping this in mind, every institution should play an appropriate role in crisis prevention, as well as in protecting nations from damage should a crisis occur. Perhaps the creation of a strong international financial institution such as a World Central Bank should be on the agenda of the global community [Loxley, 2000].

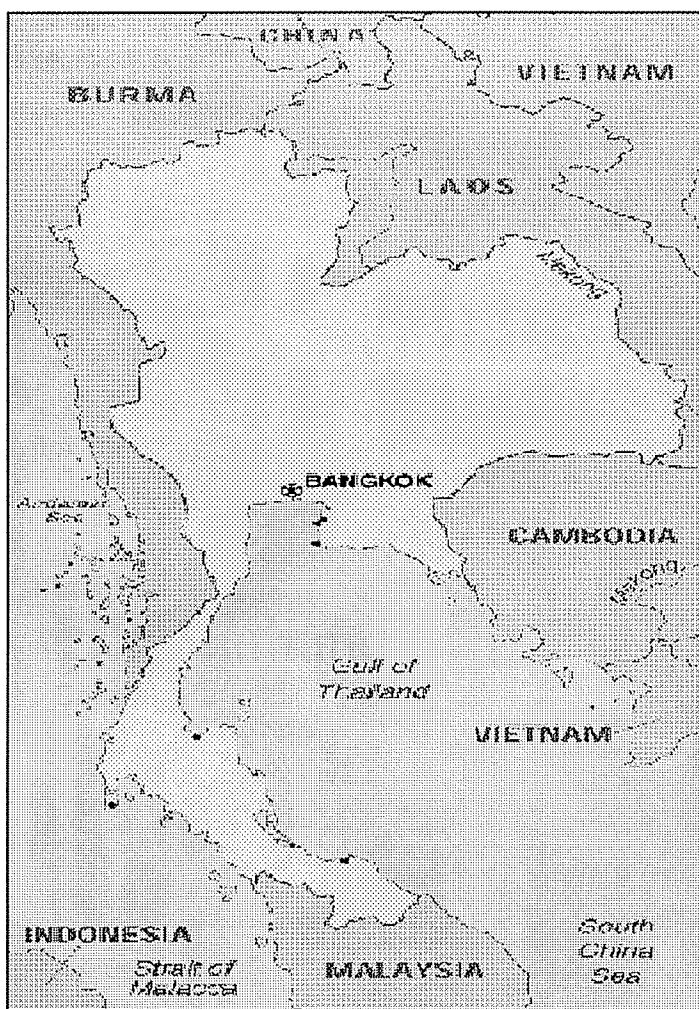
Finally, further research should continue to unearth the causes of financial crisis wherever it takes place, so that appropriate policies can be designed, first of all to prevent such crises from occurring, and in case they do occur, to contain their adverse effects. Future research could take this study further in several ways, one of which is to conduct an analysis of consumption and investment using micro data. Microfoundation could be revisited to examine whether or not there is any significant difference between developing and developed countries and/or between Asian economies and Western economies regarding consumers and investors behaviour.

Another potential area of exploration is the relative impact of the crisis on human and non-human capital. Over-investment in human capital might not be as damaging economically as over-investment in non-human capital. According to new growth theorists, if investment is directed towards knowledge (research and development, education) it will not be subject to the law of diminishing returns.

Distributional impacts (both size, and functional distribution of income) could be explored to analyze the impact of the crisis on the poverty index. The socio-cultural aspects that differentiate East Asian economies from those of the rest of the industrialized nations may be another interesting area to explore.

Appendix A

Country Profile



Area: 514,000 sq km

Population: 61,797,751

Per capita GDP (2000 Est. PPP (US \$): 6,700

Life expectancy at birth: 69 years

Natural resources: tin, rubber, natural gas, tungsten, tantalum, timber, lead, fish, gypsum, lignite, fluorite, arable land

A unified Thai kingdom was established in the mid-14th century; it was named as Siam until 1939. Thailand is the only Southeast Asian country never to have been taken over by a European power. A bloodless revolution in 1932 led to a constitutional monarchy.

Source: <http://www.countryreports.org>

Appendix B

Chronology of the Crisis

July 2, 1997

The Bank of Thailand floated the baht and raised the discount rate by 2.5%, to 12.5%, because the baht was being sold by foreign investors. By the end of the day, the currency devalued 18%, from 25 baht per US \$ to 30 baht per US \$.

August 5, 1997

Thailand's government announced the acceptance of an IMF bailout plan with a credit line of \$15 billion. The plan included increasing the national value-added tax to 10% from 7%, cutting the national budget, holding inflation to a maximum of 9%, and whittling the current account deficit to 5% of GDP from the previous year's 8.2%.

In mid-August, Thai authorities and the IMF announced mutually-agreed-upon economic adjustment programs, which included tight monetary and fiscal policies and financial sector restructuring (i.e., suspension of an additional 42 finance companies, totaling 58).

August 21, 1997

The IMF approved a \$16.7 billion rescue package, requiring the central bank to stop intervening in the operations of troubled financial institutions, to tighten the classification of non-performing loans, and to reveal the size of reserves every two weeks.

Foreign reserves dropped to \$27.9 billion in mid-August. They subsequently fell to 25.9 billion dollars during the last two weeks of August despite an estimated \$1.6 billion cash injection from IMF. Another 42 finance companies were closed.

Late August

The central bank committed \$23.4 billion to forward contracts in order to defend the baht against currency speculators.

September 1997

By September the SET had fallen almost 30% since July.

October 1997

On October 14, in compliance with IMF conditions, the Thai authorities announced plans to rehabilitate the Thai financial system and establish the Financial Restructuring Agency (FRA) and the Asset Management Corporation (AMC). The major task of the FRA was to decide which of the 58 suspended finance companies should be reopened or closed.

November 1997

The APEC summit in Vancouver: 18 governments endorse plans to deal with further regional shocks in Southeast Asia under the leadership of the IMF.

Thai Premier Chavalit Yongchaiyudh resigned in November 1997 and was succeeded by Chuan Leekpai.

December 1997

The Thai government took steps to close 56 non-bank financial firms. This was the first time any licensed lenders had been allowed to fail in Thailand.

Sources: www.bot.or.th, www.imf.org/external, various issues of *Business Week*, *the Economist*, and *the Far Eastern Economic Review* in 1997.

Appendix C

Selected Sections of the First Letter of Intent (LOI)⁶⁸

The following are selections from the First Letter of Intent (LOI) of the government of Thailand to the International Monetary Fund (IMF). The LOIs describe the policies that Thailand intended to implement in the context of its request for financial support from the IMF.

Fiscal Policy

“Our program targets an improvement in the balance of the consolidated public sector, from a deficit of 1.6 percent of GDP in 1996/97 to a surplus of 1 percent of GDP in 1997/98, thus providing a full offset to estimated implicit financial restructuring costs in 1997/98, consistent with our policy. Improvements in the financial positions of both the central government and the state enterprises are envisaged, the former supported by expenditure restraint and revenue measures, the latter by increases in public enterprise prices and cuts in lower-priority investment projects consistent with World Bank and international feasibility standards.”

“For the central government, our program targets an improvement in its balance of 2 percent of GDP in the first year, to a surplus of 1 percent of GDP in 1997/98 (on a GFS basis). The corresponding cash surplus of B 69.8 billion on a treasury accounts basis (excluding amortization) will be a performance criterion under the program. Given the

68 For details of this, and other LOIs, see www.bot.or.th or www.imf.org/external.

cyclical reduction in revenues, this will require measures of about 2.8 percent of GDP.

On the expenditure side, our measures will be secured through strict control of the disbursement rate--the ratio of actual disbursements to authorized expenditure in the budget--and the amount of carryover expenditure from previous years, which will be fixed in nominal terms. On the revenue side, the government has implemented an increase in the VAT rate from 7 percent to 10 percent, effective August 16, 1997, and this is expected to yield nearly 1 ¼ percent of GDP in additional revenues on a full-year basis."

Monetary Policy

"Following the float of the currency, a new framework for monetary policy is being introduced. In the short run, policies will be centered on stabilizing conditions in the exchange market. While we believe that the overall policy package will be sufficient to quickly stabilize the exchange rate, we will allow the rate to adjust flexibly and we will not seek to defend any particular rate in the face of sustained market pressures.

Intervention in the market will be limited to smoothing fluctuations, consistent with the quarterly floors on net international reserves set out as performance criteria under the program."

Appendix D

Reference: Data Table

Note: Reported for the period of 1990-98

Source: www.bot.or.th

Table 1D: External Debt
(Millions of US\$)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Public Sector	11,515	12,810	13,068	14,171	15,715	16,402	16,801	24,082	31,578
Long-term	11,258	12,105	12,518	14,171	15,535	16,317	16,747	24,062	31,428
Short-term	257	705	550	-	180	85	54	20	150
Private Sector	17,793	25,068	30,553	37,936	49,152	84,430	91,941	85,194	73,484
Long-term	7,633	10,382	12,189	15,302	20,153	32,117	44,252	46,920	45,213
Short-term	10,160	14,686	18,364	22,634	28,999	52,313	47,689	38,274	28,271
Total	29,308	37,878	43,621	52,107	64,867	100,832	108,742	109,276	105,062
Long-term	18,891	22,487	24,707	29,473	35,688	48,434	60,999	70,982	76,641
Short-term	10,417	15,391	18,914	22,634	29,179	52,398	47,743	38,294	28,421
Debt / GDP (%)	34.3	38.5	39.1	41.6	44.9	60.0	59.7	70.1	93.2
International reserves									
Short-term debt (%)	137.0	119.7	112.0	112.4	103.8	70.7	81.1	70.4	103.9
Debt Service Payments	3,284	3,854	4,727	5,437	6,707	8,253	9,024	11,629	14,430
Export of goods and services	30,279	36,592	41,983	48,735	57,580	72,287	73,497	74,169	67,518
Debt service ratio (%)	10.8	10.5	11.3	11.2	11.7	11.4	12.3	15.7	21.4
Public sector	5.9	4.2	3.7	3.7	3.4	2.8	2.5	2.7	3.3
Private sector	4.9	6.3	7.6	7.5	8.3	8.6	9.8	13.0	18.1

Note:

Short-term external debt is defined as debt that has an original maturity of one year or less.

Table 2D : Bangkok International Banking Facilities' (BIBF's) Lending

(Millions of Baht)						
End of Period	1993	1994	199	1996	1997	1998
Out-In	197,024.4	456,643.0	680,517.	807,633.2	1,411,362.9	767,029.4
Thai Banks	126,690.9	189,826.3	254,561.	330,040.2	514,058.1	213,504.1
Foreign Banks with Full Branch(es) in Thailand	50,768.1	102,249.1	152,370.	222,794.9	690,449.9	431,931.1
Other BIBF Units	19,565.4	164,567.6	273,584.	254,798.1	206,854.9	121,594.2
Out-Out	3,789.2	100,833.2	517,044.	482,558.5	471,081.7	148,493.7
Thai Banks	2,563.2	11,587.5	10,818.	16,318.0	35,363.0	28,982.1
Foreign Banks with Full Branch(es) in Thailand	348.2	1,996.3	4,847.	9,363.3	264,348.3	89,131.7
Other BIBF Units	877.8	87,249.4	501,378.	456,877.2	171,370.4	30,379.9
Total	200,813.6	557,476.2	1,197,561.	1,290,191.7	1,882,444.6	915,523.1
Thai Banks	129,254.1	201,413.8	265,380.	346,358.2	549,421.1	242,486.2
Foreign Banks with Full Branch(es) in Thailand	51,116.3	104,245.4	157,218.	232,158.2	954,798.2	521,062.8
Other BIBF Units	20,443.2	251,817.0	774,962.	711,675.3	378,225.3	151,974.1

Table 3D : Operation of Commercial Banks
Billions of Baht

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Sources of Fund	1,789.6	2,147.6	2,528.1	3,171.6	4,024.8	5,013.7	5,626.7	7,397.1	7,153.6
Deposits	1,426.0	1,730.6	2,010.6	2,397.3	2,710.6	3,203.6	3,643.3	4,224.7	4,595.9
(% Change per year)	27.5	21.4	16.2	19.2	13.1	18.2	13.7	16.0	8.8
Borrowings from Bot	42.4	37.6	36.3	21.2	13.7	14.7	24.6	313.1	154.5
Rediscount	22.2	23.7	26.1	16.6	6.5	8.8	8.8	n.a.	n.a.
Loans	20.2	13.9	10.2	4.6	7.2	5.9	15.8	n.a.	n.a.
Foreign Liabilities	109.8	123.9	167.6	352.4	780.0	1,164.1	1,249.3	1,904.4	1,066.2
Bor. From other Fin. Inst.	15.4	10.4	14.9	20.0	55.9	86.3	85.7	118.2	56.9
Capital Accounts	111.3	143.5	170.2	222.4	306.4	394.9	509.9	540.2	498.5
Other Liabilities	84.7	101.6	128.5	158.3	158.2	150.1	113.9	296.5	781.6
Uses of Fund	1,789.6	2,147.6	2,528.1	3,171.6	4,024.8	5,013.7	5,626.7	7,397.1	7,153.6
Claims on Private Credit	1,479.0	1,789.7	2,161.7	2,662.9	3,463.3	4,300.9	4,911.4	6,060.9	5,472.7
(% Change per year)	33.5	21.0	20.8	23.2	30.1	24.2	14.2	23.4	-9.7
Private Credit (Excluding BIBF)				2,465.9	3,006.7	3,620.4	4,103.8	4,649.3	4,705.7
(% Change per year)					21.9	20.4	13.4	13.3	1.2
BIBF (Out-In)				197.0	456.6	680.5	807.6	1,411.6	767.0
(% Change per year)					131.8	49.0	18.7	74.8	-45.7
Claims on Nonfinancial public enterprises	18.2	47.7	53.2	76.5	94.2	108.4	112.7	99.9	108.5
Investm. In Gov'T Securities	117.2	84.3	67.4	47.8	35.2	28.4	36.7	40.7	172.7
Bonds	109.2	81.0	67.4	47.8	35.2	22.1	6.2	7.6	154.2
Treasury Bills	0.0	0.0	0.0						
BOT Bonds	8.0	3.3	0.0			6.3	18.7	11.2	7.5
FIDF Bonds	0.0	0.0	0.0				11.8	21.9	11.0
Foreign Assets	56.4	72.6	77.7	157.5	169.1	235.9	180.0	409.4	462.5
Cash on Hand & Balance at Bot	43.6	57.2	60.9	73.4	79.4	111.5	136.4	127.6	127.2
Other Assets after Adjusted	75.2	96.1	107.2	153.5	183.6	228.6	249.5	658.6	810.0

Table 4D: Exports by Country (Millions of US\$)

	1993	199	1995	1996	199	1998
Japan	6,326	7,75	9,526	9,417	8,85	7,467
NAFTA	8,631	10,23	10,783	10,733	12,14	13,053
Canada	518	57	617	603	63	617
Mexico	88	11	53	71	14	271
USA	8,023	9,54	10,112	10,061	11,36	12,164
EU	6,492	7,10	8,558	8,959	9,30	9,717
Austria	110	10	82	87	10	99
Belgium	582	65	747	801	88	776
Denmark	113	13	172	190	23	233
Finland	59	7	89	122	13	140
France	775	81	982	998	93	881
Germany	1,487	1,59	1,646	1,619	1,44	1,555
Greece	46	4	74	75	9	97
Ireland	18	2	80	165	20	186
Italy	464	47	576	574	62	702
Luxembourg	2		0	0		2
Netherlands	1,161	1,26	1,809	1,798	1,86	2,180
Portugal	74	7	78	103	11	124
Spain	273	30	453	420	42	423
Sweden	137	15	149	162	17	194
United Kingdom	1,194	1,34	1,627	1,845	2,06	2,120
ASEAN	5,764	8,01	10,812	10,481	11,09	8,258
Brunei Darussalam	37	4	64	73	6	50
Indonesia	204	44	813	969	1,25	983
Malaysia	846	1,10	1,562	2,024	2,52	1,780
Philippines	200	22	416	635	71	745
Singapore	4,478	6,19	7,956	6,781	6,52	4,698
Cambodia	180	26	335	363	31	301
Laos	175	29	357	364	38	374
Myanmar	154	23	349	320	41	348
Vietnam	117	25	471	581	54	592
Middle East	1,690	1,67	2,574	2,170	1,98	1,901
Eastern Europe	510	45	757	288	32	232
Australia	515	64	781	845	94	980
China	542	93	1,650	1,879	1,77	1,767
Hong Kong	1,967	2,39	2,934	3,255	3,47	2,780
Korea, South	463	57	805	1,019	1,02	628
Nigeria	75	5	59	138	21	188
Russia	254	30	405	158	11	66
Switzerland	354	38	492	445	49	580
Taiwan	742	98	1,359	1,429	1,59	1,742
Others	2,182	2,87	3,715	3,143	3,41	3,483
Total exports	37,125	45,43	56,725	55,987	58,43	54,460

Table 5D : Import by Country
(Millions of US\$)

	1993	1994	1995	1996	1997	1998
Imports						
Japan	13,938	16,406	21,607	20,423	16,272	10,032
NAFTA	5,848	6,897	9,156	9,723	9,352	6,340
Canada	426	390	479	545	418	258
Mexico	60	75	181	154	202	124
United states of America	5,362	6,433	8,494	9,028	8,734	5,959
EU	6,793	7,375	10,223	10,885	8,908	5,278
ASEAN	5,411	7,053	8,931	9,329	7,736	6,045
Brunei Darussalam	214	181	288	213	88	21
Indonesia	379	451	672	938	891	887
Malaysia	1,672	2,635	3,232	3,601	3,038	2,171
Philippines	179	352	579	574	553	616
Singapore	2,966	3,432	4,159	3,998	3,169	2,351
Cambodia	95	126	160	49	80	23
Laos	63	69	70	68	61	31
Myanmar	156	155	221	129	86	65
Vietnam	85	40	42	65	176	233
Middle East	1,529	1,981	2,691	4,092	4,616	3,335
Eastern Europe	390	385	220	379	324	113
Australia	950	1,076	1,318	1,399	1,295	886
China	1,087	1,386	2,094	1,950	2,276	1,800
Hong Kong	535	688	746	853	823	755
Korea, South	1,946	1,974	2,472	2,681	2,266	1,477
Nigeria	0	0	19	14	10	8
Russia	626	946	1,303	894	600	114
Switzerland	574	752	979	953	793	540
Taiwan	2,333	2,753	3,417	3,142	2,882	2,211
Others	3,633	4,278	5,052	5,215	4,731	3,111
Total imports	45,994	54,338	70,719	72,248	63,285	42,402

Table 6D: Industrial Capacity Utilization by Product Group
(Percent)

	1995	199	1997	1998
Capacity utilization				
Total	77.4	72.	64.8	52.8
Total (exclude liquor)	76.3	71.	63.2	50.3
Food	41.5	37.	37.4	33.3
Beverage	82.3	83.	79.1	77.2
Tobacco	75.2	84.	75.8	60.4
Construction materials	97.3	78.	72.9	44.6
Iron & steel products	64.2	65.	50.6	35.6
Electronic & electrical products	63.9	67.	62.2	47.5
T.V.	59.3	63.	48.3	36.5
Integrated circuit	74.8	79.	95.5	73.7
Others	80.0	77.	66.1	68.9

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