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Investment Cycles, Economic Recovery and Monetary Policy*

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The views expressed in this paper are those of the authors and do not necessarily represent those of the BOT.

Abstract

This paper seeks to answer two main questions. First, given a relatively small contribution of private investment to output growth at present, will the recovery of output be anemic? And second, if private investment is crucial to sustainable output growth, what more could Thailand do to enhance private investment at this juncture?

The paper is organized into three chapters. Chapter I explores the movements or cycles of output and private investment over the past few decades and assesses the importance of private investment as a contributor to output growth. Not only so, this chapter provides insights into what took place during the 1990s, focusing in particular on the deterioration of investment efficiency in the period leading up to the 1997 crisis. Chapter II investigates the various determinants of private investment, specifically, returns on investment, cost of investment, availability of financing, and the "confidence" factor. It also provides forecasts of private investment based on a range of plausible scenarios of its determinants. Finally, Chapter III offers some policy suggestions for sustainable private investment growth.

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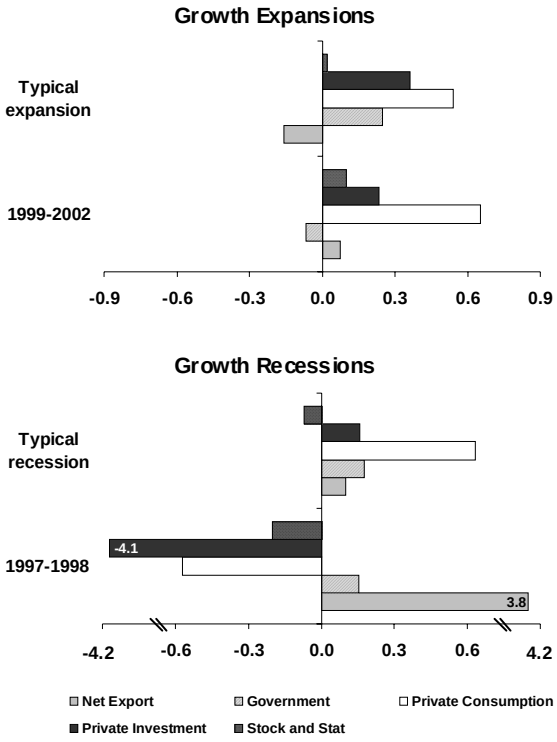
Introduction

Thailand experienced an unprecedented post-World War II recession in 1997 and 1998, and the recession was certainly atypical in more than one way. Unlike previous economic slowdowns during which output growth moderated but nevertheless remained positive, output actually contracted, implying negative growth, in 1997 and 1998. Not only so, the economy saw a very sharp fall in private investment, with its negative impact on output growth as large as four times the rate of output contraction.

After two years of output retrenchment, the Thai economy began to rebound in 1999. This upturn is also quite different by historical standard, with one obvious feature being a particularly large contribution to output growth from private consumption. There are two major explanations for that. First, there is a more limited role for direct government spending given the need to consolidate the fiscal position in light of medium-term sustainability. Second, private investment has thus far contributed relatively less to the recovery. While average contribution from private investment is around 36 percent in a typical expansion, it has been only 24 percent in the current recovery. This is consistent with the observation that the ratio of real private investment to real output has remained strikingly low. The ratio, which fell sharply from 32 percent in 1996 to 12 percent in 1998, has since recovered very modestly to about 14 percent. The figure is also low in comparison to the pre-bubble average[1] of about 26 percent.

Figure 1: Contributions Relative to Output Growth*



* Unweighted average
Notes: Contributions of changes in inventories are assumed to equal zero for 1959-1960, and contributions of statistical discrepancies are assumed to equal zero for 1959-1970.
Source: Authors' calculations

One question that is often raised both domestically and abroad when the role of private investment is considered small is: will the recovery of output be anemic if private investment remains weak for a long time? In order to answer this question, we need first to understand the relationship between output and private investment. Therefore, **Chapter I** of this paper explores the movements or cycles of output and private investment over the past few decades and assesses the importance of private investment as a contributor to output growth. Not only so, this chapter provides insights into what took place during the 1990s, focusing in particular on the deterioration of investment efficiency in the period leading up to the 1997 crisis. **Chapter II** moves on to

[1] Average for 1987-1989

investigate the various determinants of private investment, specifically, returns on investment, cost of investment, availability of financing, and the "confidence" factor. This chapter also provides forecasts of private investment based on a range of possible scenarios of its determinants. Finally in **Chapter III** we ask the question: if private investment is important to sustainable growth, what more could Thailand do to enhance private investment at this juncture? We look not only at the role of monetary policy but also at the role of other public policies.

Chapter I
Understanding the Historical Role of Private Investment

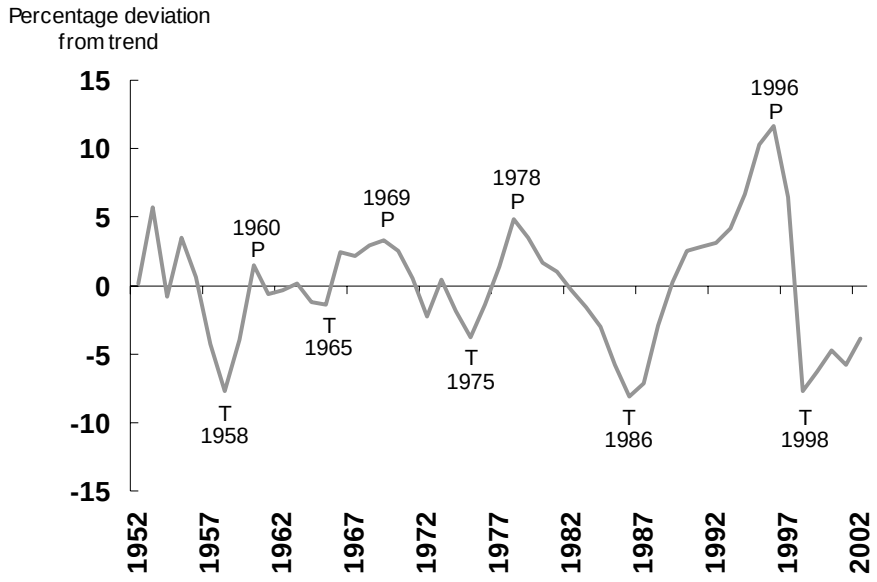
This chapter is organized into five sections to answer the following questions in respective order: (1) what do output cycles look like in Thailand over the past 4-5 decades; (2) given those output cycles, how important has private investment been as a source of output growth; (3) provided that private investment contributes significantly to output growth, what do we know about previous private investment cycles; and (4) to make the present recovery a quality one, what key lessons have been learned from experience. We argue in particular that a key mistake during the last private investment cycle was a loss of investment efficiency as a result of over-investment, and to avoid repeating that mistake, we suggest seven desirable traits for the present recovery.

I.1 Output Cycles

Business cycles are now known to be persistent features of market-oriented economies,[2] and the analysis of business cycles offers a useful starting point for the understanding of historical economic behaviors. Business cycles are defined in this paper, as appropriate for an emerging economy like Thailand where output growth is rarely negative, as fluctuations in economic activity around trend. Such identification of so-called **growth cycles**, however, depends on an arbitrary distinction between trend and cycle. Here we use Hodrick-Prescott (HP) filter as the de-trending method, and given that HP trend is sensitive at end-points, we make end-point adjustments using our medium-term economic forecasts provided in Appendix I. Discussions on the appropriateness of such adjustment can be found in the following section.

Thailand's output cycles since 1952 are depicted in Figure 2, with peaks (troughs) identified as local maxima (minima) that are at least two years away on both sides from adjacent troughs (peaks). According to these criteria, there have been four complete trough-to-trough output cycles since mid-1950s, with the present state of the economy experiencing an early stage of the fifth expansion that began in 1999.

Figure 2: Thailand's Output Cycles



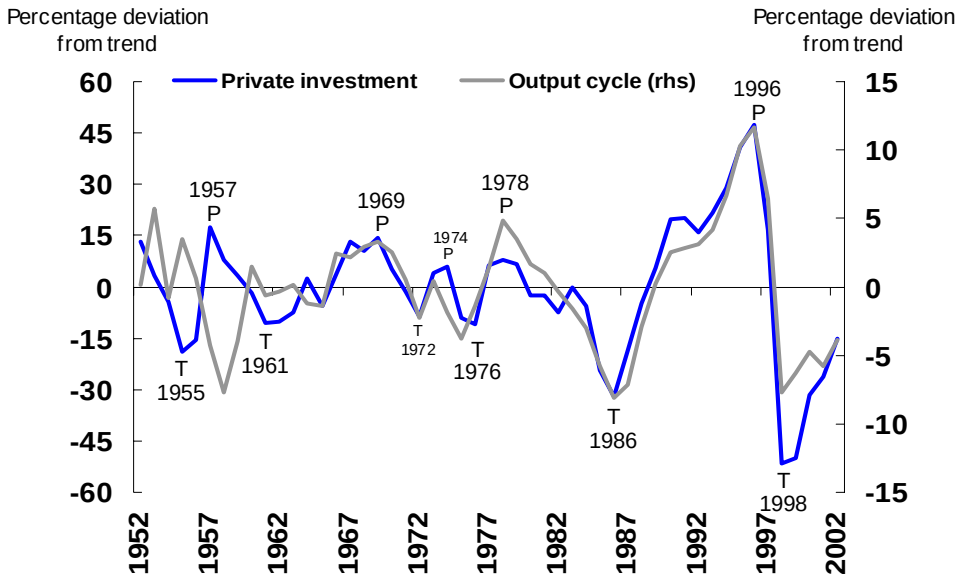
[2] International Monetary Fund, p. 104

I.2 Private Investment: Cycles and Contributions to Output Growth

Like output cycles, there seem to have been four major[3] private investment cycles since mid-1950s (Figure 3). A casual comparison between output cycles and private investment cycles reveals the following:

- Since 1966, output and private investment cycles have moved together—that is, their major turning points have coincided perfectly—except when output hit a trough in 1975 but private investment followed a year later. Prior to 1966, however, output and private investment cycles did not necessarily move together, perhaps reflecting in part the problem of data limitation in the early years of national accounts compilation.
- In percentage deviation from trend, private investment fluctuates by about four times as much as output.
- Cycles have become longer and more volatile, and recessions[4] have gotten increasingly deeper. This could reflect a combination of adverse shocks (such as the oil crisis in 1980-1981) and structural problems (such as huge current account deficits in the mid-1990s).
- The expansion phase[5] of 1987-1996 was strikingly long. In fact, of all trough-to-trough cycles since late 1950s, the fourth cycle was the only one where the expansion phase was longer than the recession phase. To the extent that there was an accumulation of economic imbalances over that period, especially in the 1990s, the long expansion undoubtedly contributed to the severity of the subsequent recession.

Figure 3: Thailand's Investment Cycles



[3] There were arguably a minor trough in 1972 and a minor peak in 1974. However, for the sake of keeping consistent with output cycles, these minor turning points are ignored.

[4] A recession is defined as years between an output peak and an output trough.

[5] An expansion is defined as years between an output trough and an output peak.

Summary statistics of past expansions and recessions, which confirm the above observations, are provided in Table 1. Notice also that the incremental capital-output ratio (ICOR) tends to rise over successive expansions, implying a deterioration in the marginal productivity of physical capital (MP_K) over the long run. On the one hand, this is expected as MP_K is likely to diminish with an accumulation of physical stock. On the other hand, however, since ICOR can be used as an indicator of relative efficiency in a cross-country comparison, it warrants attention and will be discussed in more detail in Section I.4.

Table 1: Growth Expansions and Recessions[1/]

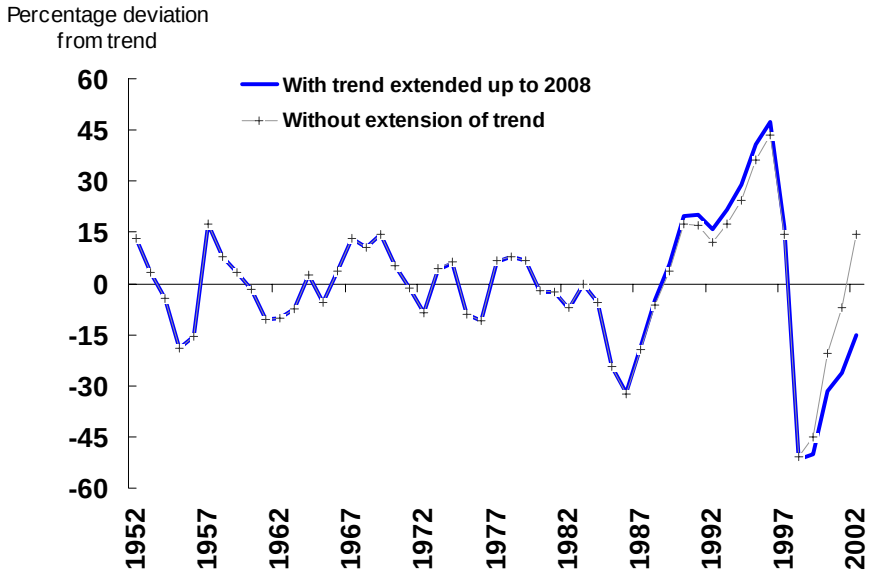
GROWTH EXPANSIONS	1959 -1960	1966 -1969	1976 -1978	1987 -1996	1999 -2002 [2/]
Average growth (%)					
Output	12.1	9.1	9.9	9.5	4.1
Investment	13.4	16.8	15.8	15.1	2.3
Private investment	8.3	17.7	12.5	15.9	7.9
Public investment	38.3	14.3	28.2	14.1	-6.3
Share in GDP (%)					
Investment	18.2	30.7	29.1	37.8	19.8
Private investment	14.1	22.4	21.5	30.6	12.6
Public investment	4.1	8.3	7.7	7.3	7.2
Deviation from trend at peak (%) [3/]					
Output	1.5	3.3	4.8	11.6	n/a
Investment	-5.2	15.6	9.4	41.2	n/a
Private investment	-1.6	14.4	7.7	47.3	n/a
Public investment	-6.6	18.7	16.1	32.5	n/a
Length of expansion (years)	2	4	3	10	4
Portion of years in expansion (%)	28.6	40.0	27.3	83.3	n/a
Average ICOR	1.7	3.8	3.2	4.6	5.9
S-I gap (% of GDP) [4/]			-4.3	-5.5	7.7

GROWTH RECESSIONS	1961 -1965	1970 -1975	1979 -1986	1997 -1998
Average growth (%)				
Output	7.2	5.8	5.4	-5.9
Investment	14.8	1.9	3.6	-32.4
Private investment	13.3	3.6	3.6	-41.4
Public investment	19.6	0.0	4.3	-9.3
Share in GDP (%)				
Investment	21.9	28.6	29.1	27.7
Private investment	15.9	22.1	20.7	17.4
Public investment	5.9	6.5	8.4	10.4
Deviation from trend at trough (%) [3/]				
Output	-1.4	-3.8	-8.1	-7.7
Investment	-1.6	-14.6	-25.9	-33.4
Private investment	-5.6	-9.0 [5/]	-32.0	-51.6
Public investment	8.5	-31.7	-4.2	3.0
Length of expansion (years)	5	6	8	2
Portion of years in expansion (%)	71.4	60.0	72.7	16.7
Average ICOR	3.3	5.7	5.7	-13.2
S-I gap (% of GDP) [4/]		-1.9	-5.0	6.0

1/ Shaded area represents an output phase which more or less coincides with a private investment phase. 2/ Not a complete cycle
3/ Measured in percentage deviation from trend 4/ For 1970-1979, S-I gap is calculated from its mirror image, the current account.
5/ The trough was actually in 1976, not 1975, with –11.0 percent deviation from trend.

Before we move on to discuss the importance of private investment as a source of output growth, let us deviate slightly to comment on two issues regarding private investment cycles: the appropriateness of **end-point adjustment** in the construction of trend, which ultimately affects the calculation of cycle, and the **usefulness of cycle identification** as a supplement to growth rate analysis.

Figure 4: Cycles and End-point Adjustments



On the **issue of end-point adjustment**, the natural question to ask is: how sensitive is the cycle identification to this manipulation? Figure 4 compares the cycles derived with and without the use of medium-term forecasts, and it is obvious that implications for the current recovery are quite different under the two scenarios. In particular, without the use of medium-term forecasts to help adjust the most recent trend, the derived cycles suggest that the current state of private investment is already above trend. This is unlikely to be correct given the following reasons:

- Capacity utilization continues to increase steadily (Figure 5), and with that firms should accelerate their acquisition of new machines.
- ICOR is trending down in the immediate run (Figure 6), and MP_K is likely to be on the rise. That is, returns on new investment are becoming more attractive and, again, firms should investment more, not less.

Figure 5: Industrial Capacity Utilization Rate

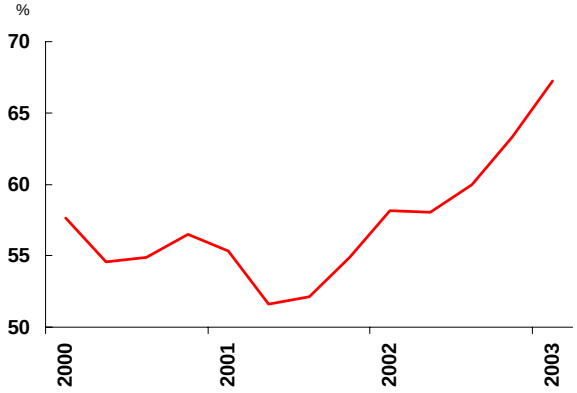
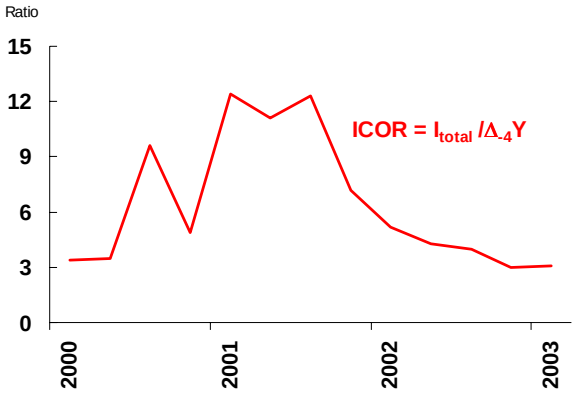


Figure 6: Incremental Capital Output Ratio

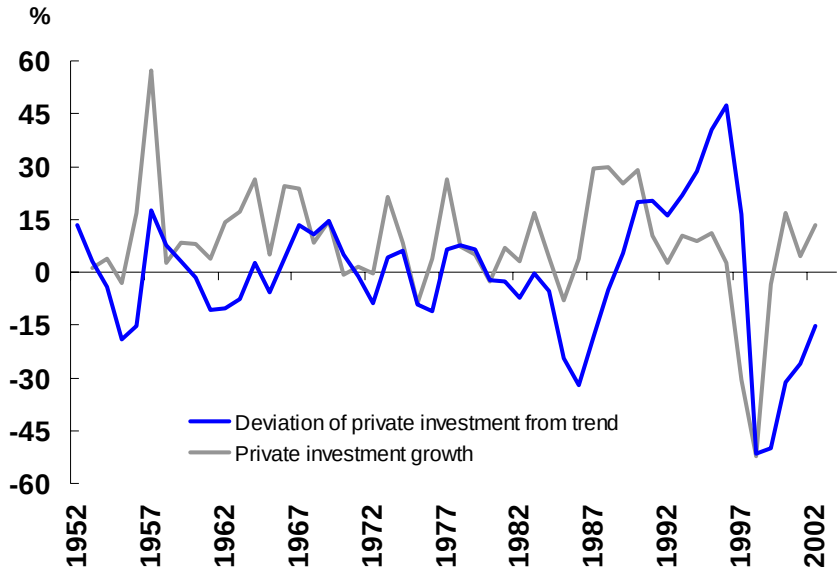


- Profitability of listed firms is improving. Not only that these firms are likely to have greater incentives to expand production, but a stronger financial position should also facilitate the funding of their new investment projects. Moreover, with interest rates trending down and inflation steady, real cost of capital is on a generally declining trend. It is becoming cheaper and easier to invest.
- Market confidence is positive, as reflected in the bullish stock market.

These factors will be assessed in more detail in Chapter II, but for now all seem to point toward a rising trend in private investment. Thus, a calculation of trend based on past observations alone would lead to an underestimation of trend and hence an overestimation of the cycle component. As a result, we believe that the use of medium-term forecasts to adjust the end-point of HP trend upward is justified and gives a more accurate picture of where we are in the current recovery cycle. Similar adjustments are done for output and other GDP components where appropriate.

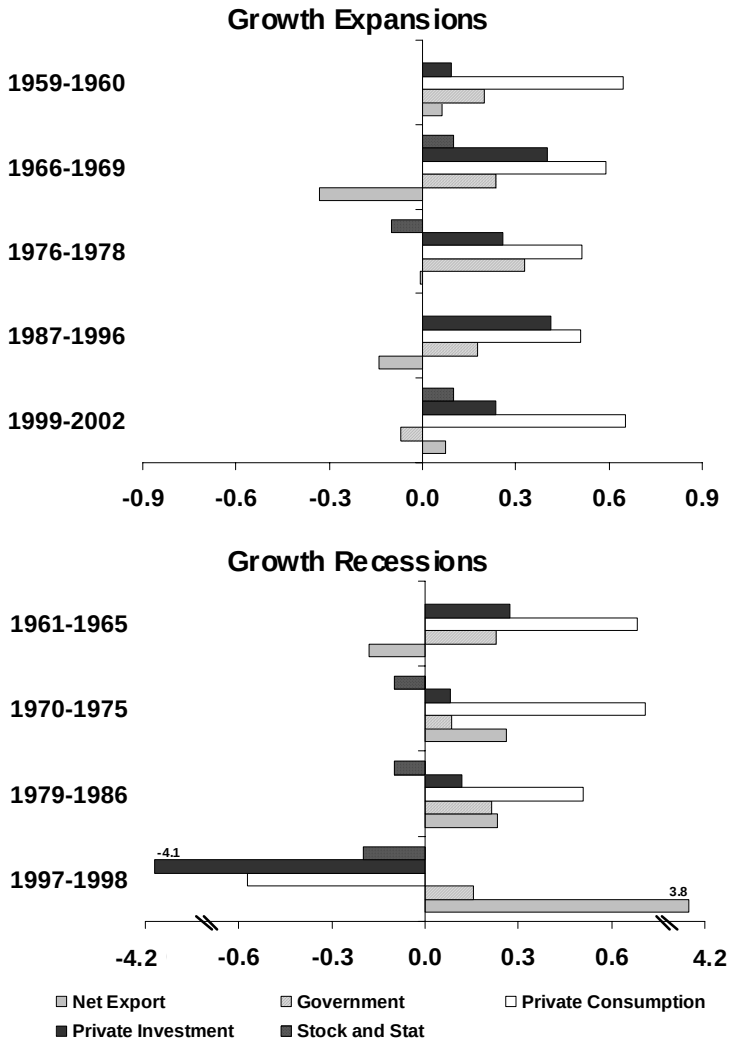
On the second issue of **why one should bother with business cycles**, we argue that looking at business cycles provides a good supplement to growth rate analysis. That is because growth rates reflect movements from both the cycle and trend components, but business cycles only look at the cycle component. Nevertheless, to the extent that there are few abrupt changes in economic trends, there is a clear tendency for cycles to move in line with growth rates (Figure 7). While our readers may be more familiar with the use of growth rate as an economic barometer, we suggest that attention be paid also to business cycles, for in many instances business cycles do make it a little easier to identify major turning points of the economy.

Figure 7: Private Investment Growth and Cycles



Let us now return to the most important issue of this section: **how important is private investment as a contributor to output growth?** To answer this, we must first keep in mind that the contribution of any GDP component may not be symmetric between an expansion and a recession. Therefore, our analysis will look at expansions and recessions separately, with the phases identified according to Section I.1. Figure 8 depicts contributions to growth of each GDP component, and Table 2 compares the previous recession and current recovery with typical recession and expansion phases, respectively.

Figure 8: Contributions Relative to Output Growth*



* Unweighted average
Notes: Contributions of changes in inventories are assumed to equal zero for 1959-1960, and contributions of statistical discrepancies are assumed to equal zero for 1959-1970.
Source: Authors' calculations

Table 2: Contributions Relative to Output Growth[1/]

	Net export	Government	Private consumption	Private investment	Stock accumulation and statistical discrepancies
Typical expansion[2/]	-0.16	0.25	0.54	0.36	0.02
1999-2002	0.08	-0.07	0.65	0.24	0.10
Typical recession[3/]	0.10	0.18	0.63	0.16	-0.07
1997-1998[4/]	3.77	0.15	-0.57	-4.13	-0.20

[1/] Unweighted average
[2/] Average of three cycles: 1966-1969, 1976-1978, and 1987-1996
[3/] Average of three cycles: 1961-1965, 1970-1975, and 1979-1986
[4/] Contributions add up to –1 to reflect negative output growth during that period

Private consumption has generally been the most significant contributor to output growth, with its contributions accounting for over half of output growth on average. In an expansion, private consumption supports output growth, but its role is even more important in a recession. That is, private consumption seems to help shore up aggregate demand during a recession, given that its contribution to output growth is somewhat larger in a typical recession than in a typical expansion.

Contributions of **private investment** to output growth are *asymmetric* between expansions and recessions. With private investment contributing on average about 36 percent to output growth during a typical expansion and only 16 percent during a typical recession, private investment tends to weigh down output growth in a recession and, together with **changes in inventories**[6] whose contributions always turn negative in economic downturns, largely accounts for growth declines during recessions. This was particularly true for the recession of 1997-1998 when the negative contribution of private investment overwhelmed output contraction by as much as four times.

Government spending[7] has by and large been pro-cyclical, moving in the same direction as output because the budget allocation is usually affected by government revenue forecast. As a result, contributions of government spending to output growth tend to be larger in typical expansions than in typical recessions.[8] This is in contrast with what has been observed in industrialized countries, where government spending plays a counter-cyclical role. Nonetheless, contributions of **net export** to output growth do seem to be counter-cyclical, as found in industrialized countries,[9] and hence unsurprisingly it was net export that played a vital role in mitigating the severity of the 1997-1998 recession.

Such analysis of contributions to output growth distinguishes the current recovery from previous expansions. In particular, present contribution of private consumption to output growth is considered quite large by historical standard, and this confirms many economists' belief that the current recovery is leaning rather heavily on private consumption. There are two main explanations for that. First, given the need to consolidate the fiscal position for medium-term sustainability, there is a relatively limited role for direct government spending at present. Moreover, the recent bureaucracy reform has caused some delay in fiscal disbursement. As a result, contribution of government spending has been negative, arising for the most part from a contraction in public investment. Second, private investment has thus far contributed relatively less to the recovery. Specifically, its contribution to output growth is only 24 percent or just two-thirds of what should be in an expansion.

One could ask whether or not such low contribution of private investment is due to the fact that the current recovery is still in an early stage and that contribution of private investment to output growth is typically smaller at the beginning of each recovery phase. The answer is negative, for average contribution of private investment during the first four years of the previous expansion was as high as 59 percent, compared to 41 percent over the entire phase. This implies that contribution of private investment was, on the contrary, even larger in the early stage of that recovery.

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[6] Implicitly assuming that contributions of statistical discrepancies average out to around zero over a period of many years.

[7] Including government consumption and government investment.

[8] Total contribution of public spending to output growth was negative for the period 1997-1998, due to a sharp contraction of public investment in 1998. However, when calculated *relative* to output growth, total contribution was positive because the contribution of public investment, which continued to expand by 10.2 percent in 1997, was considered very substantial relative to output that already contracted by 1.4 percent.

[9] International Monetary Fund, p. 120.

We thus conclude this section by reiterating that **private investment has traditionally been a thrust of output growth, second only to private consumption**. While private investment and private consumption *together* accounted for as much as 90 percent of output growth during the past three expansions and continue to do so in this expansion, their relative importance has changed considerably. Private investment now accounts for about a fourth of that combined contribution, as opposed to two-fifths previously. Given that investment involves the expansion of capital stock and thus has a long-lasting impact on output growth, especially in comparison to consumption, **it would certainly be beneficial to Thailand if private investment could play a more active role in this recovery.**

I.3 Salient Features of Past Private Investment Cycles

This section takes a closer look at past cycles of private investment with the aim to identify strengths and/or weaknesses of each so that meaningful lessons can be drawn for future policy considerations. In doing so, we first put these cycles in the context of major international and domestic events (Figure 9), while Table 3 provides corresponding summary statistics.

The past four cycles can be differentiated according to their focus of investment and financing as follows:

- **Cycle 1 (1956-1961)** – Private investment was complemented by public investment in basic infrastructure that was financed largely by government-to-government loans or loans from international organizations such as the World Bank.
- **Cycle 2 (1962-1976)** – Private investment stepped up in terms of share to output under government-supported import-substitution policy (National Development Plans 1 and 2) and was financed increasingly by domestic savings and, to some extent in the latter part of the cycle, foreign direct investment (FDI). Ironically, however, import substitution led to high demand for imported capital and hence a substantial deterioration in the current account balance. As the policy was subsequently deemed unsustainable, the government gradually switched to adopt a more outward-looking stance.
- **Cycle 3 (1977-1986)** – Private investment was channeled toward export-oriented industries as government policy shifted towards export promotion (Plans 4-5) and was financed to a large extent by long-term private external loans and FDI. Investment sentiment was occasionally affected by international and domestic turbulences, however.
- **Cycle 4 (1987-1998)** – This cycle benefited from two waves of private investment. After the Plaza Accord and the appreciation of Japanese yen, Thailand became one of the chosen locations for the transfer of industrial production bases from Japan and newly industrialized countries (NICs). Equity FDI inflow thus increased by over four-folds within just three years between 1987 and 1990. Then came the second wave of private investment, this round facilitated by financial liberalization of the early 1990s. With an influx of foreign loans—especially short-term loans—and market exuberance, as seen in the all-time peak of the stock market index and record land prices, private investment was propelled to the point of over-investment while external debt ballooned from 44 percent of GDP in 1991 to 66 percent in 1996.[10]

[10] Part of the increase was due to a more comprehensive survey of non-bank private debt for 1995 onwards.

Figure 9: Private Investment Cycles and Major Events

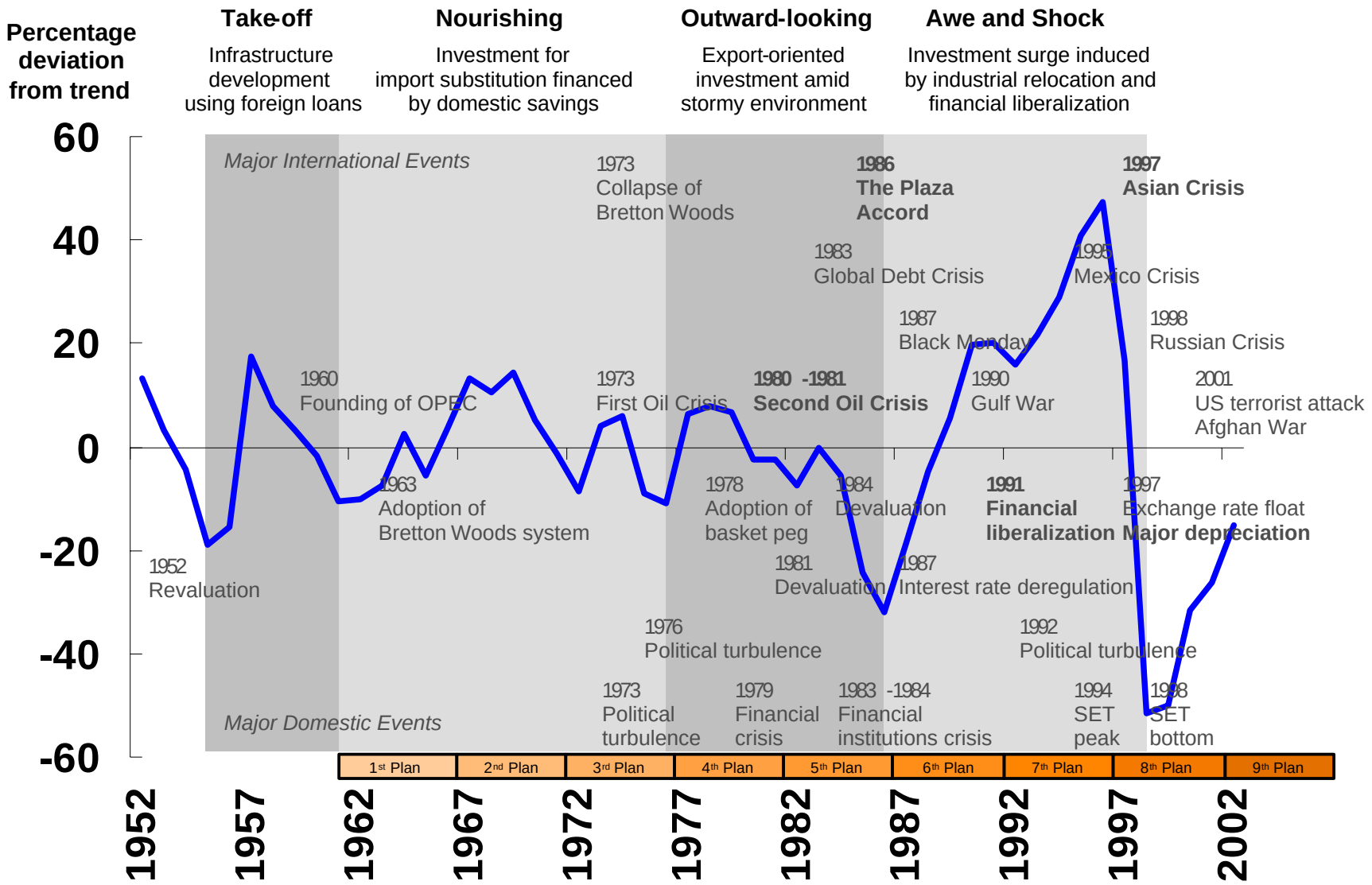


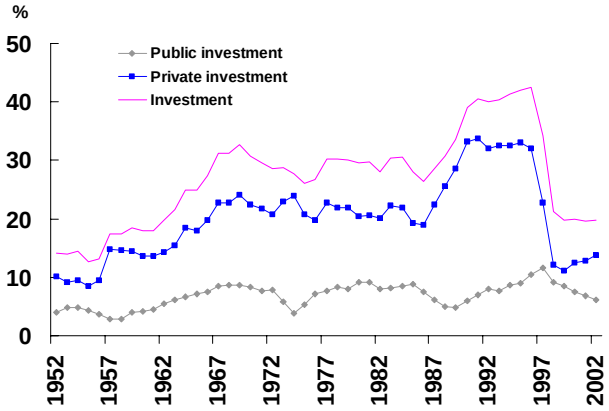
Table 3: Investment Cycles' Vital Statistics

	%Δ		% of GDP		% of I_{total}		% of I_p		% of GDP				ICOR
	GDP	I_{total}	I_p	I_g	I_p	I_g	Equip	Con	S_p	S_g	CA	Depre	
1956-1961	6.1	13.0	13.4	3.6	78.7	21.3	*	*	*	*	*	*	5.6
1962-1976	7.4	10.6	20.5	7.0	74.7	25.3	52.4	47.6	*	*	*	*	4.4
1977-1986	6.3	6.4	21.0	8.3	71.7	28.3	56.0	44.0	13.5	1.7	-5.0	7.7	5.2
1987-1998	6.9	7.2	28.4	7.8	78.5	21.5	58.9	41.1	13.9	8.9	-3.6	10.6	1.7[1/]
1999-2002[2/]	4.1	2.3	12.6	7.2	63.6	36.4	76.4	23.6	11.2[3/]	4.6[3/]	7.3	14.9[3/]	5.9

* Data not available
1/ ICOR turned negative in 1997-1998 due to a crash in output . Excluding these two exceptional years, the average ICOR would be 4.6.
2/ Not a complete cycle
3/ 1999-2001

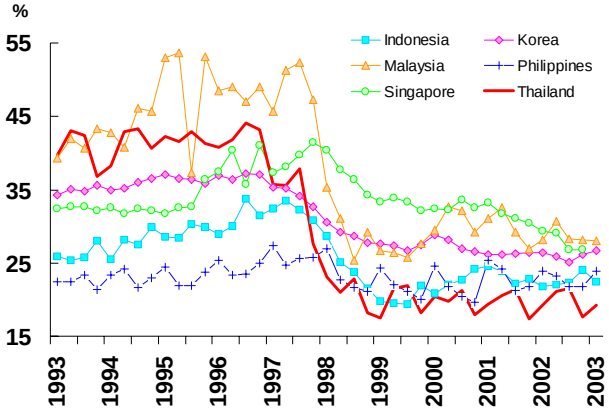
When comparing across past cycles, it could be seen that equipment investment has become increasingly important relative to construction investment over the years and especially since construction investment tumbled during the recession of 1997-1998. Moreover, the ratio of private investment to output rose markedly from a modest 13 percent in the first cycle to 28 percent in the fourth cycle,[11] whereas the ratio of public investment to output stayed at round 7-8 percent in all of the three most recent cycles. Thus, the remarkable increase in total investment relative to output, also known as the investment rate, was almost entirely due to private investment (Figure 10).

Figure 10: Ratio of Real Investment to Real GDP



Likewise, the sharp decline in the investment rate in 1997-1998 was attributable to private investment, and one lingering characteristic of the post-crisis period is the slow recovery of this rate as well as the level of real investment activity. Such sluggishness is no less obvious when compared to other crisis-stricken countries like South Korea. From a country with high investment rate by regional standard, Thailand is now a

Figure 11: Ratio of Real Total Investment to Real GDP

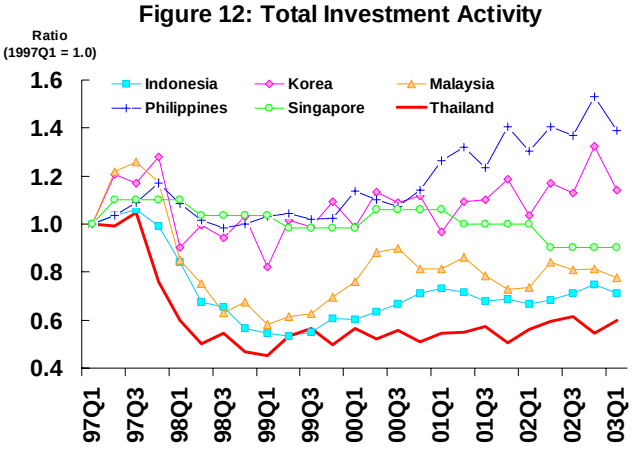


Sources: CEIC and authors' calculation

[11] Given that the ratio of private investment to output plunged in 1997 and 1998, the average ratio for the fourth cycle would be even higher (31 percent) if these crisis years were excluded.

country with the lowest investment rate and the softest recovery of investment activity among six countries shown in Figures 11 and 12. These statistics are indeed consistent with and can explain why the contribution of private investment to output growth has been low in the current expansion. **Hence, we can safely conclude that a prerequisite for the pickup in the contribution of private investment to output growth is a rise in the ratio of private investment to GDP.**

Figure 12: Total Investment Activity



Sources: CEIC and authors' calculation

I.4 Is Thailand Losing Investment Efficiency?

We point out in Section I.2 that even though ICOR—an indicator of investment efficiency—is improving at present, there has been a general deterioration in ICOR over the past three decades or so. This immediately brings up the question of whether or not Thailand is losing investment efficiency over time.

In a situation where physical labor supply is inelastic at some threshold or where capital growth keeps outpacing labor growth, capital is likely to exhibit diminishing marginal return as the capital stock grows. Thus, *some* deterioration in investment efficiency over time is expected. However, there are two caveats to that:

(1) In a world where there is technological advancement, a continuous upward shift of the MP_K schedule is plausible such that MP_K needs not diminish with an accumulation of capital stock; and

(2) Technological advancement is commonly believed transferable through foreign direct investment (FDI). Given that, all else comparable, investment rushes to wherever returns are most attractive, FDI is likely to flow into countries where MP_K are highest. This implies that those host countries are likely to benefit most from technology transfer and hence are also likely to be able to push their MP_K schedules further upward.

In the following sub-sections, we look at various indicators of investment efficiency and try to address three questions: how does Thailand fare in terms of investment efficiency vis-à-vis regional benchmarks; does Thailand experience lower investment efficiency over time; and if so, what is the likely cause of that deterioration.

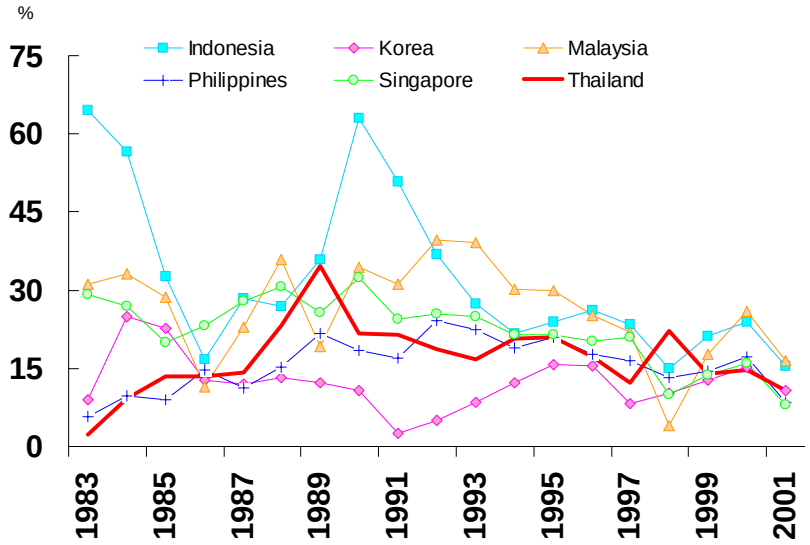
A. Returns on Investment

As said, investment flows wherever returns are most attractive. One indicator of where investment returns are highest, and hence where investment is likely to be most efficiently used, would be to look at returns on a similar type of capital. Here we look at the average rates of return on US direct investment in six regional countries, including Thailand, from 1983 onwards.

Figure 13 shows that the rate of return on US direct investment in Thailand was the lowest among six countries in 1983, but improved vis-à-vis the others in the late 1980s, suggesting a gain in relative efficiency by Thailand over that period of time.

However, between 1989 and 1996—the period leading up to the financial crisis—the rate of return on US direct investment in Thailand deteriorated clearly and by the most among the six countries, perhaps with the only exception of Indonesia. This is not surprising given that the period coincided with the second wave of the fourth private investment cycle that was driven largely by excessive risk-taking behavior and market exuberance. **Over-investment was likely to have driven the rate of return on investment down dramatically.**

Figure 13: Returns on US Direct Investment Abroad (Historical-Cost Basis)



Source: Authors' calculations based on data published by US Department of Commerce

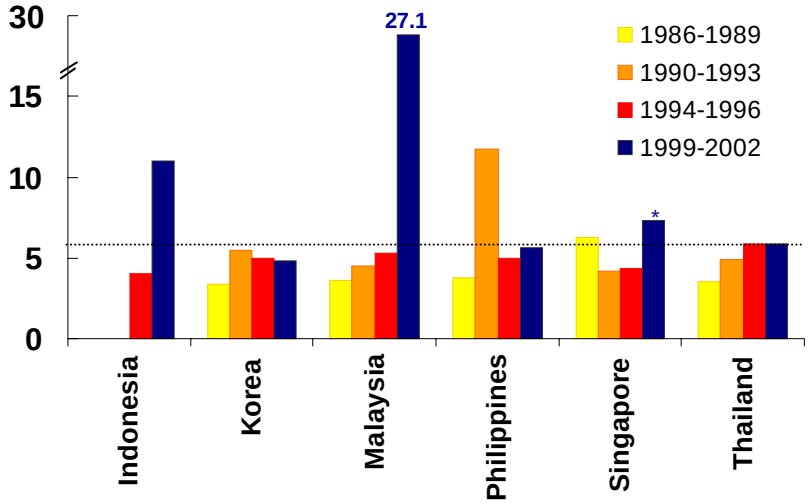
Up to 2001, the rate of return on US direct investment in Thailand remained low but largely consistent with other regional countries. The fact that the rate of return on investment was slow to recover can be explained by the persistence of excess industrial capacity in the economy. This suggests that the legacy of pre-crisis over-investment was long-lasting and, by prolonging the subsequent pickup in private investment, continued to weigh down the overall recovery process in the early 2000s.

B. Incremental Capital-Output Ratio (ICOR)

Given that returns on US direct investment can be influenced by host countries' policies toward foreign investment as well as exchange rate moevments, we look at other indicators to confirm the observation that Thailand did not invest very efficiently in the early 1990s.

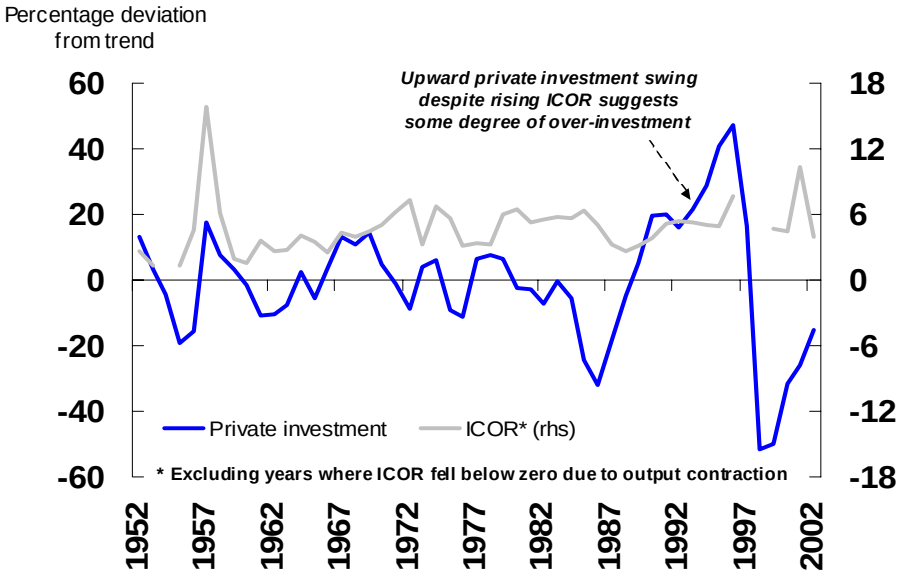
Figure 14 compares ICOR across six regional countries, and a similar story can be drawn. Thailand's ICOR gradually deteriorated in the early 1990s, and investment in Thailand was likely to be least efficient in the region at the outbreak of the financial crisis. For Thailand in particular, Figure 15 illustrates how a downward turn in private investment was usually preceded by a continued rise in ICOR. A striking exception took place in the first half of the 1990s, however, as private investment soared despite a continued deterioration in ICOR. Judging from this, over-investment loomed early on in the decade.

Figure 14: ICOR of Selected Countries



* Excluding 2000 during which Singapore's real GDP contracted
Sources: NESDB, CEIC, author's calculations

Figure 15: Private Investment Cycles and ICOR



In the post-crisis period, Thailand's average ICOR remains high by historical standard[12] and compares unfavorably against Korea despite the fact that Korea is more advanced in terms of industrial development and hence is likely to have a higher degree of capital intensity.[13] Moreover, the fact that Korea seems to be using its capital more efficiently over time suggests that there is definitely room for Thailand to improve efficiency in this respect.

[12] The average for 1999-2002 is pushed up by a particularly high ICOR of 10.3 in 2001. Since then, however, Thailand's ICOR has trended downward as earlier shown in Figure 6.
[13] Excluding 2001, average ICOR for Thailand remains above that of Korea in the post-crisis period.

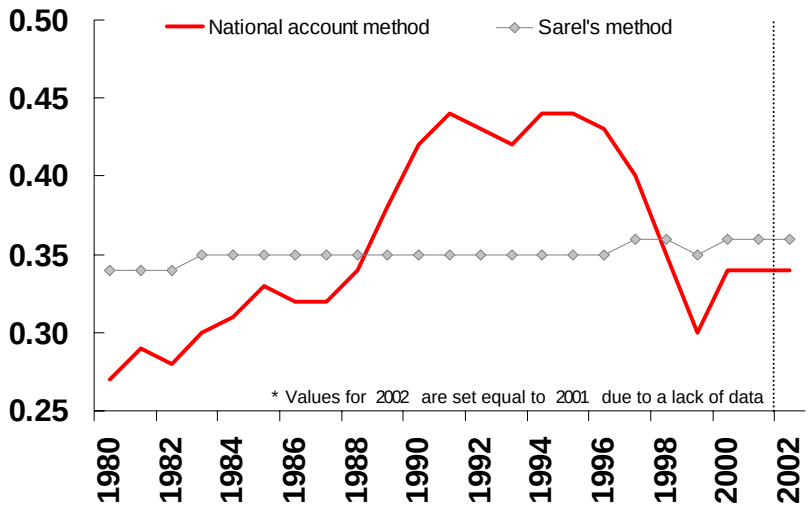
C. Marginal Productivity of Capital (MP_K)

Both the rate of return on US direct investment and ICOR are measures of average efficiency of capital. To the extent that investment efficiency should be measured at the margin rather than on average, we need to look also at indicators of marginal efficiency. An indicator of marginal efficiency like MP_K is not readily available, however. We thus derive it from a growth accounting framework based on a Cobb-Douglas production function: $Y = AK^{\alpha}L^{1-\alpha}$. Under this specification, $MP_K = dY/dK = \alpha Y/K$. We then obtain Y/K from data provided by the National Economic and Social Development Board (NESDB) and calculate the share of capital, α, using two different methods as follows:

(1) **The national accounts approach**, whereby the share of capital is assigned according to national income statistics. This approach implicitly assumes that both capital and labor markets are perfectly competitive and that income of each factor of production is equal to the value of its marginal product. The approach thus obviously ignores the possibility of market imperfections as well as effects of government intervention through policies and regulations.[14] Nevertheless, it is the most commonly used approach in the literature. (See further discussion of this approach in Appendix II.)

(2) **The approach proposed by Michael Sarel**, whereby a country's aggregate capital share is constructed as a weighted average of the capital shares in nine different sectors,[15] with these sectoral capital shares assumed to be equal to what have been found in a large sample of countries. Thus, the aggregate capital share is allowed to vary over time as the supply-side composition of GDP changes. (See further discussion of this approach in Appendix II.)

Figure 16: Estimated Capital Share for Thailand 1980-2002*

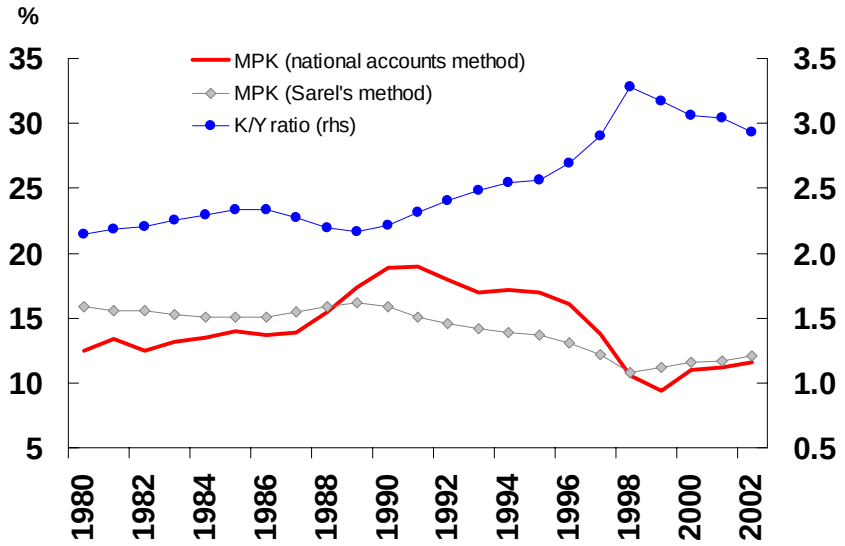


Source: Authors' calculations

[14] Sarel, p. 42-43.

[15] The nine sectors are agriculture, quarrying, manufacturing, utilities, construction, commerce, transport and communication, financial and business services, and government and other services

Table 17: K/Y Ratio and Marginal Productivity of Capital



Sources: NESDB, authors' calculations

Figure 16 illustrates how capital shares derived under the two approaches can differ quite significantly. The difference also accounts for the disparity in the estimated MP_K shown in Figure 17. Despite so, however, a consistent story can be told with either derivation of MP_K. That is, Thailand enjoyed rising MP_K in the latter half of the 1980s when the relocation of industrial production bases from Japan and NICs brought about genuine FDI and helped speed up the industrialization process in Thailand. However, with very high investment rate and hence rapid capital deepening in the early 1990s, as reflected by a sharp increase in the capital to output ratio (K/Y), MP_K was driven down very fast. Taken together, these findings confirm a degree of over-investment in Thailand in the period before the financial crisis.

Table 3 shows that our MP_K estimates are largely consistent with the estimates by Sarel and others. Moreover, Sarel also concludes from his findings that Thailand's MP_K, though generally high for its level of development, was on a declining trend up to 1996 as a result of rapid capital accumulation. As for the recovery period following the financial crisis, we have already noticed some improvement in MP_K. The pickup, however, is still modest due to the lasting impact of over-investment as mentioned earlier.

Table 3: Marginal Productivity of Capital (MP_K) in Selected Asian Countries

	1991-96
Indonesia	15.4
Korea	…
Malaysia	14.1
Philippines	15.2
Singapore	12.9
Thailand	16.8
Thailand: current study	
National accounts approach	**17.4**
Sarel's approach	**14.1**
Average	**15.8**

Sources: Sarel (1997), Jonsson (2001), authors' calculations

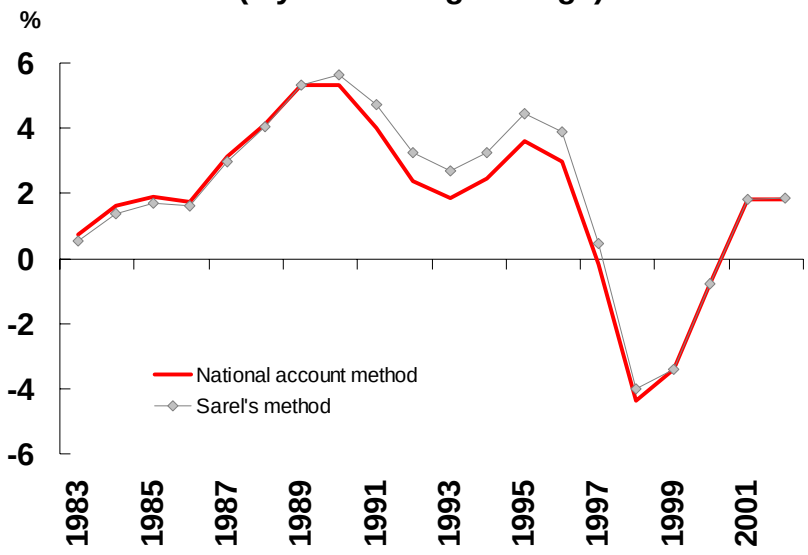
D. Total Factor Productivity (TFP) Growth

TFP growth refers to the amount of output growth not accounted for by the growth of factor inputs. TFP growth thus captures the efficiency in employing a given set of inputs and is most often associated with technological capacity and the quality of factor inputs, especially capital through which technology most often takes influence. In the economic literature, TFP is an important concept because output growth is typically regarded as more sustainable if powered by TFP improvement rather than by factor input growth alone. In particular, as mentioned at the beginning of this section, a given rate of capital accumulation will lead to diminishing MP_K and hence lower rates of output growth in the absence of TFP growth.

Once again we use both the national accounts approach and "Sarel's approach" to find A/A, or TFP growth, according to the mathematical relationship A/A = Y/Y - α K/K – (1-α) L/L. The rate of capital accumulation is taken from NESDB data, and the rate of labor accumulation is assumed to equal the rate of employment growth.

Figure 18 shows that Thailand's TFP growth was on the rise in the late 1980s before slowing down in the early 1990s. This is consistent with the finding by Jonsson and also fits well our over-investment story. As Jonsson points out, the exceptionally high investment rates during the early 1990s were offset to a significant extent by a reduction in the efficiency by which additional capital (and labor) was used.[16]

Figure 18: TFP Growth, 1984-2002
(3-year moving average)



Source: Authors' calculations

[16] Jonsson, p. 54

Nevertheless, a cross-country comparison by Sarel[17] shows that Thailand's TFP growth was not necessarily inferior to its regional counterparts over the period 1991-1996 (Table 4). Moreover, our calculations suggest that some recovery in efficiency has taken place recently, though it has not quite bounced back to the pre-crisis level.

Table 4: Total Factor Productivity (TFP) Growth in Selected Asian Countries

% per annum

	1978-96	1991-96
Indonesia	1.16	2.20
Korea	…	…
Malaysia	2.00	2.00
Philippines	-0.78	0.67
Singapore	2.23	2.46
Thailand	2.03	2.25
Thailand : current study		
National accounts approach		**2.4**
Sarel's approach		**3.3**
Average		**2.9**

Sources: Sarel (1997), authors' calculations

Having looked at four indicators of investment efficiency, let us now return to the questions posed at the beginning of this section. On the issue of whether or not Thailand seems to experience lower investment efficiency over time, there is strong evidence of significant efficiency loss during the early 1990s. However, that trend has been partially reversed since 1999 with a recovery in both MP_K and TFP growth.

What was responsible for investment inefficiency in the early 1990s then? All indicators point toward over-investment, which was facilitated by financial liberalization that began in 1991. As investment could access foreign funding more cheaply at the time, while domestic businesses were overly willing to incur external liabilities and foreigners overly willing to lend in light of exchange rate stability, cost of investment was deemed low. Market exuberance, as indicated by sharp increases in land and stock prices, also helped fuel confidence. As a result, **perception of cheap cost and optimistic expectations justified investment even though returns were on the decline**. With the benefit of hindsight, we now realize that cost was not evaluated properly, with the risk of exchange rate volatility much underestimated, while expected returns were also misjudged by over-confidence. Together they imply that significant over-investment took place in the early 1990s and was responsible for the substantial deterioration in MP_K. Consequently, high annual growth rates observed in the 1990s before the outbreak of the financial crisis were powered mainly by factor input growth, especially capital accumulation, and not by a more efficient use of resources.

In comparison to other regional economies, however, **indication of overall investment inefficiency in Thailand is inconclusive**. Even when Thailand's MP_K was deteriorating, it was found to remain higher than other countries' MP_K. At the same time, TFP growth in Thailand was also higher than in other countries, with the exception of Singapore, and the average rate of return to US direct investment was comparable to others'.

[17] Our and Sarel's calculations differ on a few points. First, we rely on NESDB data for the capital stocks, GDP, and their growth rates. Sarel, on the other hand, uses the Penn World Tables data with adjustment for purchasing power parity to ensure comparability of GDP across countries. As for the capital stocks, Sarel extrapolates them from historical data on investment flows provided by the Penn World Tables, assuming that the capital stock of every country was zero at the end of the year 1900. Second, we use actual employment growth reported by the National Statistical Office (NSO) as labor growth for Thailand whereas Sarel constructs effective labor supply using economic data from the Penn World Tables and the United Nations (UN). Jonsson (2001), who follows Sarel's method in his calculations, finds Thailand's TFP growth to equal 4.0 percent when using actual GDP growth for the period 1991-1996.

I.5 Lessons Learned

Tough set apart from other cycles by a particularly long and prosperous expansion phase, the last private investment cycle was not a true success story for Thailand because of the subsequent recession of unprecedented gravity. While the first wave of that cycle was desirable, being prompted by a genuine shift in regional production bases and financed by long-term FDI, the second wave that was accompanied by market exuberance, excessive risk-taking behavior, and severe accumulation of external imbalances proved detrimental in the longer run. Therefore, at this juncture when the fifth cycle has just taken off, it is crucial that we ask how to prevent our economy from repeating old mistakes as well as from venturing into new perilous routes.

Here we address the issue by drawing up a list of traits judged suitable for the current cycle, especially in light of minimizing economic imbalances and raising investment efficiency:

(1) **A steady increase in the ratio of private investment to GDP**, preferably to approach the pre-bubble average of 26 percent. With that, the contribution of private investment to output growth should pick up as pointed out in Section I.3.

(2) **Moderate swings** in private investment cycles.

(3) **Long expansion period** but only to the extent that it is *not* associated with an accumulation of economic imbalances.

(4) **Consistency between private cost and true social cost of capital**.

(5) **Rising investment efficiency**, for the combination of high returns to investment and efficient cost evaluation mentioned above will help steer the economy away from sub-optimal investment outcomes.

(6) **Long-term financing**, with equity preferred over debt and long-term debt over short-term debt.

(7) **Higher proportion of IT investment**. In the past, Thailand concentrated first on construction investment to improve its basic infrastructure (Cycle 1) and then on equipment investment to enhance physical production capability. Going forward, however, the country will have to move up the production ladder, concentrating more on product differentiation and service quality. It is most likely then that IT penetration will be higher, implying an expanding role of IT investment compared to both construction and equipment investment.

Now that we have identified the desirable level and traits of private investment for the present recovery, what needs to be asked next is how to attain them. The following chapters attempt to shed light on this by looking at the determinants of investment and deliberating the role of public policies in the enhancement of quality investment going forward.

Chapter II

Investment Determinants and Prospects

The current upturn in private investment, which started in early 2002 and has since picked up pace with double digit year-on-year growth has raised hope that a long-awaited sustained expansion of investment is finally arriving. Although the Thai economy has managed to recover steadily since the crisis, most economists agree that a strong and well-balanced output growth will require more contribution from private capital spending. Notwithstanding some encouraging investment growth figures in recent quarters, a sustained investment recovery is still far from certain, especially in light of external uncertainties such as rising oil price and the threat of regional terrorism which may weigh down business sentiments and delay private capital spending.

In this chapter, we review a simple theoretical framework of how private investment decisions are carried out and look at the various factors which have contributed to the private investment boom and bust over the last decade. In particular, we assess the relationships between possible investment determinants and private investment growth using both simple data plots and single-equation regressions. Equipped with a better understanding of investment determinants, we can then turn to the much more difficult task of answering whether or not we can expect a robust expansion in private investment to help support the overall economic momentum at this juncture.

II.1 Investment Determinants: Theoretical Underpinning and Quick Look at the Figures

We need to look more closely at the fundamental drivers of investment growth. Here we do so by first outlining a simple theoretical framework for investment decision, showing that three groups of factors are key for investment: the rate of return on investment, cost of investment, and investors' confidence. We then review past developments of these factors against the backdrop of pre- and post-crisis private investment behaviors.

A. Theoretical Foundation of Investment Decision

According to the *neoclassical model* of investment popularized by Dale Jorgenson (1963), firm owners base their investment decisions on an analysis of marginal benefits and costs of acquiring additional capital goods. Assuming a perfectly competitive firm facing no adjustment costs, myopic expectation and constant returns Cobb-Douglas technology, the static first-order condition for the optimization problem is

$$K = \alpha Y / C_k$$

where C_k stands for the cost of capital and α is the share of capital in a simple Cobb-Douglas production function.

In this type of model, firms' capital spending depends primarily on two factors: (1) current return on capital which is positively related to business output and demand, and (2) cost of capital. In other words, if firms project higher demand for their products, they will expand production capacity by investing in new capital goods to the point that additional benefit from doing so is exactly offset by the cost of acquiring that extra capital. Given that current output growth affects future growth forecasts, this model also suggests that there is an accelerator effect associated with the rate of present demand growth on subsequent investment growth.

The famous q-theory of Tobin (1969) instead relates investment to a firm's stock market valuation, which is meant to reflect the present discounted value of expected future profits. Thus, the q-theory emphasizes the role of expected return to investment, as opposed to actual current return, as the third type of factors which determine private investment decision.

From the first-order condition of a profit-maximizing firm that faces strictly convex cost in adjusting its capital stock, we can write the firm's investment in each period as an increasing function of marginal q, defined as the ratio of the market value of the firm to the replacement cost of its existing capital stock. The theoretical investment equation, which is common in the investment literature, can be written as

$$I / K = \gamma q$$

where I is gross investment, K is net capital stock, q is the Tobin's q value, and γ is a strictly positive parameter.

In addition to standard models of investment, there has been a growing body of economic literature which supports the view that a firm's credit constraint and financial position could have substantial effect on its investment.[18] Financial factors are introduced into standard investment models through asymmetric information between lenders and borrowers, which raises costs of external financing over costs of internally generated funds. Firms with lower liquidity, and higher leverage position would face higher costs or limited availability of external funds as a result of their perceivably higher risks. The impact of weak financial positions on firm investment will intensify during an economic slowdown as the problem of asymmetric information becomes more severe. Therefore, we would expect that extremely poor liquidity and high leverage experienced by the Thai corporate sector after the 1997 crisis will partly explain the relatively slow recovery of private investment thus far.

In the next section, we investigate various measures of private investment determinants as emphasized by the investment literature to assess their roles in explaining private investment behaviors over the past eight years. These determinants can be grouped into three categories, namely, returns to investment, costs and availability of capital, and expectation and confidence.

[18] See Hubbard (1995) for a survey of the literature. See Thaicharoen and Kiatikomon (2002) for evidences for the Thai corporate sector.

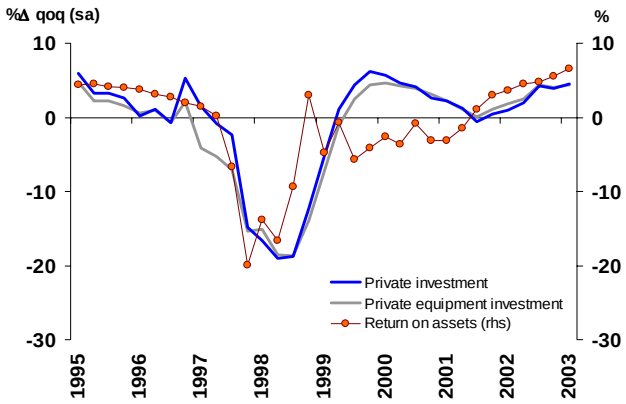
B. Determinants of Private Investment

Rate of Return on Investment

Rate of return on capital seems to be the most important determinant of investment cycle, and this observation is consistent with simple economic theory. All else equal, a higher rate of return—which is equivalent to higher marginal productivity of capital (MP_K)—means that it is more profitable to invest and thus firms should be more eager to acquire new capital at the margin.

Figure 19 plots the return on asset (ROA) of non-financial SET-listed companies against the quarter-on-quarter (qoq) growth rate of economy-wide private investment. Here we calculate ROA by dividing net income by average total assets. Over the past eight years, ROA averaged around –0.5 percent, hitting the bottom of –53 percent in the fourth quarter of 1997. However, it is clear from the figure that ROA was low and declining even before the crisis arrived in 1997. This confirms the finding in Chapter I that the pre-crisis investment boom took place despite very poor rates of return on investment. Low profitability coupled with poor liquidity and a highly leveraged position left the Thai corporate sector vulnerable to adverse shocks that subsequently came in the form of severe baht devaluation and demand collapse. Despite efforts to cut cost and increase operational efficiency, ROA continued to be low and volatile in the early years of the economic recovery, reflecting continued fragility of the corporate sector as well as uncertain economic outlook at the time. Since mid 2001, however, ROA has been positive and gradually improving as economic recovery has firmed up.

Figure 19: Private Investment and Return on Assets
(4-period moving average)



While ROA is a good measure of firms' average return, marginal return is considered more relevant to investment decisions in theory. For example, in a period of excess capacity and sluggish output growth, firms may be able to cut cost and maintain reasonable average returns. Nevertheless, there is still little incentive for firms to expand capacity in this environment. Unfortunately, the marginal rate of return on investment is not directly observable. In all likelihood, however, it should be positively correlated with capacity utilization for when capacity utilization is low the payoff to adding new capacity should also be low, and vice versa.

Figure 20 plots the seasonally adjusted capacity utilization rate of the manufacturing sector[19] and our measure of private investment shares. The figure suggests that capacity utilization was also on a declining trend prior to the 1997 crisis, signaling indeed a deterioration in marginal return to capital and foreshadowing the eventual collapse of private investment. Next came the simultaneous collapses in capacity utilization and investment due to a severe contraction of domestic demand. Following the subsequent economy recovery, however, capacity utilization gradually picked up, but the process was interrupted temporarily by the 2001 economic slowdown

[19] Capacity utilization *excluding liquor* is used because an anomaly in liquor production was observed in 2000 as one major liquor producer accelerated production in anticipation of concession expiration.

before resuming in 2002. In the meantime, private investment as a share of GDP rose somewhat more moderately. Nevertheless, Figure 21 which plots the qoq growth of capacity utilization rate against the qoq growth of private investment suggests that a change in capacity utilization tends to precede a same-direction change in private investment.

Figure 20: Private Investment and Capacity Utilization

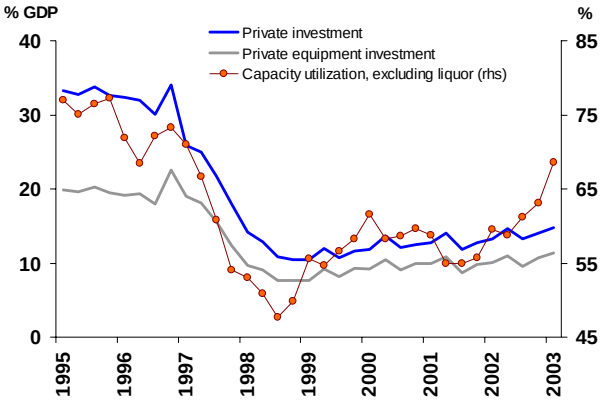
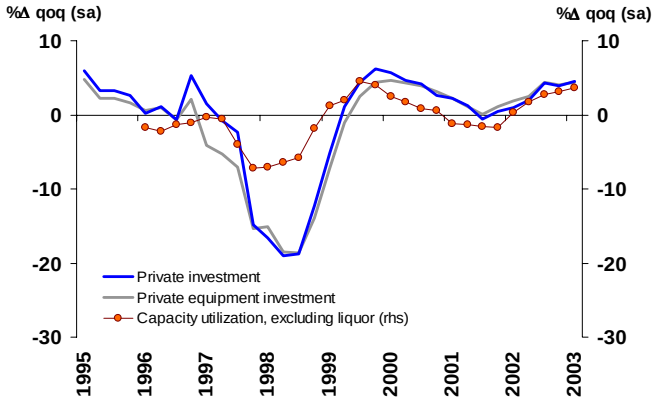


Figure 21: Private Investment and Capacity Utilization

(4-period moving average)



Due to limited availability of quarterly capacity utilization data which only began in 1995, we cannot adequately observe the historical pattern that may suggest at which level of capacity utilization an acceleration in private investment growth is likely to be triggered. It is nonetheless fair to say that with many industries such as passenger cars, motorcycles, and electrical appliances having already reached or exceeded their pre-crisis levels of capacity utilization, the need to aggressively add capacity in these industries will arise in a not too distant future.

Cost of Capital and Credit Availability

The second determinant of investment spending is the cost of capital, which depends in turn on a number of factors such as the price of capital goods and the real interest rate at which firms can borrow to finance their investment projects. We expect that, all else equal, a higher cost of capital will lower investment spending.

Figure 22: Private Investment and Relative Price of Capital

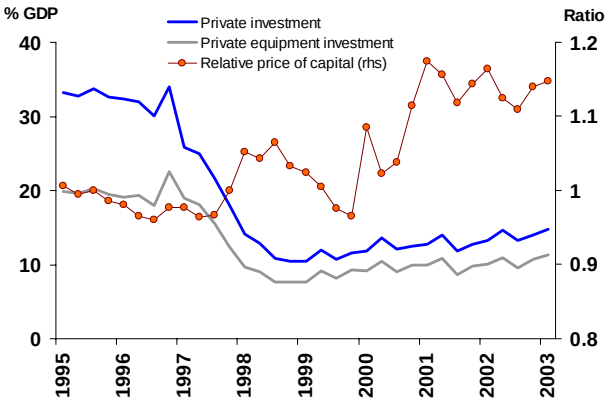


Figure 23: Private Investment and Relative Price of Capital

(4-period moving average)

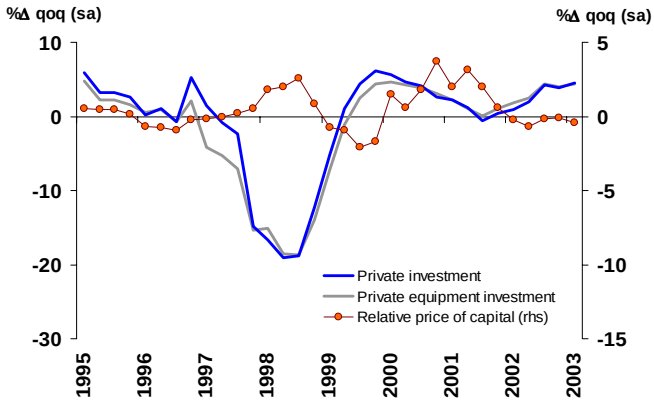
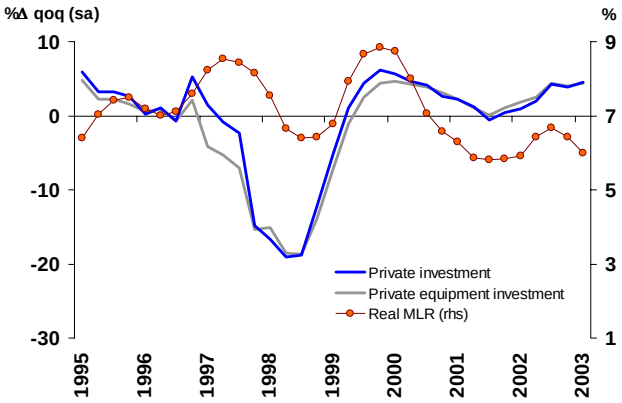


Figure 22 plots **the relative price of capital**, defined here as the ratio of private investment price deflator to private consumption price deflator. Both price deflator series are taken from the national accounts statistics published by the NESDB.

The relative price of capital was fairly stable during the pre-crisis period but went up dramatically during the crisis mainly as a result of the exchange rate depreciation, which had a direct bearing on the price of imported capital. Around 1999, the relative price of capital declined in tandem with the exchange rate consolidation, but it later went up again in 2000 due to a deterioration in Thailand's terms of trade. However, the price of capital has more or less stabilized during in the past couple of years as the terms of trade has shown some improving trend. Figure 23 plots changes in the relative price of capital against investment growth. The figure seems to suggest, as expected, that there is an inverse relationship between them, and for the past two years, the decline in the growth rate of capital price has coincided with the pick-up in private investment growth.

Figure 24: Private Investment and Real MLR

(4-period moving average)

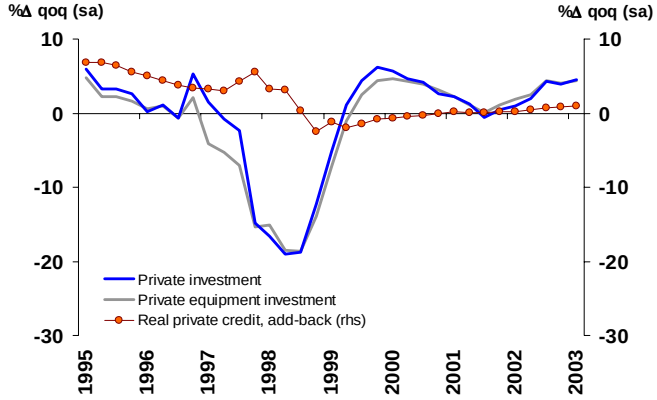


Our second measure of the cost of capital is the real Minimum Loan Rate (MLR). To the first approximation, this is equal to subtracting off headline inflation from nominal MLR. Given that the corporate sector in Thailand has historically been highly dependent on bank loans as the source of external financing, we believe that real MLR does provide us with a fairly accurate measure of the cost of external financing facing most Thai firms. Figure 24 plots real MLR against private investment growth. Over the past eight years, real MLR averaged around 7 percent per annum. It went up in 1997 as nominal interest rate was raised to defend the currency peg as well as to stabilize exchange rate movements in the early period of the float. With high inflation in 1998, however, real MLR fell substantially before rising again in 1999 as inflation moderated faster than the decline in nominal MLR. Since 2000, real MLR has been on a declining trend, following successive cuts in nominal MLR prompted by excess liquidity in the banking system. Going forward, even if private investment accelerates, it is unlikely that real MLR will increase markedly over the next four quarters. The downward trend in real MLR has effectively lowered the cost of capital for firms as well as improved their cash flow position, thus providing supportive environment for new investment.

While using real MLR as a proxy for the cost of capital acquired through externally generated funds, we take notice that in recent years the Thai economy has managed to grow without much new bank credits (Figure 25). On the supply side, private commercial banks have tightened their credit standards as confidence in the borrowers' creditworthiness has not strongly recovered. On the demand side, firms have embarked on a deleveraging process in order to improve their liquidity and leverage positions. As a result, they have relied more on internally generated funds, mainly retained earnings, to finance their investment needs. We thus do not expect to see a tight relationship between commercial

Figure 25. Private Investment and Credit Availability

(4-period moving average)



bank credit growth and private investment growth as usual, and this should remain so as long as financial intermediation is not fully functioning.

Given that many firms' investment spending may have been limited by the availability of internal cash flow, we supplement our conventional measures of capital cost and external credit availability with two measures of corporate liquidity and leverage. These variables are meant to capture the degree to which the lack of liquidity or excessive leverage position constrains firms' new investment.

Figure 26: Private Investment and Leverage Ratio

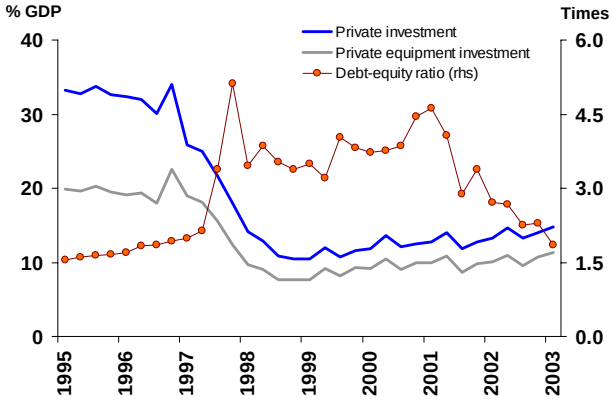


Figure 27: Private Investment and Leverage Ratio

(4-period moving average)

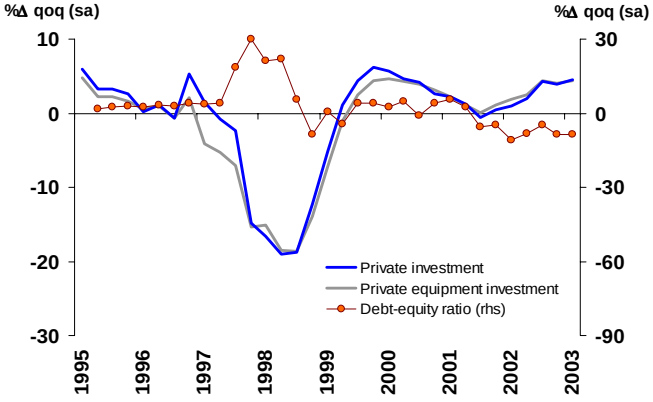
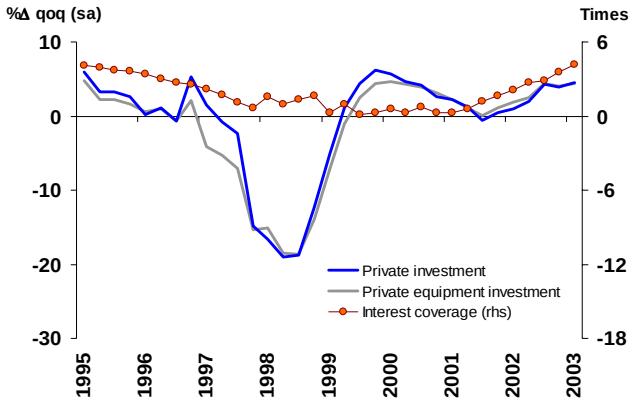


Figure 26 plots the leverage ratio of non-financial SET-listed firms, defined here as the ratio of total liabilities to total equity. The baht devaluation and domestic demand collapse associated with the 1997 crisis raised the average D/E ratio from an already high level by international standard to the level that threatened most firms' solvency. During 1998-2000, the average D/E ratio fell rather slowly due to a combination of slow progress in corporate debt restructuring and equity decline. Since 2001, however, the pace of corporate deleveraging has picked up, reflecting an acceleration in corporate debt restructuring, falling interest rates and improved retained earnings. As of 2003Q1, the average D/E ratio has come down to about 1.8, which is comparable to the pre-crisis level. Figure 27 suggests that there may be a positive relationship between the pace of corporate deleveraging and private investment growth.

Figure 28 uses the average interest coverage ratio of non-financial SET-listed firms as a measure of firms' liquidity constraint. The interest coverage ratio, or earnings divided by interest expenses, represents firms' ability to use their own earnings to cover interest expenses in the same period. Even before the crisis, SET-listed firms were, on average, quite illiquid as their earnings barely met interest payment obligations. Rising interest rates and profit squeeze in the aftermath of the crisis brought the ratio below one and even into the negative range. The situation did not improve much during 1999-2000 as firms still struggled to improve their liquidity position. Only after 2001 that firms' liquidity began to improve steadily and also became less volatile,

Figure 28: Private Investment and Interest Coverage

(4-period moving average)



reflecting both the decline in interest rates and consistent profitability. As of now, firms' liquidity has improved to the point where internal cash flow may become less of a binding constraint on new investment.

Expectation and Confidence

In addition to actual returns and cost of capital, investment decision also depends on expectations of future returns relative to current actual returns. Measuring expectation or other factors which affect business confidence is no easy task, however, since they are unobservable and subjective in nature. In this paper, we measure the gap between expected and actual returns by Tobin's q—the market value of firm's capital relative to its replacement cost. The rationale is that a firm will increase (reduce) its capital stock if the market value of capital exceeds (falls below) the cost of acquiring it. We approximate Tobin's q for non-financial SET-listed firms by dividing the sum of total liabilities and market capitalization of firms' equities by total asset value. Admittedly, this is only an approximation of the true q measure as we lack data on the market value of debt as well as the actual replacement cost of capital. However, this proxy should still give a relatively reasonable benchmark for the assessment of market sentiments over time. Not surprisingly, the Tobin's q value moves closely in line with the SET index as equity price is the key determinant of a firm's market capitalization.[20]

Figure 29: Private Investment and Tobin's q

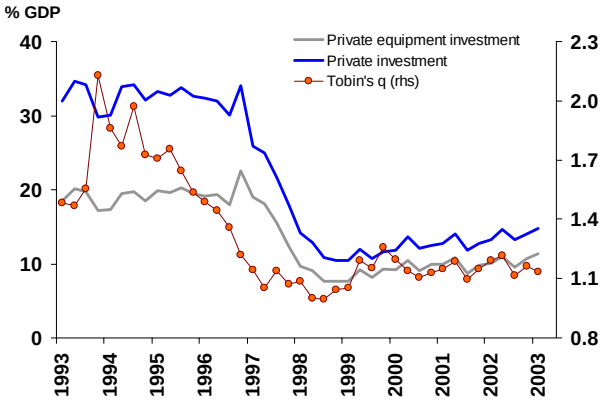


Figure 30: Private Investment and Tobin's q
(4-period moving average)

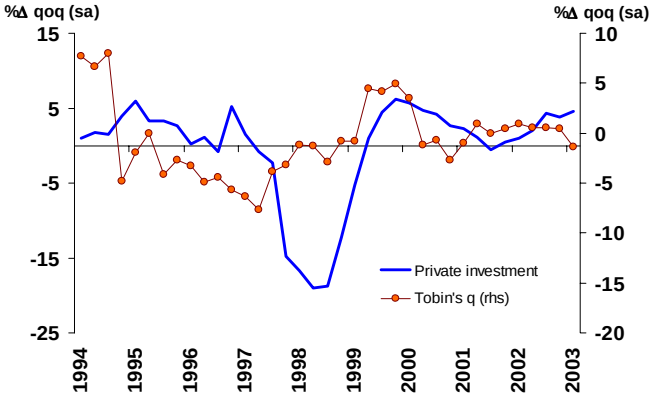
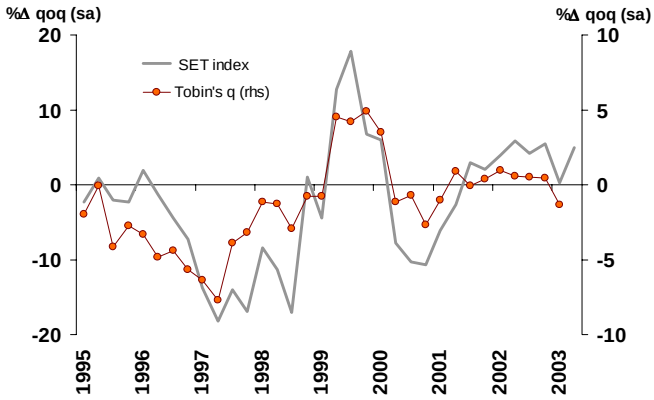


Figure 29 illustrates Tobin's q since 1993. Tobin's q was very high in the early 1990s as a result of record high equity prices, and with some time lag, this over-optimism led to over-investment in the period leading up to the 1997 crisis (Figure 30). However, once the market came to realize that actual returns could not possibly match such unrealistic expectation, equity prices plunged spectacularly and Tobin's q hit the bottom in 1998. Although Tobin's q has since remained subdued, it is expected to improve with the recent pick-up in

Figure 31: Tobin's q and SET Index
(4-period moving average)



[20] The correlation between our Tobin's q and SET index over 1993Q1-2003Q1 is 0.91.

investors' confidence, as reflected by the significant gain in the SET index over 2003Q2 (Figure 31). If true, it will bode well for the outlook of private investment.

Investor's confidence is also adversely affected by economic uncertainties. For small and open economies, it has been found that real exchange rate volatility hampers private investment growth as volatile exchange rates are associated with erratic swings in the relative profitability of investment.[21] In addition, cost of new capital becomes uncertain with real exchange rate volatility due to the high import content of investment in developing countries. Since investors are risk-averse and investment is typically irreversible, high real exchange rate volatility would cause investors to require higher return premiums, thereby hampering new capital spending. Figure 32 plots the conditional variance of Thailand's real effective exchange rate (REER) against private investment growth. Our measure of REER volatility is estimated as the conditional variance of REER based on the generalized autoregressive conditional heteroskedasticity model (GARCH (1,1) with AR (1)). As easily seen in the figure, REER volatility shot up during the peak of the 1997 crisis, coinciding with the collapse of private investment. REER volatility then came down rather rapidly in 1998, owing mostly to the nominal exchange rate consolidation. Since then, REER volatility has been low, as both nominal exchange rate and inflation have been quite stable.

Figure 32: Private Investment and Exchange Rate Volatility

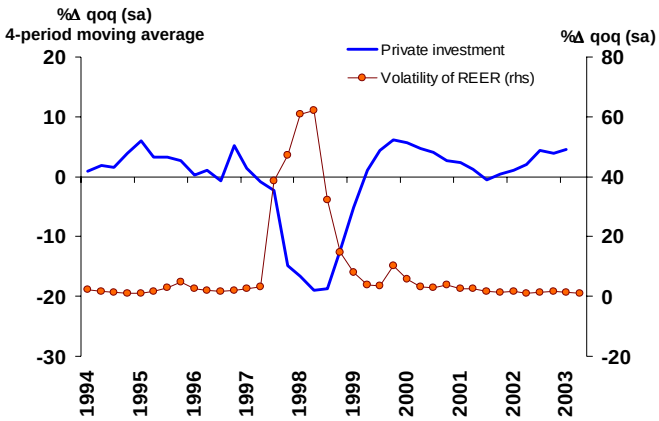


Figure 32 thus suggests that except for the episode of extremely high REER volatility during the 1997 financial crisis, Thailand has enjoyed an environment of relatively stable real exchange rate. This has contributed greatly to the country's overall macroeconomic stability in recent years. One caveat is that achieving as little REER volatility as possible should not be the overriding goal; after all economic benefits of maintaining low REER volatility is likely to dissipate below a certain level. Therefore, we should not aim to eliminate nominal exchange rate volatility since it may create other distortions in the economy as mentioned in Chapter 1. The best way to avoid excessive REER volatility in the long run is to maintain price stability. In this light, BOT's commitment to inflation targeting should put Thailand on a good position to provide stable macroeconomic environment conducive to sustained capital accumulation.

So far we have examined a number of possible determinants of private investment individually. To gain a better understanding of the relative importance of these factors over the past decade, we estimate in the next section single-equation regressions with multiple explanatory variables.

[21] Serven, 2002

II.2 Private Investment Function: Data and Empirical Evidence

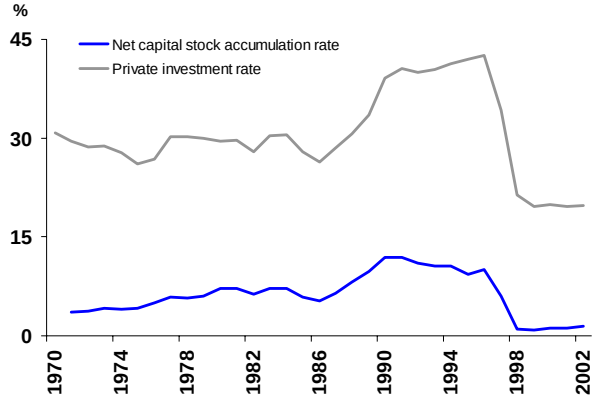
The following sub-sections discuss the data used in our statistical estimation, a summary of which is presented in Table 5, and the regression results.

The Data

Dependent Variables

Theoretically, the most appropriate measure of investment activity for our empirical estimation is the rate of capital accumulation, K/K, which is equivalent to the ratio of net investment to the existing capital stock. Although we lack quarterly data on the capital stock, we find that the ratio of investment to GDP (or private investment rate) tracks the rate of capital accumulation very well over time, with the correlation coefficient of 0.93 between 1971-2002 (Figure 32). Therefore, the ratio of *private* investment to GDP, which is also known as the private investment rate and is available on a quarterly basis since 1993Q1, will be used as our proxy for the rate of *private* capital accumulation. Due to presence of unit root in this series (see the next section), our preferred choice of dependent variable is therefore the growth rate of private investment over GDP.

Figure 32: Net Capital Stock Accumulation Rate and Private Investment Rate



In addition to our preferred choice of dependent variable, we also explore three other dependent variables, namely, growth rate of real private investment, growth rate of real private equipment investment, and the growth rate of real private equipment investment over GDP. Regression results using these alternative dependent variables are presented in Appendix III.

Explanatory Variables

We divide our explanatory variables into three groups in line with the theoretical framework proposed in the earlier section. The three groups of investment determinants are returns (capacity utilization, real ROA), cost of capital and fund availability (Real MLR, relative price of capital, real private credit, leverage ratio, interest coverage ratio) and expectation and confidence (Tobin's q and conditional variance of REER). In each specification, we will include at least one measure from each of the three determinant groups.

All data have quarterly frequency and cover the period between 1994 and the first quarter of 2003. Exact coverage of each variable may vary slightly due to data availability. Table 5 provides descriptions of the variables and their sources.

Table 5: Variable Descriptions and Sources

Variable	Symbol	Description	Source
Real private investment over GDP	PRVINV_GDP	real private investment divided by real GDP	NESDB
Growth rate of real private investment over GDP	GR_PRVINV_GDP	qoq growth of the seasonally adjusted series of real private investment over GDP	NESDB, authors' calculation
Real private equipment investment over GDP	PRVEQ_GDP	real private equipment investment divided by real GDP	NESDB
Growth rate of real private equipment investment over GDP	GR_PRVEQ_GDP	qoq growth of the seasonally adjusted series of real private equipment investment over GDP	NESDB, authors' calculation
Growth rate of real private investment	GR_PRVINV	qoq growth of the seasonally adjusted series of real private investment	NESDB, authors' calculation
Growth rate of real private equipment investment growth	GR_PRVEQ	qoq growth of the seasonally adjusted series of real private equipment investment	NESDB, authors' calculation
Capacity utilization rate	CAPU	industrial capacity utilization rate excluding production of liquor (quarterly average)	BOT
Real return on asset	RROA	ratio of net income over average total asset of non-financial listed companies, deflated by change in CPI	SET, MOC
Real MLR	RMLR	Minimum Loan Rate (quarterly average) deflated by change in CPI	BOT, MOC
Leverage ratio	DE	ratio of total liabilities over total equity of non-financial listed companies	SET
Interest coverage ratio	INTCOV	ratio of earning before interest and tax over interest expense of non-financial listed companies	SET
Relative price of capital	RPCAP	price deflator of private investment divided by price deflator of private consumption	NESDB, authors' calculation
Real private credit	RPRVCRD	commercial bank private credits (adding back debt write-offs and net transfers to AMCs but excluding commercial bank credits to AMCs) deflated by change in CPI	BOT, MOC
Tobin's q	TOBINQ	sum of total liabilities and market capitalization of equity divided by total assets	SET, authors' calculation
Real GDP	RGDP	Gross Domestic Product (1988 prices)	NESDB
Conditional variance of real effective exchange rate	VAR_REER	estimated conditional variance of REER using GARCH(1,1) model with AR(1)	IFS (IMF), authors' calculation
Dummy96q4&97q1		value equals 1 for 1996Q4 and -1 for 1997Q1	

Unit Root Testing and Model Specification

One of the first exercises carried out is to select the appropriate specification for our regressions, in particular to determine whether the equations should be estimated in level or in difference form. To test for stationarity, we use the Augmented Dickey-Fuller (ADF) test,[22] and the test results presented in Table 6 show that most series are nonstationary. Therefore, we convert these nonstationary variables into first difference form by calculating the qoq growth rates of the seasonally adjusted series. Subsequent ADF tests indicate that the variables exhibit stationarity property once in qoq growth form. For the two series found to be stationary, namely real MLR and the conditional variance of REER, we simply use them in level form.[23]

After taking into account the unit root problem, our base model to be estimated is as follows:

$$\Delta(PPRVINV\_GDP)_t = c + \Delta(CAPU)_{t-2} + \Delta(GDP)_{t-1} + RMLR_{t-1} + \Delta(DE)_{t-1} + \Delta(TOBINQ)_{t-2} + \varepsilon_t$$

All explanatory variables are lagged by at least one quarter to avoid the problem of endogeneity. We tried both one and two quarter lags since we do not have strong priors on the exact timing. Nevertheless, our overall results are not affected by the choice of one or two lags for the explanatory variables.

Regression Results

We report our basic regression results in Table 7. Note that in our estimation we include a dummy variable, which takes the value of 1 in 1996Q4 and –1 in 1997Q1, to account for a significant jump in private investment in 1996Q4, which caused the qoq growth rate of private investment to be extraordinarily high in 1996Q4 and extraordinarily low in the following quarter. The inclusion of this dummy variable does not change the signs of our explanatory coefficients but helps to improve the goodness of fit.

[22] We report unit root test results with the inclusion of 3 lagged differences in the ADF specification. Changing the number of lagged differences to 2 or 4 does not affect our overall conclusions.

[23] We also test for the presence of unit roots using the Phillips-Perron (PP) test. Results are similar to the ones reported here.

Table 6 : Unit Root Tests

Variable	Test Specification*	ADF statistics
PRVINV_GDP	C,T	-1.52
Growth of (PRVINV_GDP)	no	-1.96[b]
PRVEQ_GDP	C,T	-1.82
Growth of (PRVEQ_GDP)	no	-2.40[b]
PRVINV	C,T	-2.19
Growth of (PRVINV)	no	-1.94[b]
PRVEQ	C,T	-2.11
Growth of (PRVEQ)	no	-2.52[b]
CAPU	C,T	-1.61
Growth of (CAPU)	no	-2.51[b]
TOBINQ	C,T	-2.26
Growth of (TOBINQ)	C,T	-3.41[b]
GDP	C,T	-1.81
Growth of (GDP)	C	-3.15[b]
DE	C,T	-0.54
Growth of (DE)	C,T	-3.42[c]
RPCAP	C,T	-2.12
Growth of (RPCAP)	C	-3.04[b]
RMLR	C,T	-4.09[b]
INTCOV	no	2.16[b]
VAR_REER	C	-3.48[b]

* In the test specification column, the symbol indicates whether a constant (C), a trend term (T) or none of the above (no) is included in the ADF specification.

a, b, and c denote statistical significance at 1, 5 and 10 percent, respectively.

Table 7: Regression Results for Private Investment Determinant Equations

Dependent variable: Growth of private investment rate ($\%\Delta (I_p/ GDP)$) Sample: 1995:4 - 2003:1 Independent variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	6.10[c] (3.19)	6.21[c] (3.27)	6.46[c] (3.31)	6.73[c] (3.28)	6.16[c] (3.16)	6.78[c] (3.30)	8.36[b] (3.90)
Growth of capacity utilization (-2)	0.79[a] (0.13)	0.77[a] (0.14)	0.78[a] (0.13)	0.78[a] (0.13)	0.82[a] (0.13)	0.72[a] (0.15)	0.61[a] (0.18)
Real return on asset (-1)		0.03 (0.09)					
Real MLR (-1)	-1.09[b] (0.44)	-1.09[b] (0.45)	-1.09[b] (0.45)	-1.16[b] (0.45)	-1.10[b] (0.44)	-1.11[b] (0.44)	-1.07[c] (0.53)
Growth of leverage ratio (-1)	-0.10[a] (0.03)	-0.09 (0.06)	-0.11[a] (0.03)	-0.10[a] (0.03)	-0.08[c] (0.04)	-0.10[a] (0.03)	-0.08[b] (0.03)
Interest coverage ratio (-1)			-0.20 (0.37)				
Growth of relative price of capital (-1)				-0.17 (0.19)			
Growth of real private credit (-1)					-0.31 (0.26)		
Growh of Tobin q (-2)	0.34[a] (0.10)	0.36[a] (0.11)	0.33[a] (0.10)	0.36[a] (0.10)	0.32[a] (0.10)	0.36[a] (0.10)	0.42[a] (0.12)
Growth of real GDP (-1)	1.41[a] (0.24)	1.36[a] (0.28)	1.41[a] (0.25)	1.36[a] (0.25)	1.44[a] (0.24)	1.18[a] (0.36)	
REER conditional variance (-1)						-0.04 (0.05)	-0.17[a] (0.04)
Dummy96q4-97q1	19.51[a] (2.00)	19.47[a] (2.04)	19.52[a] (0.03)	19.34[a] (2.02)	19.73[a] (1.99)	19.50[a] (2.01)	20.37[a] (2.38)
Number of observations	30	30	30	30	30	30	30
Adjusted R^2	0.90	0.90	0.90	0.90	0.90	0.90	0.86
Durbin-Watson Statistics	1.68	1.64	1.78	1.53	1.69	1.70	1.76

Numbers in parentheses are standard errors.
a , b , and c denote statistical significance at 1, 5, and 10 percent, respectively.

Column 1 of Table 7 shows the results from our base specification. Most importantly, the empirical measures of investment determinants seem to influence private investment over the past eight years as suggested by theoretical framework. The estimated coefficients for all five explanatory variables take their expected signs and are statistically significant. All else equal, higher growth rates of capacity utilization, Tobin's q, and GDP seem to lead to higher growth of private investment rate in subsequent quarters. On the other hand, higher real MLR and higher growth of corporate leverage ratio deter growth of private investment rate. The results here seem to confirm that investment determinants have worked through all three channels: returns, cost and expectation. Note also that even though the Durbin-Watson statistics is a bit low at 1.68, a direct serial correlation LM test rejects the presence of serial correlation at 90 percent confidence level.

In column 2, we add lagged real return on asset (real ROA) to capture the additional effect through average rate of return. The results are similar to our base model, and while the estimated coefficient of real ROA takes its expected sign, it is not statistically significant at 10 percent. In columns 3 and 4, interest coverage ratio and growth of relative price of capital are added to our base model to provide alternative measures of firms' financial constraint and cost of capital, respectively. Both variables have their expected signs but again are not statistically significant and do not improve the overall fit of the equations.

To see if a measure of credit availability would help explain the movements of private investment rate, we include growth rate of real private credit to our base model. The results are shown in column 5. The coefficient of real private credit shows a negative sign but is not statistically significant. We obtain similar results using different lags of real private credit growth. This implies that credit availability may not lead private investment as some people expect. The result is not entirely surprising given that the post-crisis corporate sector, in an attempt to deleverage its balance sheet, has been relying more on internal funds rather than external borrowing to finance its capital spending.

In columns 6 and 7, we test whether or not a confidence proxy such as REER volatility would improve our base specification. When added to our model, REER volatility is shown to have a negative coefficient as expected, but it is not statistically significant. However, once we drop lagged GDP growth, REER volatility becomes statistically significant. Nevertheless, our base model still has better goodness of fit as reflected by higher adjusted R^2.

Our results are quite robust, with the size of the estimated coefficient of each key determinant in the basic model shown to be stable across alternative specifications. Therefore, we believe that our base specification does a good job at capturing most of the variations in private investment share over the past eight years.

In addition to the results presented in Table 7, we run similar regressions using three other dependent variables mentioned earlier. The estimates, which are shown in Appendix III, are similar to the results in Table 7. This confirms the robustness of our conclusions.

II.3 Contributions to Private Investment Growth Since 1996

To gain a better understanding of how each determinant identified by our base model has played a role in shaping the path of private investment rate over the last 7-8 years, we calculate for each of these variables its annual contributions to the growth of private investment over GDP. Quarterly contributions are first calculated by

multiplying the estimated coefficients shown in column 1 of Table 7 with actual levels (for the case of real MLR[24]) or growth rates of the respective explanatory variables using appropriate lags. Annual contributions are then calculated by averaging the quarterly contributions within the same calendar year.

Figure 23: Contributions to Private Investment Growth*

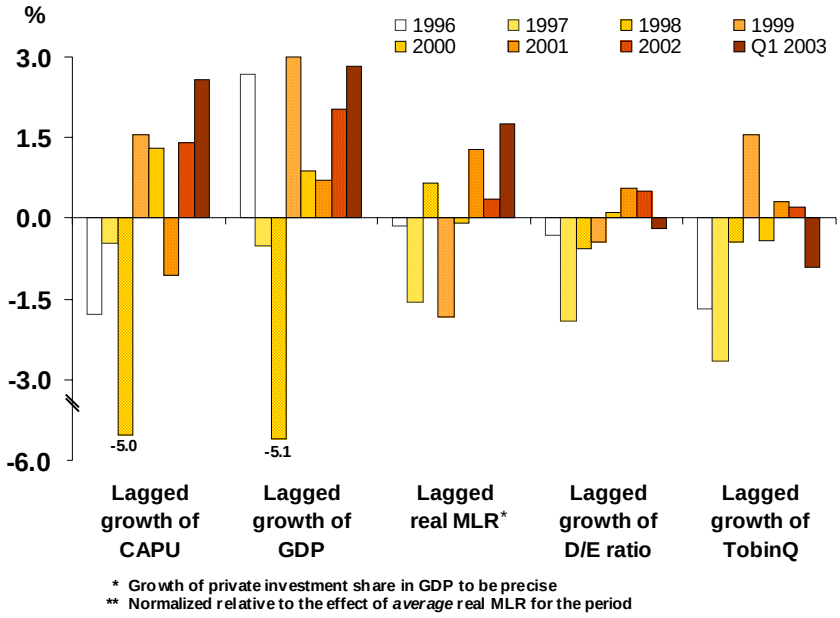


Figure 23 chronicles the evolution of private investment share between 1996 and 2003Q1 through the estimated contributions of each key determinant. It highlights the relative importance of the determinants in explaining the collapse of private investment over the period 1997-1998 as well as its post-crisis recovery. In 1996, all determinants except lagged GDP growth signaled a dim outlook of private investment. Over the next two years, all fundamental factors contributed to the plunge in private investment, including unattractive marginal returns on new investment as implied by a steep drop in capacity utilization rate, severe contraction of output demand, worsening financial health of the corporate sector as well as a collapse of market confidence as shown by a marked decline in Tobin's q value. While all three channels—returns, cost and expectation—worked to lower private investment, the returns channel was likely to be the most influential one at the time.

For the period 1999-2001, private investment expanded slowly, reflecting for the most part a gradual improvement in economic fundamentals. Declining interest rates, nevertheless, helped to reduce the cost of capital and improve firms' liquidity and leverage positions to a fairly significant extent.

It was in 2002 that private investment growth clearly picked up and outpaced GDP growth. Accelerated capacity utilization and stronger output demand contributed importantly to this development, while falling capital cost as a result of monetary policy easing also helped. The trend continued well through 2003Q1, and even though Tobin's q is shown to contribute negatively to the investment momentum in the most recent period, a notable rise in the SET index in 2003Q2 suggests that Tobin's q is likely to be

[24] Contributions of real MLR to the growth of private investment share are shown relative to the contribution of the mean value of real MLR over the estimated period, which is roughly 7 percent per annum.

on the increase and, with some time lag, will contribute positively to the investment momentum in the latter part of this year.

To arrive at a projection of private investment growth over the next four quarters, we make use of the coefficient estimates from our base model in combination with some assumptions on the likely ranges of private investment determinants. Table 8 shows a set of plausible assumptions and their implications on future private investment share and growth. Admittedly, one can criticize that our variables are inter-related and endogenous to the path of private investment. While aware of its limitation, we still believe that this is a simple but useful thought exercise. With our assumptions deemed consistent and realistic in light of recent trends and current outlook, the projection should give us a reasonable sense of the private investment direction over the next four quarters.

Table 8 : Assumptions of Investment Determinants and Projected Range of Private Investment Over the Next 4 Quarters

Variable	Avg. 94-96	Avg. 97-99	Avg. 00-02	Avg. 03:Q1	Avg. 03:Q2	Range of Variables (Avg. over next 4 quarters) (Q3:03 - Q2:04)
Capacity utilization (sa:exclude liquor)	74.0	56.6	58.8	66.4	68.4	66 - 72
Real MLR	7.0	7.8	6.3	4.8	4.7	4.25 - 5.75
D/E ratio of nonfin. SET companies (sa)	1.7	3.5	3.4	1.9	-	1.5 - 1.9
GDP growth (yoy)	8.1	-2.5	4.0	6.7	4.7^{e}	4.0 - 6.0
Tobin's q (sa)	1.6	1.1	1.2	1.1	1.2^{e}	1.1 - 1.3
Share of private investment to GDP	32.6	15.3	13.0	14.8	-	15.6 - 17.9
Real private investment growth (% yoy)	7.6	-27.7	11.7	18.9	-	10.7 - 20.3

e denotes estimated values

Given the above assumptions, our model predicts that private investment share will rise to 15.6 – 17.9 percent of GDP by end-2004Q2. This is consistent with private investment growth of 10.7 – 20.3 percent year-on-year over the next four quarters. It is worth noting that despite a relatively high growth rate of private investment predicted by our model, the private investment share would not increase significantly. This can be explained by the fact that growth of private investment is calculated from a relatively low base, reflecting the slow recovery of private investment thus far. The

forecast hence implies that we still need a sustained period of robust private investment growth before its share to GDP can return to anywhere close to the 1991-1996 average of 32 percent. Of course, returning to the pre-crisis level may not be our objective since it may imply over-investment, but certainly something within the range of 25 – 26 percent is reasonable for a developing country like Thailand in the medium term.

In summary, we believe that private investment momentum is likely to gather pace in the near future. This relatively sanguine view is based on recent improvements in a number of investment determinants. In terms of returns, a continued rise of the capacity utilization rate as well as robust GDP growth should help raise incentives for firms to invest in new capacity. Cost of capital should meanwhile stay low and supportive of the investment recovery as interest rates will probably not rise significantly in the near future given remaining excess liquidity in the banking sector. Corporate debt restructuring should progress, albeit somewhat slowly, and with a continued improvement in the health of the banking sector, a noticeable increase in bank credits is not unrealistic for the near future. This resumption of bank credits to the corporate sector would add on to the current momentum of private investment, something that has been absent so far in this recovery cycle. Our view is of course not without risks. One potential downside risk is capricious business confidence that could be easily and adversely influenced by a wide range of factors. A significant and sustained increase in oil prices or terrorism can certainly derail business confidence and delay capital spending.

Chapter III
Policies and Private Investment

This chapter links monetary policy with key determinants of private investment, aiming in particular to assess the importance of its transmission channels. The paper then concludes with policy recommendations for the promotion of sustainable private investment growth.

III.1 Influence of Monetary Policy on Determinants of Private Investment

This section uses vector auto-regression (VAR) analysis to ascertain the dynamic consequences of a change in the policy interest rate on key determinants of private investment, namely, real MLR, the corporate leverage ratio, Tobin's q, GDP, and the rate of capacity utilization. The VAR approach enables us to sidestep the need for structural modeling by treating every endogenous variable as a function of the lagged values of all endogenous variables in the system.

To anticipate the results, monetary policy should have a direct influence on commercial banks' lending rates, which reflect in turn the cost of capital, with a relative short time lag. To the extent that it also affects market confidence and causes a shift in portfolio allocation, thereby moving the stock index, monetary policy is likely to influence Tobin's q which has been found to closely track stock prices from Chapter II. Note that in this paper we consider the leverage ratio to be an indicator of firms' financial constraint. Therefore, it is expected to respond quite fast to monetary policy relative to when it is taken to reflect firms' optimal decision regarding their liability structure. This assumption is deemed reasonable given that we are dealing for the most part with the crisis and post-crisis periods during which banks are reluctant to lend. Unlike financial variables, real variables such as GDP and capacity utilization are expected to be influenced by monetary policy in a less direct manner and with longer time lags.

We choose the 14-day repurchase rate to be the monetary policy variable. Each VAR system includes real output (GDP), the consumer price index (PRICE), the 14-day repurchase rate (RP14), and one of the following determinants of private investment: commercial bank lending rate (MLR), the leverage ratio (DE), Tobin's q (TOBINQ), and the rate of capacity utilization[25] (CAPU). In addition to a constant term, our VAR contains the baht/USD exchange rate and terms of trade as exogenous variables, in part to control for the financial crisis of 1997.[26] The observations are quarterly, with all variables seasonally adjusted and in logarithmic terms except for interest rates, and the results are estimated up to 2003Q1 with two lags.[27] While the optimal lag length under various criteria appears to be one quarter, we follow Disyatat and Vongsinsirikul[28] in opting for two quarters as one quarter is likely to be too short to capture the underlying dynamics of the system and longer lags would constrain the estimation's degree of freedom.

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[25] Capacity utilization excluding liquor

[26] A dummy variable for 1997Q3 (1997Q4) is entered as another exogenous variable in the VAR system with MLR (DE) to help take care of the extraordinary impact of the financial crisis.

[27] VAR systems with MLR, DE, TOBINQ, and CAPU are estimated from 1993Q3, 1994Q4, 1993Q3, and 1995Q3, respectively. We attempt to use the longest sample range given data availability.

[28] Disyatat and Vongsinsirikul (2003)

We also keep the ordering of our variables consistent with Disyatat and Vongsinsirikul. In particular, GDP is assumed not to be affected contemporaneously by shocks to other variables in the system, while RP14 responds to innovations in GDP and CPI within the same period. This reflects an assumption about the speed with which the variables respond to shocks, with output being the least responsive, followed by prices, and finally interest rates.[29] Financial variables like TOBINQ and DE are assumed to respond more slowly than interest rates but faster than CPI. Capacity utilization rate, however, is expected to respond rather slowly and is hence ordered between GDP and CPI. Nevertheless, it should be noted that the results are fairly robust to alternative ordering.

Figure 24 traces out the implied dynamic paths of MLR, PRICE, and RP14 in response to an unexpected tightening of monetary policy, represented here as an approximately 1 percent increase in RP14.[30] MLR is shown to follow a humped-shape response, rising to the peak of about 0.14 percent after 2-3 quarters before largely dissipating after 8 quarters. PRICE begins to decline after 4 quarters, but the reduction seems small though quite persistent. As PRICE responds very little, real MLR is expected to rise following an increase in RP14 for about 8 quarters by nearly as much as nominal MLR. This suggests that policy transmission through cost channel is likely to be important.

Figure 24

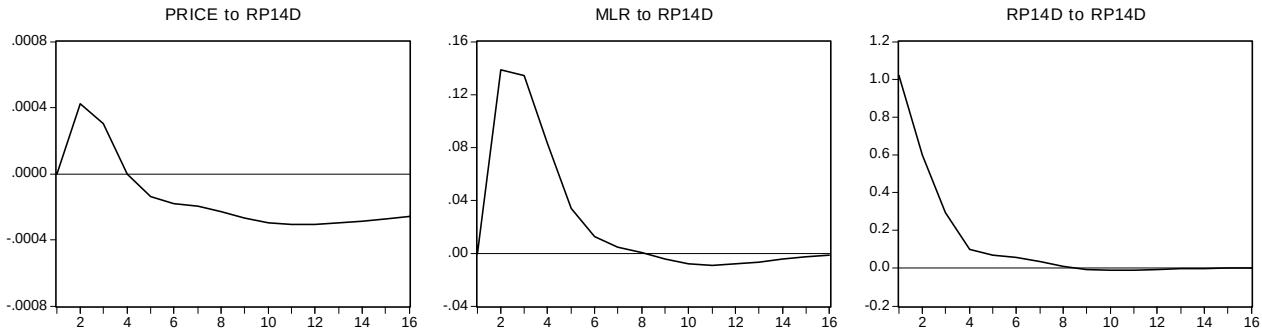

Figure 25 presents the dynamic responses of other determinants of private investment to the same innovation in RP14. All variables take their predicted directions. DE is shown here to respond quickly to an innovation in monetary policy, with the peak of about 1.7 percentage increase after 2 quarters. This suggests that an increase in RP14 leads initially to tighter financial constraints on firms. The impact then declines quickly and turns slightly negative after 3-5 quarters before dissipating altogether after 8 quarters. It thus seems that firms can make some adjustment to their DE over time, i.e., choosing to deleverage when the cost of borrowing is high. It should be noted, however, that we believe this adjustment path of DE, especially the speed of its response, is somewhat specific to the sample period used. As DE was highly affected by extreme exchange rate movements in the early periods of the exchange rate float, the response of DE was likely to be more sensitive at that time than under normal circumstances, and hence the VAR result for DE should be interpreted with caution and not overly generalized.

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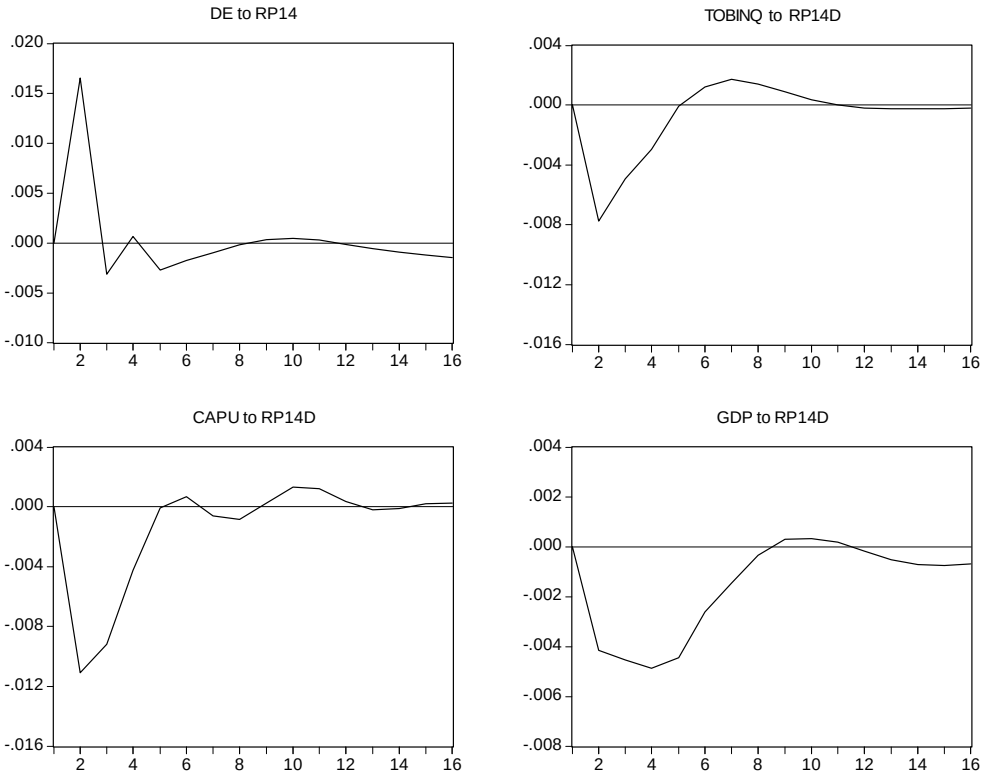
[29] Disyatat and Vongsinsirikul (2003)

[30] This is equivalent to a RP14 innovation of one standard deviation.

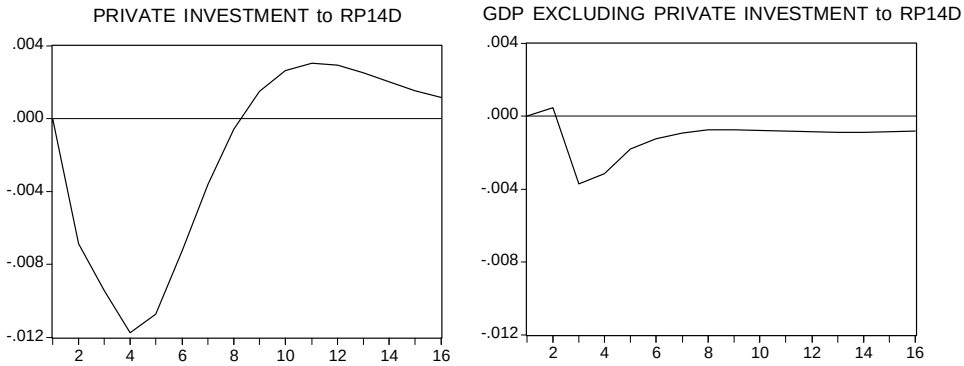
Figure 25: Determinants of Private Investment



As for TOBINQ, the negative response lasts about 5 quarters, but the maximum impact is less than -1 percent. Capacity utilization responds to the increase in RP14 with a U-shaped path which bottoms out after 2-3 quarters (at -1.1 percent) and dissipates after 5 quarters. GDP also follows a U-shaped path, bottoming out after 4-5 quarters (at around -0.5 percent) and dissipating after 7-8 quarters.

Finally, our VAR results (Figure 26) confirm Disyatat and Vongsinsirikul's finding that monetary policy operates on the real economy largely through its impact on investment, in particular private investment.

Figure 26



From these results, we conclude that monetary policy takes influence on private investment via many channels. While cost and credit availability variables such as real MLR and the leverage ratio do respond relatively more to a change in monetary policy as expected,[31] thus confirming the transmission via **cost channel**, the fact that small changes in returns variables such as capacity utilization and GDP can have an important impact on private investment, as indicated by the relative magnitude and significance of their coefficients from Chapter II, suggests that the influence through **returns channel** is also significant and possibly even stronger than through cost channel. However, given that monetary policy affects market confidence and expectation variables such as Tobin's q to a lesser extent compared to cost and returns variables, plus the magnitude of Tobin's q's coefficient is somewhat smaller than most other variables, transmission through **expectation channel** on the whole is likely to be a bit weaker than cost and returns channels.

III.2 Sustainable Output Growth Through Sustainable Private Investment

In Chapter I we argue that private investment has thus far taken up a relatively small role in the present economic recovery. This is due mainly to the slow revival of private investment activity in the post-crisis period, owing in part to excess industrial capacity as a consequence of over-investment in the period leading up to the financial crisis. Such sluggishness in the recovery of private investment is also highly noticeable compared to other regional countries.

In order for private investment to contribute more to output growth at this juncture, private investment growth must exceed output growth and the ratio of private investment to GDP must rise. The good news is that all determinants of private investment are pointing in the right direction, and in the absence of unexpected severe shocks, private investment is set to take off.

Nevertheless, complacency must be avoided. Experience has taught us that high growth of private investment alone is not enough to sustain high output growth in the medium term. Moreover, private investment growth that is too high can jeopardize economic stability. What is needed at this juncture is rather an acceleration of private investment growth that is supported and justified by economic fundamentals. We thus highlight three prerequisites for a balanced and sustainable private investment growth in Thailand.

Prerequisite 1: Appropriate Monetary Policy Framework

A grave mistake in the earlier half of the 1990s was to allow the economy to expand far beyond market fundamentals. Private investment growth was strikingly high despite a continued deterioration in returns on investment. That happened largely because market expectations of future returns were overly optimistic while the cost of investment was also much understated. In particular, private assessment of investment cost overlooked exchange rate risks, and the Thai economy was effectively subsidizing investment through a pegged exchange rate by keeping the cost of external borrowing low at the expense of severe external imbalances that eventually proved too costly to bear.

[31] A 0.14 percentage point increase in real MLR is equal to a change of 2 percent when real MLR is 7 percent per annum.

Such macroeconomic policy mistake cannot be repeated, and in this respect, **flexible exchange rate under inflation targeting framework is serving Thailand well**. Firstly, some exchange rate volatility makes risk perception more realistic. Secondly, when investment in Thailand looks attractive (unattractive) vis-à-vis other countries, funds for investment rush in (out) and, with a faster (slower) accumulation of capital, work to lower (raise) MP_K in Thailand. This downward (upward) push in MP_K can be partially offset by an appreciation (depreciation) of the exchange rate, however. As funds rush in (out) and the baht appreciates (depreciates), additional investment in Thailand becomes more (less) expensive in the eyes of investors who must now put in more (less) foreign currency for each new baht invested in Thailand. In addition, a stronger (weaker) baht will dampen (boost) exports and hence future output growth, thereby lowering (raising) expected returns on investment. Through such mechanism, a flexible exchange rate thus acts as an automatic stabilizer to discourage excessive capital flows, both inward and outward, and should help keep MP_K relatively stable. Without a subsidy to investment via a public guarantee against exchange rate risks, it also means that private cost of capital and social cost of capital are brought closer together than under a pegged exchange rate regime. This should allow market forces to work more efficiently, and hence the probability of incurring severe imbalances both externally and domestically is substantially reduced.

Besides the flexible exchange rate, policy reaction under inflation targeting provides yet another automatic stabilizer for the economy. For instance, when demand is overheating and animal spirit fuels private investment activity through higher and perhaps unfounded expected returns, it is likely that underlying price pressure would rise and that calls for an increase in the policy interest rate under inflation targeting framework. Given that a change in the policy rate can have material impact on private decisions regarding investment as shown in Section III.1, this would work to curb private investment growth and keep private sector-driven over-investment in check. Thus, monetary policy under inflation targeting framework is an effective demand management tool, at least in the short run, and the built-in mechanism fosters efficient market-based decisions, i.e., keeping their outcomes consistent with the true fundamentals of the economy.

Therefore, we conclude that in safeguarding against economic imbalances, including sub-optimal investment decisions, Thailand should maintain its current monetary policy framework of inflation targeting with flexible exchange rate.

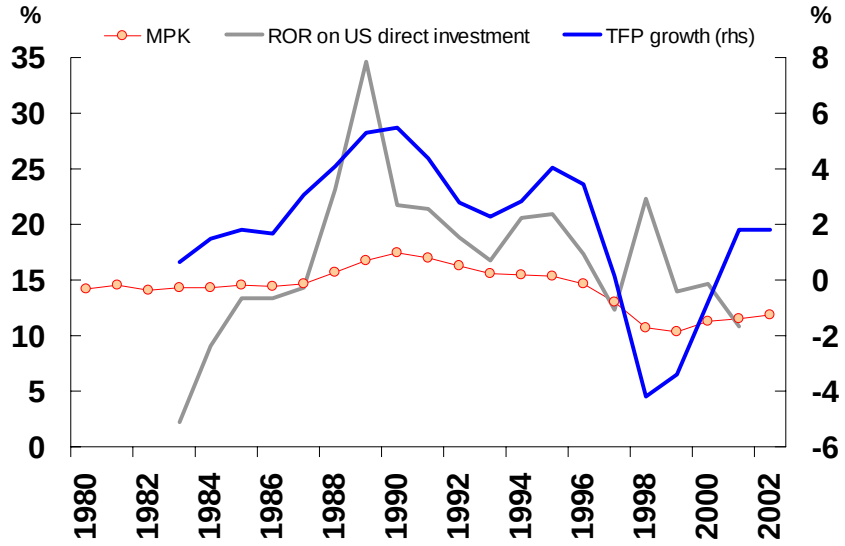
Prerequisite 2: Enhancement of Returns on Investment

The first ingredient offers an environment where market-based decisions are likely to operate efficiently. It does not guarantee, however, that new investment will take place for the reason that the activity is justified only when returns on investment exceeds cost of investment. **The key to promote new investment is to keep returns on investment attractive relative to cost**.

Even though there are at present emerging signs of recovering returns on investment in Thailand, with MP_K and TFP edging up in the most recent years (Figures 17 and 18) and quarterly ICOR falling since 2001 (Figure 6), the fact that we have done better in the past and are currently lagging behind some regional countries like Korea in terms of investment efficiency suggests that there is room for improvement.

How can we make returns on investment more attractive going forward? The answer seems to lie in the improvement of TFP growth for in the case of Thailand TFP growth tracks MP_K with a high correlation of 0.90 (Figure 27).[32] This suggests that efficiency gains in Thailand owe much to the improvement of factors complementing capital use, which leads in turn higher returns to capital inputs.

Figure 27: Selected Indicators of Investment Efficiency



Sources: US Department of Commerce, authors' calculations

Many factors have been documented in the economic literature as having positive associations with TFP growth. They include trade openness, foreign direct investment, market competition, human capital accumulation, information technology, and research and development (R&D).

We believe that the Thai economy is already quite open, ranking third among selected regional countries in terms of trade openness and second as FDI host country (Table 9). The fact that openness encourages competition and allocative efficiency and hence is associated with stronger TFP growth is widely established. For the case of Thailand, however, while remaining open is undoubtedly beneficial to TFP growth, significant additional gains in efficiency are unlikely to come from this factor given the country's existing level of openness.

On other fronts, in contrast, **Thailand can potentially benefit enormously from greater improvement in human capital, information and communication technology (ICT), and research and development (R&D)**. In terms of human capital, Thailand already has a high literacy rate compared to other regional countries, thanks to a strong foundation in basic education. However, the country still lags behind in higher education, with its secondary school participation rate of only 55 percent compared to above 90 percent in Korea and Singapore. To the extent that a better educated labor force facilitates technology improvement and hence raises MP_K, pushing secondary and tertiary school enrollment closer to that of Malaysia, Singapore, and Korea will most probably lead to higher TFP growth in Thailand.

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[32] Three-year moving average of MP_K is used, and correlation is calculated over the period between 1983 and 2002.

Table 9: Selected Determinants of TFP Growth

	Openness to trade [2/] (X+M)/(2xGDP)	FDI inflows [2/] (%GDP)	Adult literacy [1/] (%)	High school [1/] enrollment (%)	Computers [3/] (per 1000 persons)	IT skills availability [4/] (scale 1-10, 10=best)	Telecom investment [1/] (%GDP)	R&D [2/] (%GDP)
Indonesia	37.9	-2.3	86.8	47.5	13	4.9	0.5	<0.1
Korea	41.4	0.8	97.8	94.4	342	7.7	0.8	2.9
Malaysia	109.4	0.6	87.4	82.1	137	7.7	1.2	0.5
Philippines	50.2	2.5	94.9	50.9	25	8.1	0.6	0.1
Singapore	167.4	12.9	92.3	92.0	596	8.5	1.1	2.1
Thailand	**67.3**	**3.3**	**95.5**	**55.4**	**43**	**6.1**	**0.4**	**0.3**
(rank)	**(3)**	**(2)**	**(2)**	**(4)**	**(4)**	**(5)**	**(6)**	**(4)**

[1/] 2000 [2/] 2001 [3/] 2002 [4/] 2003 Source: IMD World Competitiveness Yearbook, 2003

Likewise, Thailand can benefit from an improvement in ICT as well as R&D. At present, the level of computer penetration is only one-third that of Malaysia and less than one-tenth of Singapore, and survey results reveal a disturbingly low rating for IT skills in Thailand, falling considerably behind other regional countries except for Indonesia. Furthermore, Thailand currently invests the least in telecommunications among regional countries and continues to allocate modest budget for R&D compared to Singapore and especially Korea. As the world moves towards keener competition, especially in speed and in service quality, only well-informed providers of goods and services will remain competitive in the global arena. To keep Thai producers well informed and hence render their investment in other capital investment more productive, more intensive ICT investment[33] is very much needed at this juncture. Thus, we would like to see a rise in ICT investment as a proportion of GDP and of total investment for the period to come.

Prerequisite 3: Structural Reforms to Remove Impediments to Private Investment Growth

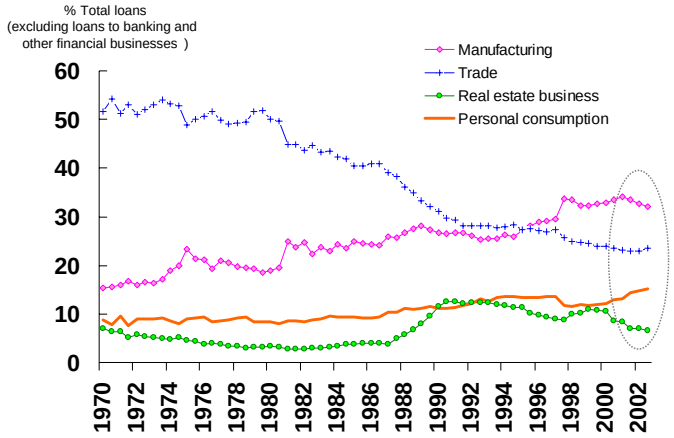
At present, the macroeconomic environment has already set the stage for private investment to take off, but unfortunately it has not been sufficiently complemented by structural reforms. For example, commercial banks continue to be saddled with non-performing loans (NPLs) and as a result credit growth remains sluggish. This limits firms' access to external funding and keeps the cost of investment unnecessarily high. Moreover, while many countries vie to attract foreign investment by reducing the cost of conducting business locally, Thailand has made little progress to compete. At the same time, better financial intermediation and more comprehensive data on economic efficiency and productivity can also contribute meaningfully to a sustained growth in private investment. We discuss these issues in turn:

[33] ICT investment includes investment in telecommunications, computer hardware, and computer software.

Corporate Debt Restructuring

Although bank loans have begun to recover, loan growth continues to be in the single-digit range. This is considered low for the current stage of economic recovery, and there is also evidence that banks are preferring loans to households over loans to the industrial sector (Figure 28). Given that bank loans still constitute the most important source of corporate funding despite firms' ability to tap alternative sources in recent years, bank loans—especially industrial loans—need to pick up more strongly to support the investment take-off.

Figure 28: Selected Types of Commercial Bank Loans



Source: Bank of Thailand

The key to that lies in **a speedier resolution of NPLs**, which is a priority issue in the immediate run. At present, the CDRAC-led initiative to accelerate NPL resolution at private banks has fallen behind schedule, and even though the TAMC has met its stated targets, the agency still has a large number of cases on the way. As a result, the ratio of NPLs to total loans of commercial banks stays at 15.86 percent as of end-June 2003 compared with 15.73 percent at end-December 2002, and the economy-wide level of distressed assets continues to be high. All these imply a much too slow progress in NPL resolution, and the issue warrants continued attention from policy-makers. It is only when the economy-wide NPL problem is resolved and banks rid of high provisioning burden that loan growth can rebound to double-digit level and become truly broad-based.

At the same time, Thailand ought to make sure that NPL resolution is accompanied by the necessary **corporate restructuring**. In an economic upturn, even bad firms survive, only to run into difficulties in the subsequent downturn of the business cycle. It is therefore imperative that weak operational inefficiency be repaired early on. Not only so, for new credits not to turn into new NPLs down the road, implementation of **cash flow-based prudential guidelines** and **more stringent risk management practice** on the part of commercial banks must be forceful. Better **corporate governance** can also help foster prudent investment decisions undertaken by firms. In particular, it is important that firms maximize returns to shareholders and keep their operations transparent. Regarding their investment decisions specifically, the setting up of a high-level investment committee to carefully evaluate the returns, costs, and risks of investment projects is strongly encouraged.

Bureaucracy

When asked whether or not bureaucracy hinders business practice, Thailand does not score poorly against other regional countries. However, Thailand is still perceived to suffer from fairly prevalent bribing and corruption, and the score in this category falls far behind that of Singapore (Table 10). To the extent that corruption lowers investors' confidence and adds cost to local as well as foreign businesses, it is likely to deter foreign investment, hinder national competitiveness, and reduce TFP growth.

Therefore, **the government should forcefully crack down corruption**. At the same time, **red tape, slow decision-making, and inflexibility of rules and regulations ought to be minimized** to limit loopholes for extortions and lower the cost of doing bona fide business in Thailand relative to other countries. On this note, we suggest not only that all investment-related rules and regulations be reviewed as one package but also that they be kept consistent with, if not more appealing than, other emerging countries' practice.

Table 10: Bureaucracy and Corruption

	Bureaucracy*	Corruption*
Indonesia	1.8	0.8
Korea	3.0	3.4
Malaysia	5.2	4.9
Philippines	2.3	1.4
Singapore	6.4	8.6
Thailand	**4.2**	**2.7**
(rank)	**(3)**	**(4)**

* 2003 survey, graded on a scale of 1-10, with 10 = best
Source: IMD World Competitiveness Yearbook, 2003

Financial Intermediation

To promote longer-run economic efficiency, the financing of each investment project should match its risk profile and time horizon. For instance, a small start-up company (a "high risk, high return" project) should be funded through long-term venture capital rather than short to medium-term bank loans or debt instruments. This points to the necessity of efficient and effective financial intermediation, and right now **Thailand can certainly benefit from a larger menu of financial instruments offered to both borrowers and savers**. This will enable borrowers to avoid maturity and currency mismatches between their revenues and liabilities and savers to choose their asset allocations more flexibly according to risk appetite.

On a related note, even though current account deficit is not a problem in Thailand at present, the return of current account deficit is expected in the medium run. Prudence suggests, however, that the deficit be kept within 3 percent of GDP, which also means that domestic investment can no longer exceed domestic saving by more than 3 percent of GDP. Under such restraint, saving mobilization may be necessary in the medium term to carry on high investment growth, and the success of that will hinge crucially on the efficiency of financial intermediation, most importantly the availability of saving options.

Information

In deliberating business and policy decisions, one of the most crucial ingredients is **accurate and timely information**. For the case of Thailand, credit bureaus have been set up, but the use of such credit information is still limited by legal issues and the lack of incentives to provide public good-type credit information on the part of large market players. Thus, obstacles to the use of such information channel should be tackled to mitigate the problem of asymmetric information and adverse selection associated with credit lending. This will help to reduce commercial banks' reluctance to lend, especially to smaller borrowers, and should thereby facilitate the recovery of credit growth. At the same time, Thailand can benefit from better data on labor productivity such as unit labor cost, which is a commonly used indicator for cross-country comparison of economic efficiency.

Conclusion

A grave mistake during the period leading up to the 1997 financial crisis was to allow the economy to expand far beyond market fundamentals. Private investment growth was strikingly high despite a continued deterioration in returns on investment. At that time over-investment took place largely because market expectations of future returns were overly optimistic while the cost of investment was also much understated. In particular, private assessment of investment cost overlooked exchange rate risks, and the Thai economy was effectively subsidizing investment through a pegged exchange rate by keeping the cost of external borrowing low at the expense of severe external imbalances that eventually proved unsustainable.

Six years after the crisis, the legacy of over-investment in the early 1990s remains. Though showing noticeable improvement recently, industrial capacity utilization continues to stay below the pre-crisis level and has thus far provided modest incentive for new investment. As a result, the ratio of private investment to GDP hovers around 14 percent at present, compared to 26 percent during 1986-1990 and 33 percent during 1991-1996.

Although the economy is once again on a distinct recovery path, economic growth cannot be sustained for long without greater contribution from private investment. This is because historically private investment always served as a main thrust of growth during an upward cycle. Consequently, for this recovery to last, Thailand would require private investment to significantly outpace GDP, which will lead in turn to a higher ratio of private investment to GDP over time.

The good news is that private investment looks set to accelerate in the near future as all key factors are pointing in the right direction. Returns on investment are recovering as output growth is favorable and industrial capacity utilization begins to accelerate more strongly. Meanwhile, cost of capital is falling in tandem with interest rates, and financial constraints on the corporate sector have eased considerably, for example, with a continued decline in the corporate leverage ratio. There is also an extra boost coming from stronger business sentiments, evidenced by the SET index which has outperformed all major stock markets in the region since the beginning of this year. This suggests that many firms should soon be looking for new investment projects.

Accommodative monetary policy has played an important role in fostering the present recovery of private investment. Empirical results show that monetary policy affects private investment not only through the cost channel via changes in interest rates but also through the rate of return and confidence channels.

The crucial point to note is that higher growth of capital inputs is a necessary but not sufficient condition for sustainable output growth over the medium term. Moreover, we know from experience that investment growth that is too high can jeopardize economic stability. It is thus imperative that public policies help foster a balanced growth of private investment at this juncture. On this note, the current monetary policy framework of inflation targeting with flexible exchange rate is serving Thailand well as it encourages efficient market decisions by bringing private and social costs of investment closer together. As a result, the probability of incurring severe economic imbalances both externally and domestically has been greatly reduced.

Going forward, industrial productivity must be raised to further boost returns on investment, and initiatives that are likely to be effective in this respect are human capital improvement and higher research and development (R&D) spending. The government should also help remove current obstacles to private investment growth, for

example, by expediting corporate debt restructuring, promoting better financial intermediation, and cutting down red tape which continues to impose material cost on business practice in Thailand.

Appendix I

Table 11: Medium-Term Projection*

%Δ year-on-year	2003	2004	2005	2006	2007	2008
Real GDP	4.3	5.2	5.2	5.3	5.3	5.5
Real private investment	10.6	13.1	14.0	13.5	14.0	14.0

Note : * Forecasted in May 2003 by the authors

Appendix II

In this paper, we calculate total factor productivity growth using the Cobb-Douglas production function:

$$Y_t = A_t K_t^{\alpha} L_t^{1-\alpha}$$

Where Y denotes the amount of output; A is the level of technology whose change constitutes TFP growth; K denotes the amount of capital used as input; L denotes the amount of labor used as input; α (1-α) denotes the share of capital (labor) input; and t is the time subscript.

Two different approaches are used to calculate the share of capital, α, as follows:

(1) National Accounts Approach

This method uses data from the national accounts statistics to estimate factor share of capital and labor. Income to each factor input is assigned as follows:

Table 12: Distribution of National Income

Labor	Capital	Ambiguous
• Compensation of employees	• Income from property received by households • Savings of corporations • Direct taxes on corporations • Corporate transfer payments • General government income from property and entrepreneurship	• Income from farms, professions, and other unincorporated enterprises • Corporate transfer payments • Interest on public debt • Interest on consumers' debt

Note in particular that there are some items which we cannot assign specifically to either labor or capital. We thus distribute these ambiguous items to both labor and capital according to the proportions of unambiguous items.

(2) Sarel's Approach

Sarel uses a large sample of countries to estimate sectoral capital shares. The most critical assumption here is that the same type of activity, such as agriculture or manufacturing, requires fundamentally the same capital intensity across countries and over time. Therefore, one country's total capital share at any point in time is determined by its supply-side composition. That is, the total capital share (α) is a weighted average of sectoral capital shares, and total labor share is the residual, 1-α.

Table 13: Capital Share for Each Activity

Activity/Sector	Capital Share
Agriculture	0.275
Quarrying	0.601
Manufacturing	0.308
Utilities	0.538
Construction	0.189
Commerce	0.232
Transport and communication	0.320
Financial and business services	0.604
Government and other services	0.081

Appendix III

Table 14: Regression Results Using Alternative Dependent Variables

Sample: 1995Q4 - 2003Q1	(1)	(2)	(3)
Dependent variable	Growth of private investment	Growth of private equipment investment rate	Growth of private equipment investment
	%Δ Ip	%Δ(Ipe/GDP)	%Δ Ipe
Constant	8.23[b] (3.63)	7.63[c] (4.07)	11.69[b] (5.02)
Growth of capacity utilization (-2)	0.94[a] (0.15)	0.75[a] (0.16)	0.82[a] (0.18)
Real MLR (-1)	-1.31[b] (0.50)		
Real MLR (-2)		-1.26[b] (0.56)	-1.78[b] (0.69)
Growth of Tobin's q (-2)	0.31[b] (0.11)	0.44[a] (0.12)	0.49[a] (0.15)
Growth of leverage ratio (-1)	-0.15[a] (0.03)	0.12[a] (0.04)	-0.16[a] (0.04)
Interest coverage ratio (-1)			
Growth of real GDP (-1)	1.82[a] (0.28)	1.35[a] (0.30)	1,84[a] (0.36)
Dummy96Q4&97Q1	18.33[a] (2.27)		
Dummy96Q4		32.47[a] (3.33)	29.75[a] (4.12)
Dummy97Q1		-9.45[b] (3.64)	
Number of observations	30	30	30
Adjusted R^2	0.90	0.88	0.85
Durbin-Watson statistics	1.84	1.63	1.69
LM test w/ 2 lags (p value)	0.28	0.14	0.76

Numbers in parentheses are standard errors.
***,**, and * denote statistical significance at 1, 5, and 10 percent, respectively.

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