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Policy Discussion Paper

No. 0030

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**(IR)RELEVANCE OF CURRENCY CRISIS THEORY
TO THE *DEVALUATION AND COLLAPSE*
OF THE THAI BAHT**

Ramkishan S. Rajan

July 2000

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OF THE THAI BAHT**

Ramkishen S. Rajan

Centre for International Economic Studies,
School of Economics,
Adelaide University, Australia
and
Institute of Southeast Asian Studies, Singapore
E-mail: ramkishen.rajan@adelaide.edu.au

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Detailed comments and suggestions on earlier versions of this paper by Sven Arndt, Art Denzau, Gene Grossman, Tom Willett and two anonymous referees are much appreciated. The author is also grateful for general comments and encouragement by Tom Borchering. Harminder Chyle provided excellent research assistance which ensured timely completion of this paper, as did Tracy Yang and Regan Engelhardt. Thanks also go to Sakulrat Montreevat for help with the interpretation of some of the Bank of Thailand data. Partial financial support from Adelaide, Claremont and ISEAS is gratefully acknowledged. The usual caveat applies.

All dollars (\$) refer to US\$.

(IR)RELEVANCE OF CURRENCY CRISIS THEORY TO THE *DEVALUATION AND COLLAPSE OF THE THAI BAHT*

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Abstract

This paper provides a detailed study of the crisis in Thailand with the goal of determining the usefulness of existing currency crisis theory to the breakdown of the baht's *de facto* dollar peg in 1997-98. We do not attempt to provide a comprehensive survey of the currency crisis literature; nor do we add *directly* to the empirical and theoretical literatures on currency crises. Rather, our goal in this paper is to examine, through the lens of the existing currency crisis literature, the sequence of events culminating with the *devaluation* of the Thai baht in July 2, 1997 and the financial and economic *collapse* thereafter. But why do we concentrate on Thailand in particular? First, the devaluation of the baht is widely acknowledged as the dawn of the East Asian crisis. Second, and in relation to this, given that Thailand was the first domino to fall, there seems to be greater debate/disagreement as to whether the Thai crisis was "fundamentals-based" or due to "self-fulfilling expectations". Given our emphasis on Thailand, we do not address the issue of the reasons for the widening and deepening of the crisis from Thailand to the rest of East Asia and beyond (i.e. "contagion").

Key words: *capital flows, currency crisis, multiple equilibria, Southeast Asia, Thailand*

JEL Classification: *F31, F33, F41*

1. Background and Introduction

The 1990s have seen an accelerated progress towards the liberalization and integration of global financial markets, a process that began in earnest in the 1980s. Developing countries have enjoyed a surge in capital inflows, which reached an all time high of \$190 billion (bn) in 1996, more than ten times the average annual flow between 1984 and 1989 (Table 1). The increasing globalization of finance and capital flows has however not been an unmitigated blessing, as this period has simultaneously witnessed several episodes of severe financial turbulence worldwide. Indeed currency crises seem to have been the norm rather than the exception since 1992¹.

Specifically 1992-93 marked the breakdown of the European Exchange Rate Mechanism (ERM). The Italian lira and the British pound were withdrawn from the ERM, three other currencies were devalued, and there was a substantial widening of the bands within which the currencies could fluctuate. In 1994-95 there was the Mexican crisis which saw a steep devaluation of the peso and Mexico at the brink of default. There were also some spillovers effects to Argentina and Brazil (so-called "Tequila effect"). The world experienced the effects of the East Asian crisis between mid 1997 and mid 1998, which started somewhat innocuously with a run on the Thai baht, but swiftly spread to a number of other regional currencies, most notably the Indonesian rupiah, the Malaysian ringgit, the Philippine peso and the Korean won. Other large emerging market currencies such as Russia and Brazil also experienced periods of intense market selling and required the assistance of the IMF. The Russian ruble was devalued in August 1998 while the Brazilian real's peg was

¹ We use the terms "currency crisis", "exchange rate crisis" and "balance of payments crisis" interchangeably in the paper. The terms "speculators" and "speculative attacks" are also used rather loosely, these just as easily denoting arbitragers and arbitrage activities (terms that are probably more appropriate in many instances). We make no distinction here between fiscal and monetary (central banking) authorities, taking the "policy maker"/"government"/"monetary authority" to be a monolithic body.

eventually broken in January 1999. Some other smaller emerging countries such as Turkey and Ecuador also experienced currency crises in the 1990s.

These waves of currency crises have inspired widespread interest in currency crisis models and their corresponding implications for economic policy. The East Asian crisis of 1997-98, coming as it did on the heels of the ERM and Mexican crises, has further motivated a large body of academic research on the theory and empirics of currency crises. At the risk of generalizing, this literature may be divided into three broad categories. First, are the burgeoning empirical papers that attempt the ambitious task of developing a set of indicators - early or distress warning systems - to “predict” currency and banking crises². Second, are the theoretical papers that aim to capture seemingly important facets of recent crises in emerging economies (such as government guarantees and the role of the financial sector). Third, are the descriptive studies on the East Asian crisis in general³, or those specifically on individual crisis-hit East Asian countries.

There are important limitations to each of these strands of the literature. On the one hand, by making theoretical and empirical generalizations by examining the East Asian region as a whole rather than each crisis-hit country separately, the first two lines of research as well as the East Asian descriptive studies tend to blur potentially important differences between individual regional economies (Corsetti, 1998). On the other hand, the individual country descriptions are open to the criticism of, by and general, having conducted the discussion “within a vacuum” rather than within the context/confines of the currency crisis literature.

In view of the above, this paper provides a detailed study of the crisis in Thailand with the goal of determining the usefulness of existing currency crisis theory

² For instance, see Berg and Patillo (1999), Frankel and Rose (1996), Kaminsky (1999) and Kaminsky et al. (1998).

³ The East Asian descriptive studies we have in mind here include, but are not limited to, Berg (1999), Corsetti et al. (1999a), Radelet and Sachs, (1999a,b), Rajan (1999) and World Bank (1998).

to the breakdown of the baht's *de facto* dollar peg in 1997-98. We do not attempt to provide a comprehensive survey of the currency crisis literature; nor do we add *directly* to the empirical and theoretical literatures on currency crises. Rather, our goal in this paper is to examine, through the lens of the existing currency crisis literature, the sequence of events culminating with the *devaluation* of the Thai baht in July 2, 1997 and the financial and economic *collapse* thereafter. Such a study takes on added significance in light of the growing skepticism voiced by some observers about currency crisis models. For instance, Rodrik (1998) has noted that:

(a) sad commentary on our understanding of what drives capital flows is that every crisis spawns a new generation of economic models. When a new crisis hits, the previous generation of models is judged to have been inadequate (p.58).

But why do we concentrate on Thailand in particular? First, the devaluation of the baht is widely acknowledged as the dawn of the East Asian crisis. Second, and in relation to this, given that Thailand was the first domino to fall, there seems to be greater debate/disagreement as to whether the Thai crisis was “fundamentals-based” or due to “self-fulfilling expectations”. Given our emphasis on Thailand, we do not address the issue of the reasons for the widening and deepening of the crisis from Thailand to the rest of East Asia and beyond (i.e. “contagion”)⁴.

⁴ With regard to contagion in East Asia, to be precise, the regional crisis might be divided into four sub-periods. The devaluation of the Thai baht was the first period (July 1997). The second period was when the contagion spread to the other Southeast Asian countries (Indonesia, Malaysia and the Philippines specifically) between July and mid October 1997. The third period was when the crisis engulfed the larger East Asian region (Hong Kong, Singapore, South Korea and Taiwan) following the pre-emptive devaluation of the New Taiwan dollar in October 1997. Once the South Korean won was devalued in November 1997, this then reverberated back to the Southeast Asian countries in general. This was the fourth period (Berg, 1999). The crisis intensified in mid 1998, but this was due to a pronounced liquidity crunch in emerging markets as a whole following the Russian debt moratorium (IMF, 1999a). See Dornbusch et al. (2000) for an overview of the recent contagion literature and Pritsker (1997) and Forbes and Rigobon (1999) for recent surveys on the theoretical and empirical aspects of contagion respectively. The World Bank has assembled a comprehensive collection of recent papers on contagion on their website: <http://www1.worldbank.org/economicpolicy/managing%20volatility/contagion/index.html>

Roadmap of the Paper

The remainder of this paper is organized as follows. The next section highlights the various categories of currency crisis models under consideration in this paper. Given the presence of some definitional ambiguities in the literature, we make explicit the scope and definitions of the various categories of models. Before the relevance - or lack thereof - of the currency crisis literature to the Thai crisis can be evaluated, we examine macroeconomic data on the boom and bust sequence of capital flows experienced by the country in section 3. We proceed to investigate the relevance of the existing currency crisis literature to the Thai crisis in the next two sections. To anticipate the main findings of these sections, we argue that the Thai crisis may be divided into two distinct but related events, viz. the *initial devaluation* and the ensuing *financial panic*. While the initial devaluation itself was largely fundamentals-based (i.e. a case of unique equilibrium) due primarily to financial and monetary considerations (section 4), it provoked a confidence crisis and an international bank panic, the end result of which was an outright financial and economic collapse (section 5). Section 6 offers a summary by way of concluding.

2. Categories of Currency Crisis Models

It is important to clarify and classify at the outset the various models of currency crisis that we have in mind in this paper. Three broad groups or “generations” of currency crisis models may be delineated.

2.1 First and Second Generation Crisis Models

The classic approach to balance of payments crises was laid out in the papers by Krugman (1979) and Flood and Garber (1984) - henceforth referred to as KFG. They showed how, within a monetary framework, the presence of rational, forward looking speculators would hasten the breakdown of a fixed exchange rate regime that was inherently unsustainable due to the policymaker’s attempt at

monetizing a persistent fiscal deficit.

In contrast to this “first generation” currency crisis model, “second generation” models are highly varied in their set up but share two basic traits: (i) there is a reason why the policymaker is tempted to opt out of defending the parity (viz. interest costs of defending the peg and the payoffs to devaluation per se); and (ii) there is a reason why the policymaker would like to hang on to the fixed exchange rate (viz. political credibility/reputational benefits). Thus there is a tension between motives (i) and (ii). Abandonment of the peg is ultimately a policy decision, the exchange rate being used as an optimization tool as the policymaker weighs the costs and benefits of devaluing the currency. In other words, this class of models has in common “escape clauses” *a la* Flood and Isard (1989) and Obstfeld (1997) in which the policymaker uses discretion in the event of exceptional circumstances (i.e. the escape clause is invoked) otherwise it follows a policy rule.

Models of this genre show that there is a zone of weak fundamentals (“crisis zone”) in which a crisis may or may not occur. Within the crisis zone, if private agents expect a devaluation, the costs of maintaining the parity (in terms of increasing interest rates and wages, for instance) rises, consequently undermining the policymaker’s ability/commitment to defend the exchange rate, and vice versa in the case where investors perceive the policymaker’s defense of the parity as being credible. - This circularity therefore gives rise to the phenomena of self-fulfilling expectations and multiple equilibria. - Beyond this range a crisis will definitely occur if fundamentals are “very weak” or never occur if fundamentals are “very strong”. In other words, weak fundamentals are *necessary* but not *sufficient* conditions for a currency crisis⁵.

It is not uncommon to contrast the above two “generations” of models by

⁵ The pioneering escape clause-based second generation model is by Obstfeld (1994, 1996b) in which the government attempts to offset adverse shocks to employment and competitiveness.

arguing that the former is a monetary-based one with a *unique equilibrium* and the latter involves explicit optimization of a policymaker's loss function with *multiple equilibria*. However such a distinction is neither helpful in application of currency crisis theory to actual country experiences nor is it entirely accurate. For instance, the earliest multiple equilibria models were based on the KFG monetary framework with growth in domestic credit conditional on the occurrence of a speculative attack. This is in contrast to the constant (unconditional) manner in which domestic credit evolves according to a trend rate as specified by KFG (see below)⁶. To be sure, multiple equilibria arise due to "non-linearities" in private sector behavior based on their beliefs about the responses of the authorities to a speculative attack and not due to the assumption of an optimizing policymaker *per se*⁷. Accordingly the characterization of the first generation model as pertaining solely to monetary disequilibrium - unlike the second generation models which suggest a whole gamut of economic indicators as being important - is also incorrect. These escape clause-based models reduce to unique (crisis) equilibrium once a secular deterioration in fundamentals is allowed for (Krugman, 1996).

In light of the foregoing discussion, we understand the first generation crisis models to refer to those that involve a progressive deterioration of economic/financial fundamentals and an inevitable currency crisis due to policy inconsistencies ("fundamentals-based"). By contrast, a crisis is self-validating in second generation models, with a shift in market expectations triggering a crisis; the crisis itself is

⁶ See Obstfeld (1986) and Dellas-Stockman (1993). According to the Obstfeld model the authorities are assumed to follow a stable monetary growth rule if there is no speculative attack (thus ensuring the sustainability of the exchange rate regime), but alter the policy rule (to one of monetary expansion) in the event of a speculative attack, thus making the attack self-validating. Cavallari and Corsetti (1998) show that the possibility of multiple equilibria always arises in the KFG framework as long as the shadow exchange rate is itself a function of nominal wages. Also see Flood and Marion (2000).

⁷ This in turn emphasizes the importance of institutional mechanisms and safeguards that enhance the reputation of policy makers. Drazen and Masson (1994) have illustrated the complexities of this task, making the important distinction between the *credibility of policies* versus the *credibility of policymakers*.

neither inevitable nor predictable. The KFG model is a special case of a fundamentals-based model which highlights monetary disequilibrium as an example of the underlying policy inconsistency. Given our frequent reference to this model in various parts of the paper (and in section 4 specifically), we set out its essentials below⁸.

The KFG Model

This model assumes a small open economy with perfect capital mobility and a single tradable good. Agents hold three assets, viz. domestic money, foreign and domestic bonds. The equations (eqs.) listed below fully describe the model:

$$m_t - p_t = \alpha_0 - \alpha_1 i_t + \alpha_2 y_t, \quad \alpha_1 \alpha_2 > 0 \quad (1)$$

$$m_t = g_t + c_t, \quad (2)$$

$$i_t = i_t^* + \hat{e}_t + r p_t, \quad (3)$$

$$p_t = p_t^* + e_t, \quad (4)$$

$$\text{def}_t = \dot{c}_t = \mu > 0, \quad (5)$$

where: all variables other than those in rates (i.e. interest rates and growth rates) and $r p_t$ are in natural logarithms; m_t = nominal domestic money (high-powered) supply; y_t = real output/income (which is assumed constant for simplicity); p_t = domestic price level; p_t^* = foreign price level; c_t = domestic assets (in nominal terms); i_t = domestic real interest rates; i_t^* = foreign real interest rates; e_t = exchange rate (in foreign

⁸ There have been a number of general surveys of the first and second generation currency crisis literature. For instance, Agenor et al. (1992) and Blackburn and Sola (1993) focus solely on the KFG model and extensions within that framework. Obstfeld (1994) reviews the basic KFG model and works out two versions of the second generation model. Calvo (1996a) provides a rather informal review of the first generation model and suggests intuitively how banks may be incorporated in the basic KFG framework. Second generation models are however not considered. Kenen (1996) reviews the first and second generation models and emphasizes policy options for managing currency crises. Krugman (1996) attempts to synthesize the first and second generation models without explicitly reviewing available literature on either group of models. Krugman (1998) offers a highly readable and informal discussion of the first and second generation models. His focus is on explaining the models and their policy implications to the non-specialist. Obstfeld (1996a,b) present useful insights on the second generation models. Cavallari and Corsetti (1999) and Flood and Marion (1998) review both the first and second generation models with an eye towards developing a common framework for these two sets of currency crisis models.

currency terms); \hat{e}_t = expected rate of depreciation; def_t = fiscal deficit; all the variables with a dot ($\dot{\cdot}$) over them refer to rates of change; and $\alpha_0, \alpha_1, \alpha_2, \mu$ are non-negative parameters.

Eq. (1) is the conventional real money demand function, with real money balances being positively related to income and negatively related to interest rates. Eq. (2) states that money supply (monetary base) equals domestic assets plus foreign assets⁹. Eq. (3) is the international asset market arbitrage condition, i.e. uncovered interest parity theorem plus a country/currency risk premium (rp), the latter taken to be exogenous and constant. Eq. (4) is the purchasing power parity (PPP) condition. Eq. (5) states that the fiscal deficit is monetized at a constant rate of μ . This is the rate of credit growth. Assuming that i_t^* , p_t^* and rp_t are constant, substituting eqs. (1) and (3) into eq. (4) derives:

$$e_t = m_t + \alpha_1 \hat{e}_t - \gamma, \quad (6)$$

where: $\gamma = (\alpha_0 + p_t^* - \alpha_1 i_t^* - \alpha_1 rp_t + \alpha_2 y_t)$. Under a fixed exchange rate regime (i.e. $\hat{e}_t = 0$), using eq. (2) and totally differentiating the resulting equation, we get:

$$\dot{g}_t = -\dot{c}_t = -\mu. \quad (7)$$

where: g_t = foreign assets/reserves (which, for simplicity, are assumed to earn no interest). Eq. (7) simply states that the combination of a fixed exchange rate regime and an open capital account simultaneously must imply the loss of monetary autonomy (i.e. the “impossible” or “inconsistent” trilemma principle). The fiscal deficit generates domestic credit in the form of money creation, and under a fixed exchange rate regime, has to be absorbed as a decline in international reserves. These trends in the above variables are captured in Chart 1, which reveals the constant credit growth (from c_0) to be mirrored by a decline in international reserves (from g_0) at a

⁹ This is a logarithmic approximation of the original linear identity. We normalize the spot

similar rate (μ), while the monetary base remains constant (at m_0).

Agents are assumed to have perfect foresight and understand that the peg is unsustainable in light of the prevailing fiscal (and therefore monetary) stance. Hence they expect reserves to eventually fall to some minimum level and the currency to consequently depreciate, i.e. $\hat{e}_t > 0$. From eq. (3), the international interest parity condition produces a rise in domestic interest rates. By eq. (1), this implies a consequent reduction in real money demand. Specifically real money demand experiences a discrete *fall*. Noting that domestic prices are held by world prices through the PPP assumption, by eq. (6), one way to re-equilibrate the system would be through a discontinuous upward jump in the actual exchange rate. However, under the zero profit condition, such exchange rate jumps are ruled out as they automatically gives rise to the possibility of capital gains (losses). The nominal money base must jump given the restriction (of continuity).

Since domestic credit grows continuously (by μ), this decline in the nominal monetary base must be fully accounted for by a fall in foreign reserves (g). In other words, the presence of farsighted agents (speculators) implies that foreign reserves will decline to their “minimum level” at the earliest possible time of an expected currency depreciation¹⁰. To be precise, the loss of reserves (Δg), which must equal the drop in money demand, is given as follows:

$$\Delta g = \alpha_1(i^* - i_t) = -\alpha_1\hat{e}_t. \quad (8)$$

We are left to determine the issue of the exact timing of this jump in reserves¹¹. Abstracting from speculative bubbles by imposing the transversality

exchange rate to one, such that g_t is the domestic price of foreign reserves.

¹⁰ It is not necessary that there exist *persistent past* trends in a monetized deficit, an *expected future* trend sufficing for the above result to go through. This is a point of some significance and is noted again in section 4.

¹¹ An obvious question is why, given the anticipated collapse of the currency, do speculators not attack the currency at the earliest possible time? Two reasons may be offered. First, if the

condition and making use of the idea of a “shadow exchange rate” (Flood and Garber, 1984)¹², the exact time at which the peg is broken - the switch time (t_c) - is easily derived:

$$t_c = g_0/\mu - \alpha_1. \quad (9)$$

where: g_0 = initial stock of foreign reserves. Eq. (9) states that the higher the initial stock of reserves or the lower the rate of credit growth (and thus the fiscal deficit), the longer it will take for the exchange rate peg to be broken. Note that if money demand is completely interest-inelastic ($\alpha_1 = 0$), the switch time depends solely on these two factors. From eq. (8) we see that there is no discrete jump in reserves in this case. Rather reserves experience a gradual depletion at the rate of the excess credit growth until they reach the minimum level (assumed zero here), after which the peg gives way (“natural collapse”). Conversely, the greater the α_1 parameter, i.e. the more elastic the speculative money demand, the sooner the exchange rate peg breaks down and the sharper the discrete fall in reserves. In other words, speculators in this model only bring forward the breakup of a fixed exchange rate regime that was unsustainable to begin with.

2.2 Third Generation Crisis Models

The virulence of the recent crises in emerging economies has generated significant interest in a third generation of currency crisis models which emphasize/

authorities have sufficient reserves such that they can stave off an attack, flotation of the currency would lead to its appreciation, as speculators who sold the currency short will need to close out their positions by purchasing the currency in the forward market. This appreciation would consequently lead to capital losses by those who attempted to speculate against a currency. Second, there might exist non-negligible transactions costs (including interest costs of short selling the currency in question).

¹² The shadow exchange rate “is defined as the floating exchange rate that would prevail if speculators purchase the remaining government reserves committed to the fixed rate” (Flood and Marion, 1998, p.5).

attempt to rationalize the over-reaction or “overshooting” of markets and the degeneration of a currency crisis into an outright financial and economic collapse (i.e. “the punishment far outweighs the crime”). Thus, in reference to East Asia, the IMF (2000c) stresses the “new breed of economic crisis” in a “globalized financial market” (p.2). These third generation models may more specifically be characterized as emphasizing the “capital account”, in contrast to the first two generation of models which focus on the “current account” (Yoshitomi and Ohno, 1999)¹³. In similar vein, Caballero and Krishnamurthy (1998) have observed that:

the Asian crisis is just the most recent chapter of an increasing trend toward shifting the ‘blame’ from current to capital account issues. Many think that this trend is an almost unavoidable side effect of increasing globalization of capital markets (p.2).

It has arguably become somewhat common to interpret these models as taking a “bank-centered” view of currency crises (see Krugman, 1999b for instance). However a characterization of the first two generations of models as being “non-financial” would be incorrect, as the role of (weak) banks may be quite easily incorporated within a KFG-type model¹⁴. Conversely, not all third generation models are necessarily bank-based, a prominent example being the portfolio equity-based model developed by Guillermo Calvo (see Calvo, 1996a and Calvo and Mendoza, 1996)¹⁵. This being said, in this paper we concentrate specifically on the Chang-

¹³ This distinction has come into vogue in East Asia. For instance, the Japanese finance minister, Kiichi Miyazawa, noted that East Asian crisis was “a new form of capital account crisis rather than the traditional current account crisis” (cited in the Asian Development Bank Institute Newsletter, January 2000).

¹⁴ Specifically, see Calvo (1996a), Calvo and Mendoza (1996), Rajan (2000) and Velasco (1987).

¹⁵ The Calvo capital crisis model is a simple one period mean-variance model of optimal portfolio diversification/allocation. It shows that the marginal gain from gathering information about any single country falls as portfolios get increasingly diversified internationally. Thus just a rumor or some other adverse event - such as a devaluation - may be sufficient to generate large-scale reallocation of funds away from one destination to another, making small open economies susceptible to sharp boom and bust cycles. The Calvo model may best be seen as an open economy extension of the information-based herding and cascades genre of models that have been recently developed to explain herding behavior in domestic financial markets a la Banerjee (1992), Scharfstein and Stein (1990) and others. Bikhchandani and Sharma (2000) provide a succinct discussion of the various types of recent herding models in

Velasco (1998) model of bank panic (discussed further below), which is essentially an open economy extension of the Diamond and Dybvig (1983) model of illiquidity¹⁶. By so doing, we admittedly leave ourselves open to the criticism of having excluded two other sub-classes of models, viz. the Calvo capital crisis model noted above, and the bank-based models emphasizing “insolvency” rather than “illiquidity”¹⁷.

But how do we justify our narrowed focus on the bank panic model (or “fast-action” crises models as referred to by Dornbusch, 1999)?

The models of insolvency have been inspired by the KFG first generation model and, to our mind, are more appropriately discussed in section 4 (along with the KFG model)¹⁸. The omission of the Calvo capital crisis model is easier to handle as it is based on the premise that international equity flows constitute the single largest component of capital flows responsible for the boom and bust sequence in developing countries. However in the case of East Asia, the collapses of the baht and the regional currencies were primarily due to reversals in capital flows from the banking sector rather than portfolio equity investments. Indeed, the five crisis-hit East Asian countries most afflicted by the regional crisis saw a sharp reversal in net private capital flows of almost \$130 billion between 1996 and 1998 (Table 2). This reversal was primarily due to net (short term) lending by foreign commercial banks, which averaged around \$55 billion in inflows between 1995 and 1996, but turned into

financial markets.

¹⁶ Also see Goldfajn and Valdes (1997) for a similar mechanism to the Chang-Velasco framework without multiple equilibria. (I thank an anonymous referee for pointing this out). The Goldfajn-Valdes model depicts a bank run as being due to a rise in either international interest rates or a fall in investment productivity, and emphasizes how bank intermediation may generate bank runs, capital outflows and currency crises.

¹⁷ There are a number of closely related insolvency models, though the ones we have in mind here are Burnside et al. (1998), Chinn and Kletzer (1999), Corsetti et al. (1999b) and Dooley (2000) (also see Chinn et al, 1999). These models are touched upon in section 5. Related models (of moral hazard-driven lending) include Krugman (1999a) and McKinnon and Pill (1998, 1999).

¹⁸ On the other hand, Corsetti (1998) does not even use the term “third generation”, preferring to lump financial panic models with the escape clause-based second generation ones.

a net outflow of almost \$30 billion over the following two years as international banks became unwilling to roll over existing short term debts to the region¹⁹.

Therefore the Calvo model, with its emphasis on equity investment, as opposed to bank lending, appears of limited relevance to the Thai crisis (as well as the crises in the other East Asian countries for that matter)²⁰. This being the case, we consider below a highly simplified but intuitively appealing version of the Chang-Velasco model (Chang and Velasco, 1998).

The Bank Panic Model

Assume a small open economy with identical agents. Let there be three distinct periods: $t = 0$ ("planning period"), $t = 1$ ("short run") and $t = 2$ ("long run"). Each agent is endowed with e units of consumption with world price normalized to 1. The agent is indifferent between whether she consumes in either time period (short or long run). In addition to their endowment, domestic residents have access to international capital markets and are able to borrow at most d units. There exists a technology in the planning period which yields R units of consumption in the long run or r units of consumption if liquidated in the short run, where $0 < r < 1 < R$. However, due to indivisibilities, agents are unable to access the technology if acting individually, only being able to do so if they pool their resources (i.e. if they coalesce and form a bank). If agents do form a bank, the relationship/contract between each bank and the domestic resident/owner is as follows. She surrenders her endowment (e) and capacity to borrow (d) to the bank and, in exchange, can withdraw either the initial deposit (e) in the short run or an amount (y) in the long run. Both deposits and loans are assumed to be short term, needing to be renewed at $t = 1$. The banks

¹⁹ Official reserves in East Asia varied sharply from an increase of about \$17 billion in 1996 to a decrease of \$31.5 billion in 1997, but rose by about \$42 billion in 1998. Portfolio flows have, to a lesser extent, also been variable. In contrast, FDI flows have been remarkably stable. Thai specific data are discussed in the following sections.

²⁰ More generally, Kaminsky and Reinhart (1999) have documented the high correlation between banking and currency crises (so-called "twin crises") since the late 1980s and 1990s. Their formal econometric findings suggest that the causation most often runs from banking to currency crises. In a recent study, Glick and Hutchison (1999) have found that these twin

operate in a perfectly competitive environment such that long run profits are zero, and they distribute all their remaining value to the depositors/owners at $t = 2$. Banks are faced with a reserve requirement of b per depositor. These reserves are held in liquid form (i.e. the world asset). Given these assumptions, at $t = 2$, investment by each bank (k) = $e + d - b > 0$ per depositor²¹. Consequently, $y = R(e + d - b) - d + b = Re + (d - b)(R - 1)$. Since $R > 1$, and as long as b is “small” (compared to d), $y > e$, thus providing the incentive for the depositor to form/invest in the banks. As noted by Chang and Velasco (1998):

(t)he typical bank will offer demand deposits, borrow in the world market, and allocate investment in order to maximize profits; in so doing, the banking system will improve social welfare (p.20).

Assume that there is some trigger such that depositors and creditors “panic” and attempt to withdraw funds from the banks at $t = 1$. To be precise, creditors will recall d units while depositors will attempt to withdraw their initial endowment of e units. The bank however has only b units of liquid assets and receives just r from “premature” liquidation of the project. Since $r < 1$ and $k = e + d - b > 0$, the potential capital outflows from/obligations of the bank ($e + d$) exceeds the resources available ($b + rk$). In other words, the bank is *internationally illiquid*. Thus banks, in this model, are social welfare maximizers that channel liquid assets of their owners (depositors) into illiquid but high-yielding (productive) investments. By so doing, they help increase capital inflows to the economy with the potential for higher growth and consumption levels (“good equilibrium”). However this maturity transformation role of banks makes them susceptible to panic withdrawals.

Following some negative shock, depositors, concerned about the safety of their savings, attempt to withdraw *en masse* (which occurs given the “first-come-first-

crises are far more pervasive in developing countries rather than developed ones.

²¹ Since the depositor is indifferent between consuming in the short and long runs, the bank will maintain only the required amount of reserves (b), the rest being invested in the high-yielding asset. One could think of this as implying no excess reserves being held.

served” rule of deposit withdrawals), while creditors are unwilling to rollover short term loans. Since the banks’ liquid asset/reserves are less than their potential foreign currency obligations, they are forced into premature liquidation of long term investments. Given the partial irreversibility of investments they obtain a lower return on liquidation. However insofar as the foreign currency revenues obtainable in the short term are still less than the corresponding short term potential foreign currency obligations, the banks are “internationally illiquid”. This sudden termination of bank finance forces the abandonment of potentially solvent investment projects. This consequent decline in capital formation - indeed, capital destruction - leads to a sudden output/economic collapse. Conversely, the resumption of liquidity ought *ceteris paribus* to facilitate a rapid restoration of investment and output levels.

3. The Boom and Bust Cycle in Thailand: 1990 to Mid 1997

Before applying the currency crisis theory to the Thai experience, we review Thailand’s macroeconomic fundamentals in this section, emphasizing trends in money, credit and capital flows. While our focus is on Thailand, the epicenter of the crisis, data for the other crisis-hit Southeast Asian countries - viz. Indonesia, Malaysia and the Philippines (henceforth referred to as SEA4) - are also provided for comparability²².

3.1 Period of Capital Inflow Boom

Radelet and Sachs (1998a) have observed “at the core of the (East) Asian financial crisis were the massive capital inflows that were attracted into the region during the 1990s” (p.8). A proper perspective of the Thai crisis may therefore only be

²² The peculiar industrial structure in South Korea (dominated by few chaebols) and the fact that it is the only OECD member among the crisis-hit East Asian countries (and the only one in Asia other than Japan), seem to provide sufficient justification for its partial exclusion from the comparative analysis. More generally Booth (1999) has stressed that the Northeast Asian countries of Japan, South Korea and Taiwan are significantly different from the Southeast Asian countries.

gained by considering the pre-crisis boom period²³. Table 3 summarizes selected “conventional” macroeconomic data on the countries concerned. As can be seen, Thailand ran persistent current account deficits that averaged 7.5 percent of GDP for the whole period between 1990 and 1996. Nevertheless the current account deficits were generally not viewed with much concern because they were not driven by either fiscal profligacy or low private savings rates. Fiscal positions in Thailand were healthy and aggregate private savings rates had been running at over 30 percent of GDP. Being a consequence of high rates of private investment, the current account deficits were thus looked upon as “benign” (i.e. capacity-enhancing). The large and persistent current account deficits experienced by Thailand in the 1990s must imply that they were being financed either through a sustained drain in international reserves or through infusions of foreign capital.

Net private capital inflows to Thailand were positive (Table 4) and exceeded the corresponding current account deficit, resulting in an accumulation of international reserves. This accumulation was particularly high in Thailand, which was among the ten largest emerging market recipients of net private capital flows (together with Malaysia and Indonesia) during the period under consideration (Lopez-Mejia, 1999 and World Bank, 1997). This period of capital inflow surges corresponded to the time when Thailand undertook steps to liberalize the domestic financial sector as well as to decontrol capital account transactions. The establishment of the Bangkok International Banking Facility (BIBF) in early 1993 epitomized this *laissez faire* policy. Financial institutions under the BIBF were authorized to accept deposits and loans from abroad in foreign currency and extend loans to both overseas - but mainly - local markets (so-called “out-in” lending) and engage in cross-currency foreign currency trading and loan syndication. Foreign

²³ Dooley (2000) has made the more general observation that the speculative attacks in emerging economies have, by and large, been preceded by very large private capital inflows into the country.

capital inflows were encouraged by the fact that loans through the BIBF were exempt from the withholding tax (of 10 percent). The BIBF institutions also benefited from reduced corporate income tax rates (10 percent as opposed to 30 percent) and exemptions from stamp duties, the permanent establishment tax, and a number of sales taxes (BOT, 1996, 1999)²⁴.

Of significance is the fact that the “other net investment” component constituted about 75 percent of the private capital inflows on average in the case of Thailand. This category of capital flows includes short and long term credits (including use of IMF credit) and currency and deposits and other accounts receivable and payable²⁵. We provide a more detailed breakdown of capital flows to Thailand in Table 5. Capital flows are broadly divided into the bank and non-bank sectors. The banking sector flows are further sub-divided into banks and the BIBF institutions, which, as noted, began to play an active role from 1993. Thus the sharp rise in the bank component of capital flows in 1994 to 1996 corresponded to the inflows to the BIBF. The non-bank categories include FDI, portfolio investment, loans, non-resident baht accounts (NRBAs) and trade credit (which we incorporate in the “other” capital flows component). NRBAs are essentially nostro accounts held in domestic banks that serve various transactions, including baht clearing for foreign

²⁴ This emphasis on financial liberalization prior to the bust is consistent with recent empirical studies. For instance, in a recent study using a broad sample of lending boom episodes worldwide involving 91 countries during the period 1960-96, Gourinchas et al. (1999) conclude that the probability of experiencing a currency crisis is significantly greater following a lending boom, linking this to financial liberalization. Empirical investigations of a panel of 53 countries for the period 1980-95 by Demirguc-Kent and Detragiache (1998) and of 97 countries for the period 1975-97 by Hutchison and McDill (1999) reveal that a banking crisis is more likely in a liberalized financial system, particularly when the institutional support is weak. The study by Kaminsky and Reinhart (1999) concludes that in 18 of the 26 banking crises in their sample, the financial sector had been liberalized some time during the previous five years. Chinn et al. (1999), Sachs et al. (1996b) and Tornell (2000) are among those who have emphasized that bank lending booms are important predictors of currency crises, while Gavin and Hausmann (1996) document this relationship in the case of Latin America.

²⁵ This component of capital flows has been found to be the most volatile while direct investment the most stable (Bird and Rajan, forthcoming and World Bank, 1999b). The accumulation of increasing debt during these periods may at least partly have been due to the fact that the emerging market bond and syndicated loan spreads fell between mid 1995 and mid 1997 (Cline and Barnes, 1997 and Eichengreen and Mody, 1999).

currency-related transactions and stock market transactions by foreigners. Given their multi-functional roles, NRBAAs have been highly volatile, particularly since most of the transactions involved are of relatively short term maturities. While FDI flows did decline during this period, it is instructive to note that some part of the transactions measured as BIBF (“out-in”) lending was due to “rebooking” of intra-company loans as BIBF transactions in order to benefit from the tax advantage afforded to BIBF institutions (BOT, 1998). This might be a small part of the reason for the decline in the FDI component of Thailand’s total capital inflows.

Also of significance is the fact that the rise in total private capital inflows in 1994 was much smaller than the increase in bank lending to Thailand through the BIBF owing to sharp net outflows of portfolio investments. Private capital inflows did rise markedly in 1995 and 1996 because of continued large bank lending inflows along with a recovery in portfolio flows to all emerging economies (following the Mexican peso crisis). Funds intermediated through the NRBAAs remained important throughout the period. The corresponding boom in bank lending to the private sector is captured in Table 6 and Chart 2. These capital inflows were intermediated through the domestic banking system, resulting in real bank credit growth to the private sector in Thailand at about 20 percent annually between 1990 and 1995. Finance companies lent particularly aggressively in the belief that volume growth was an important criterion for upgrading to full-branch status.

Some additional salient features of the effects of the capital inflow boom enjoyed by the Southeast Asian countries are summarized in Table 7. The period of comparison for changes in key macroeconomic variables is the boom period relative to the immediately preceding period of equal length. The duration of the boom period was especially long lasting in Thailand (between 1988 and 1995). During this period, Thailand saw its GDP growth rate increase by about 4 percent on average over the corresponding pre-boom period. Further in contrast to Mexico during its boom period prior to the Tequila crisis (1989-94), where a capital inflow fuelled a consumption

boom, average consumption (as a percent of GDP) actually fell in Thailand; while average investment in Thailand saw a sharp increase²⁶. This rise in productive capacity ensured that the growth was relatively non-inflationary.

There were however growing concerns about - and some signs of - the misallocation of funds, as indicated by declining rates of investment efficiency, for instance (see Corsetti et al., 1999a, Tinakorn and Sussangkarn, 1998 and World Bank, 1998, 1999a). While this may in turn have been partly due to investments being undertaken in prestige projects (“white elephants”), more obvious was the fact that a large and growing proportion of credit was channeled into the real estate sector (Table 8) which is notoriously prone to speculative booms (“euphoria”) and dramatic busts (“panics”) (Kindleberger, 1989). By 1996 almost one third of the loan portfolios of Thai finance companies were to the real estate and construction sectors, this figure being about 13 percent in the case of commercial banks (Table 9) (also see IMF, 2000b). Large as these figures may seem, there is reason to believe that they in fact under-estimated the *de facto* exposure of the financial system to the real estate sector. One, a substantial portion of the loans made to the manufacturing and export-oriented industries were re-lent to subsidiaries in the real estate sector (BOT, 1998). Two, while the BOT set a limit on the overall exposure by commercial banks to the property sector, commercial banks faced large indirect exposures to the property cycle as they were large net creditors to the finance companies.

Construction constituted about half of total fixed investment during the period 1990-94 (IMF, 2000b). The channeling of capital inflows (via the financial system) to the non-tradables sector such as real estate inevitably led to a persistent fall in the tradables to non-tradables relative price ratio (Warr, 1998). This consequently suggested the need for a contraction of the “over-expanded” non-tradable sector and the “crowding in” of the production and sale of tradable goods (IMF, 2000b). Thai

²⁶ The aggregate data must however be interpreted with some caution. Disaggregated savings data reveal household savings in Thailand to have collapsed during the boom period

financial institutions lent aggressively for property development for a number of reasons, including their perceived attractive market prospects, a belief that the real estate sector collateral was safe, the country's land-based collateral system, and lax prudential supervision²⁷. In relation to this issue, the IMF (2000b) has noted that:

(a) anecdotal evidence suggests that banking practices in Thailand focussed heavily on 'name' based lending, relying on personal guarantees and collateral – frequently tracts of rural land and partially completed real estate projects – to secure loans. Extensive credit risk analysis was not often carried out, and collateral was mostly valued in-house (not by independent appraisers) (p.29).

We will have much more to say about the financial system-real estate nexus in Thailand in section 4; while vulnerability considerations due to foreign currency and maturity mismatches of external assets and liabilities are the specific focus of section 5.1. However in the remainder of section 3 below we focus on the crisis scenario leading to a devaluation of the Thai baht.

3.2 Crisis Scenario²⁸

In relation to the previously noted trend in the tradables to non-tradables price ratio and its consequent implications for resource allocation, was the nearly fifty percent nominal appreciation of the dollar relative to the yen between June 1995 and April 1997. The *de facto* dollar pegs of the baht and other regional currencies (Table 10) implied that they too rose in value relative to the yen. This, along with the outpacing of inflation rates in the Southeast Asian countries vis-à-vis the developed country trading partners in turn contributed to an abrupt and marked appreciation of Thailand's real effective exchange rate (REER) between mid 1995 and mid 1997 (Chart 3). Studies suggest that Thailand's pre-crisis REER was misaligned

(Thanompongphan and Associates, 1999).

²⁷ These vulnerabilities (i.e. "over-exposure" to the property sector) existed in Thailand in the early 1990s (Khan and Reinhart, eds., 1995), with the BIBF institutions significantly exacerbating the situation.

²⁸ We only highlight pertinent aspects of the onset of the crisis here, the dynamics being more

“overvalued”) by anywhere between 11 and 30 percent relative to some measure of “equilibrium” REERs (Montiel, 1999).

There was simultaneously a striking slow down in regional export growth due to a global glut in the semiconductor industry in 1996 and a deterioration in the terms of trade of all the East Asian economies. The negative export shock was particularly severe in Thailand as it also experienced a marked decline in global demand for its labor-intensive exports such as footwear and textiles (Warr, 1999). Thus between 1995 and 1996, Thailand was the only one of the few East Asian economies that saw a fall in exports growth in both *value* and *volume* terms (Table 11)²⁹. Added to these real sector considerations were increasing worries about the health of certain financial institutions in Thailand as the extent of overproduction in the real estate sector became clear (elaborated upon in the next section). The crisis of confidence in the financial conditions of many of the finance companies and certain weak banks was exacerbated by the highly public collapse of the Bangkok Bank of Commerce (BBC). Moody’s downgraded Thailand’s short term bonds, notes and deposits from “Prime 1” to “Prime 2” in early September 1996.

Initial attacks on the baht took place in January-February 1997 at the heels of the resignation of Thai prime minister, Banharn Silpa-archa; the first Thai corporate default on a Euroconvertible bond by Somprasong Land & Development); and the attempted government bailout of Finance One, one of the country’s largest finance companies (Henderson, 1998, Chapter 5). Available BOT data reveal there to have been a temporary capital reversal from BIBF institutions of \$70 million and about \$78 million from NRBA’s in July 1996 (foreign deposits). Thus overall private capital inflows fell dramatically to \$320 million that month compared to an average inflow of about \$2 billion for the seven previous months. This period corresponded to a steady

systematically discussed within the context of the currency crisis theory in the next section.

²⁹ While exports fell between 1995 and 1996, Thailand’s current account deficit did not rise as imports had also stagnated (Table 3).

erosion of international reserves as they hemorrhaged gradually from mid 1996 onwards (Chart 4). The data however fail to capture the net reserve position as the authorities committed a large amount of its reserves in the forward market in November-December 1996. Selling pressures on the baht intensified when the forward sales of reserves came due. The finance minister at that time, Amnuay Veerawan, who had steadfastly defended the parity, resigned on June 19. Net “usable” international reserves - i.e. gross reserves that could be used in defense of the currency less the forward obligations of the BOT that came due - were almost drained by the end of June 1997 (MOF, 1998).

The Thai authorities finally succumbed to the speculative pressures and the exchange rate was floated on July 2, 1997. The baht immediately lost about one fifth of its value against the US dollar during this period. The IMF’s Executive Board approved a three-year Stand-by Arrangement amounting to \$4 billion (505 percent of quota) on August 11, 1997. The World Bank and the Asian Development Bank (ADB) pledged \$2.7 billion, Japan provided \$4 billion and several other countries in the Asia and Pacific region pledged smaller amounts (between \$0.5 and \$1 billion each). In totality, the IMF-led international support package reached \$17.2 billion (Lane and Associates, 1999 and IMF, 2000c).

4. Devaluation of the Baht: Fundamentals or Self-fulfilling Expectations?

Recapping the point made in section 2, the only distinction of significance between the fundamentals-based and self-fulfilling expectations-based stories of currency crises has to do with whether the crisis was predictable or unexpected. This being said, differentiating between the two sets of models in practice is far from straightforward. For instance, what is important as far as the fundamentals-based models are concerned is not a *historical* trend in worsening fundamentals but an *anticipated future* trend (Corsetti, 1998, Krugman, 1996 and IMF Survey, August 18, 1997); while Corsetti (1998) has noted that:

there is no empirical content to these (second generation) models, as they are not falsifiable...The empirical failure of fundamental models is...presented as evidence in favor of multiple equilibrium theories (p.14).

In addition, as will be noted below, Morris and Shin (1998, 2000) have emphasized that multiplicity is removed once “noise” is added to a game of multiple equilibria. In recognition of these empirical challenges in distinguishing between fundamentals versus self-fulfilling theories, we take a more eclectic approach (rather than attempting formal hypothesis testing³⁰), examining different forms of evidence to determine whether the Thai devaluation was a case of “sudden death” or “death foretold” *a la* Sachs et al. (1999b).

4.1 The Thai Devaluation: A Case of “Bad” Fundamentals

Most of the key economic variables in Thailand were on definite downward/deteriorating trends since mid 1996. Some evidence of this is captured by movements in the Leading Index of real economic activity in Thailand (Chart 5)³¹, the industrial capacity utilization ratio (Chart 6), indices of manufacturing production and private investment (Chart 7), various indicators of private consumption (Chart 8), trends in overall economic growth (“growth recession”) (Chart 9), as well as the Thai stock market price index (Chart 10). Paralleling this worsening of economic fundamentals were the rising concerns by market participants about the near term prospects of the Thai economy. More specifically, apart from the downgrading of Thailand by Moody’s, the regional press coverage - such as the Asiaweek, the Far Eastern Economic Review and the Bangkok Post - highlighted significant and swelling unease about Thailand’s unsustainable external position and the likelihood of an eventual baht devaluation (see Lauridsen, 1998 for selected quotes). Following

³⁰ For a recent example of attempted econometric testing of a self-fulfilling model, see Jeanne (1997).

³¹ The Leading Economic Index, which is meant to signal the direction of Thailand’s future economic growth, tracks variables such as department store sales, vehicle sales, trade

its annual consultations with Thailand on June 1996, the IMF expressed concerns about the country's large current account deficit and its mounting vulnerabilities to economic shocks and sudden shifts in investor sentiments (discussed further in section 5).

While syndicated loan spreads were low and falling for the other crisis-hit East Asian countries, the Eurobond spreads (a measure of default premium) in Thailand began to rise from 100 basis points in January 1997 to 170 basis points by April 1997 (Cline and Barnes, 1997). In line with this, Thai interest rates trended upwards between 1996 and early 1997 before jumping up in mid 1997 (Chart 11); while earnings before interest and depreciation (EBITDA) simultaneously trended downwards (Table 12). As such, on the basis of a sample of publicly listed Thai firms, it was found that the proportion of Thai firms facing interest expenses that exceeded profits rose sharply from 4 percent in 1994 to almost 40 percent by the third quarter of 1997, the bulk of which were property and construction-related companies. Similarly, while profits were six times interest expenses in Thai firms (listed on the Thai Stock Exchange) by the end of 1994, this figure fell to one and a half times by the end of 1997; and profits, which were just under one quarter of liabilities in 1994, fell to just under one tenth by the third quarter of 1997.

Also of importance is the fact that the empirical studies that have attempted to develop indicators of currency crises have been able to "predict" the Thai crisis with a fairly high probability *ex-post*. For instance, Berg and Patillo (1999) have estimated out-of-sample crisis probabilities using a probit model of a balance of payments crisis on a panel of data of developing countries. Their model makes use of macroeconomic fundamentals such as the size of the current account deficit, degree of exchange rate overvaluation, export growth and reserve losses. They find that the probability of a crisis in Thailand rises continuously from 1994 to 1997. Similarly Glick and Moreno (1999) state that, according to their empirical analysis:

volumes, manufacturing index and the stock market.

(i)n Thailand, the monthly predicted probability (of a crisis) increases by factor of about 10 between July 1995 and July 1997, to peak at about 4.2 percent (roughly 40 percent probability of a crisis in a 12-month period). The increase is gradual and then steepens towards the middle of 1997 (p.20).

Kaminsky (1999) refers to Thailand as constituting “the perfect picture of the typical financial crisis” and finds that the probability of a currency crisis rose from a low of 20 percent in 1995 to about 100 percent in mid 1997. In fact a general conclusion that emerges from a large number of models of banking and currency crises is that Thailand was the only one of the crisis-hit countries for which a crisis might have been consistently predictable (Furman and Stiglitz, 1998). Thus Berg (1999) has concluded that:

(t)he Thai crisis was predictable on the basis of a variety of macroeconomic and microeconomic weaknesses. Moreover, the situation was deteriorating through 1996 and the first part of 1997. It is thus not surprising that most models that are designed to predict currency crises, even those formulated and estimated on pre-1997 data, are able to identify Thailand as a country at risk of crisis in 1996 (p.46).

In a recent study that combines the estimation approach to modeling real exchange rates with a calibration approach that derives “medium-run equilibrium” real exchange rates, Lim (2000) is able to generate estimates of the expected depreciation of the Thai baht (i.e. the divergence between equilibrium exchange rates and actual levels) prior to the mid 1997 data. The author finds that there was a “persistent expectation of depreciation, suggesting strongly that the Thai baht exchange rate was not maintainable” (p.24).

This being said, the evidence is admittedly not completely “airtight”. For instance, the credit agency, Standard & Poor’s, failed to reduce Thailand’s credit ratings, while a number of mutual funds remained overweighted in Thailand right up until May-June 1997 (Institutional Investor, December 1997, pp.54-5). However this apparent heterogeneity of views and uncertainty about Thailand’s economic prospects seems to paradoxically fortify the fundamentals-based explanation. Morris and Shin (1998, 2000) show that multiplicity of equilibria is the result of two modeling

assumptions, viz. fundamentals are common knowledge and economic agents (“speculators”) are aware of one another’s’ actions in equilibrium. Absent these assumptions, the multiple equilibria are eliminated and the currency will face a definite break of the peg, as the Thai baht would have been successfully attacked at the soonest time possible (i.e. as soon as Thailand was in the “crisis zone”).

In the final analysis, while one might be able to fault each one of the above pieces of evidence seen in isolation³², when viewed in their entirety, they seem to provide quite a convincing case for a fundamentals-based (unique equilibrium) explanation to the devaluation of the Thai baht. Thus Ito (1999) has noted that:

when the baht floated on July 2, 1997, it was hardly a surprise for many foreign exchange dealers, Treasury officials and central bankers of G7, and many academic economists (p.2).

Similarly, Corbett and Vines (1999) have concluded that:

there does not appear to be a need to appeal to self-fulfilling ideas in order to explain Thailand’s original devaluation...(However) ...(i)n none of the other economies was overheating or macroeconomic vulnerability nearly as obvious as in the Thai economy (p.167-8)³³.

In some senses the more challenging question is the narrower one of whether the devaluation of the baht fits the KFG monetary-based framework specifically (which, as noted, is a sub-set of the fundamentals based models). We now turn to this issue.

³² For instance, while we have emphasized badly trending fundamentals in the first part of this section, Obstfeld (1996) has taken - the rather strong - position that:

(e)ven a temporary recession will display a clearly deteriorating trend for a while - without telling us what would have happened in states of the world that did not materialize subsequently (p.399).

³³ But in what seems to be somewhat contradictory, Corbett and Vines then go on to state that the second generation genre of models is applicable to all regional economies *including* Thailand. Burnside et al. (1998) also argue for the validity of a self-fulfilling crisis for Thailand along with the other regional countries. Their position is that there is no evidence of reserves being insufficient to meet existing money stock. They however do not consider the forward commitments made by the BOT (which were substantial, as previously noted). Further, in a bank-based system, the appropriate monetary measure ought to be M2 balances rather than M1, which they focused on.

4.2 Relevance of the KFG Monetary-based Model to the Devaluation of the Thai Baht

To recap, we noted in section 2 that Thailand was plagued with macroeconomic weaknesses - such as an overvalued exchange rate, rapidly rising real wages, large current account balance and declining output growth in 1996 prior to the July 2nd devaluation. All this is fully consistent with a KFG framework appropriately extended through the relaxation of some of the strong/crude monetary assumptions (such as PPP, price flexibility, etc)³⁴. Conversely, the fact that the evolution of certain key variables in Thailand is broadly consistent with the KFG model is obviously not in itself conclusive evidence of the model's validity to Thailand. We need to go much deeper to tackle this issue.

Recall from section 2 that in the original KFG set up, a persistent fiscal deficit that was monetized was the way the excess credit growth was motivated. This may, in the first instance, seem to be at odds with the Thai experience where the government had run persistent fiscal surpluses until 1996. However two points ought to be noted in this regard. One, there was a substantial weakening in fiscal discipline, resulting in the budget balance in Thailand being in deficit from the fourth quarter of 1996 after nine consecutive quarters of fiscal surpluses and six consecutive years of annual surpluses (Chart 12)³⁵. Two, these conventional fiscal figures fail to incorporate the implicit or contingent liabilities of the government, as a number of finance companies were faced with insolvency following the real estate and stock market bust in 1996 (discussed further in this section and particularly in section 5.3).

The Thai authorities established the Financial Institutions Development Fund (FIDF) in 1985 after the country experienced a deep financial crisis in 1983-84. The

³⁴ See Goldberg (1990) specifically as well as the surveys of the KFG model by Agenor et al. (1992) and Blackburn and Sola (1993) and references cited within.

³⁵ This is consistent with the "Talvi effect" whereby average fiscal revenue tends to be lower during periods of capital outflows and vice versa in the case of capital inflows (Talvi, 1997). Calvo (1996a) explicitly incorporates this effect within a currency crisis framework.

FIDF was given the mandate of providing liquidity support to ailing financial institutions. At that time, a support scheme within the FIDF - the “April 4 Lifeboat Scheme” - was created, which offered soft loans to a number of such institutions. Depositors in and a number of creditors of these institutions were generally bailed out. This historical precedence offers a credible basis for agents to have expected an implicit guarantee/strong government backup of the financial system. To be sure, the BOT (1999) explicitly stated that that the aim of the FIDF is to:

provide financial and managerial assistance to financial institutions facing difficulties. This measure has helped protect public interest and boosted confidence in the financial system to a large extent...FIDF acts as a lender of last resort to supplement the role of the BOT, whose lending is constrained by collateral requirements as regards the types of acceptable collateral. Liquidity assistance provided through the FIDF, on the other hand, is more flexible and timely than that of the BOT, as FIDF can accept a wider range of assets as collateral for loans (p.6).

The Thai government's more recent handling of troubled financial institutions such as the BBC undoubtedly fuelled these expectations of a government “bail out” (Siamwalla, 1997). Forward-looking agents ought therefore to have been aware of/sensitive to the existence of the contingent liabilities of the government and the consequent high fiscal costs involved in financial sector restructuring (documented in section 5). As such, not only were *actual* fiscal balances deteriorating since end 1996, these contingent liabilities implied fairly high *prospective* fiscal deficits *a la* Burnside et al. (1998)³⁶. Empirical analysis by Corsetti et al. (2000) suggests that the fiscal costs of bailout are a robust predictor of a crisis³⁷.

³⁶ In similar vein, writing about Chile's banking and currency crisis of 1982, Diaz-Alejandro (1985) noted that:

(t)he massive use of central bank credit to “bail out” private agents, raises doubts about the validity of pre-1982 analyses of the fiscal position and debt of the Chilean public sector (p.372).

Daniel (1997), Daniel et al. (1997) and Polackova (1998) define and examine the issue of government contingent liabilities and their fiscal costs (particularly with regard to banking crises).

³⁷ While they proxy these fiscal costs of a bailout by the share of pre-crisis non-performing loans (NPLs) to GDP, Tornell (2000) has argued that since NPL figures are notoriously difficult to obtain in a timely and accurate manner, the extent of a lending boom may be a good proxy. See fn 40.

The apparent importance of implicit liabilities in the East Asian crisis has inspired a sub-class of models which emphasize their role in a currency crisis (see fn 17 for references). In one sense, as noted previously, since the KFG model has been the motivation behind all of these models, they might be interpreted as more “elegant” extensions of the KFG model³⁸. However, an important issue that is often overlooked and left in the background in discussions of the solvency-based models, is that of the “road to devaluation”. Corsetti et al. (2000), for instance, argue that the size of the financial liabilities generates expectations of either a drastic policy change (i.e. a fiscal reform) or recourse to seigniorage revenues; while Burnside et al. (1998), Chinn and Kletzer (1999) and Dooley (2000) are of the view that the crisis occurs once the size of fiscal liabilities is eventually matched by the available reserves, at which point there is currency crisis. In any case, all these solvency-based models have in common an emphasis on the current or anticipated size of the quasi-fiscal deficit.

While we agree that the contingent liabilities represented an important fiscal problem that was becoming increasingly apparent in Thailand, we opine that it was not the *direct cause* of the crisis in Thailand. Rather, the crisis - or more specifically, the original devaluation - was in fact consistent with a classic (unique equilibrium) KFG-type monetary disequilibrium induced by an expansion of credit by the BOT to domestic financial institutions. To be sure, our position is very similar to that of Calvo (1996b), who has noted that:

(w)hen the monetary authority is highly sensitive to cuts in bank credit, a decrease in the demand for money may result in a balance of payments crisis along the lines of Krugman’s model. An unsustainably large fiscal deficit becomes the proximate cause of crisis, but the fiscal deficit is an endogenous variable, and rises as monetary aggregates show a tendency to contract. Thus, a deeper cause for the crisis lies in monetary/financial variables although, on surface, it may appear that the cause is simply lack of fiscal discipline (p.217).

³⁸ Indeed, Michael Dooley is of the view that the “modelling challenge..is to construct a new generation of first generation fundamentals-based models...” (see comments in Global Economic Institutions, 1999, p.14).

Evidence in favor of the KFG framework

What evidence can we bring to bear in support of this stand? We noted the sharp increase in bank lending during the boom period in Section 3, a large part of which was channeled to the real estate sector either directly or indirectly. Thailand experienced a bursting of asset price bubble in 1994, and the real estate market remained very soft, with residential vacancy rates of 25-30 percent and office vacancy rates of 14 percent (Lauridsen, 1998). However the stagnant volume of transactions (particularly since much of the office construction was by companies for their own use rather than by professional property developers), along with the lack of market liquidity, resulted in very few new transaction prices being registered. The downward correction in real estate prices was not apparent until sometime later (IMF, 2000b)³⁹. Given the large exposures of the domestic financial system to the real estate sector, there was a simultaneous deterioration in the profits and financial conditions of the real estate and finance companies (Table 13)⁴⁰. Capital inflows into Thailand also slowed down sharply between 1996 and early 1997, mainly due to withdrawals from the NRBA's, which were short term deposits held in domestic banks and other nonbank components, as well as other loans components (Table 5).

We revisit the issue of financial sector weaknesses in section 5, making the important distinction between *illiquidity* versus *insolvency*. For now though, it suffices to note that the accumulating losses by the financial institutions inevitably contributed to a stagnation in bank lending in 1996 (Chart 13). As would be expected of most developing countries, bank lending has been the dominant form of funding in

³⁹ It is revealing that the World Bank economists Renaud, Zhang and Koeberle (1998) have entitled their paper "*How the Thai Real Estate Boom Undid Financial Institutions...*"

⁴⁰ Burnside et al. (1998) and Corsetti et al. (1999a) also provide evidence of the weaknesses in the financial sector. While BIS data suggest that NPLs in Thailand and the regional countries were single digit pre-crisis, this was probably a reflection of a number of factors, including data inadequacies and ever-greening of bad loans rather than a sign of financial stability. In any case, Moretto (1998) has noted that NPLs in the finance companies at the end of 1997 constituted some 15 percent while that of commercial banks was 11.5 percent.

Thailand (Table 14)⁴¹. Thus we see that there was a sudden decline in the growth rate of overall private sector credit in Thailand in 1995 and 1996 (Chart 2). A sustained drop in bank lending would have been severely detrimental to real economic activity, and it is of no surprise that the BOT attempted to support the ailing financial institutions through a massive liquidity infusion. This can be partially discerned from Table 15 and Chart 14, both of which reveal a pointed rise in the claims by the BOT over the financial institutions from late 1996 onwards through the FIDF. There was a four-fold rise (in real terms) in the liquidity provided over the next six months, with BOT credit to financial institutions rising from 2 percent of GDP in 1996 to 15 percent by the end of 1997 (World Bank, 1999a). The Property Loan Management Organization (PLMO) was established to purchase and manage property loans from financial institutions so as to reduce balance sheet pressures on the latter (BOT, 1998 and Renaud, et al., 1998). These steps allowed financial institutions to resume lending from early 1997 (Chart 13).

While the crisis scenario was described in section 2, we note here that, according to available data, the increase in BOT credit to the financial institutions in Thailand corresponded almost precisely with the steady loss in reserves, both occurring from the second and third quarters of 1996. This broadly conforms to the KFG model, i.e. *actual* and - more importantly - *anticipated* growth in domestic credit matched by a steady drain in international reserves and a sudden collapse⁴². While

⁴¹ World Bank data on small and medium sized enterprises in Thailand suggest that bank loans accounted for some 35 percent of total working capital in Thai firms (Hallward-Driemeier, et al., 1999).

⁴² Calvo (1996a) considers the sudden loss of reserves at the switch time despite perfect foresight of agents as the “most remarkable feature of a Krugman crisis” (p.5). It is interesting to note that the devaluation in Thailand occurred only *after* a collapse of effective reserves. While this does not automatically imply the relevance of the KFG model, reserves in general ought not to play a significant role in the second generation models. More to the point, there is no reason for the crisis and devaluation of the baht to have occurred *after* the sharp fall in net reserves (indeed, this was at least part of the impetus for development of the self-fulfilling models in the first instance following the ERM crisis, where reserve depletion did not seem to have played any significant role in the crisis). If the problems were those of self-validating expectations, the successful run against the currency (and consequent devaluation) could have taken place any time before the virtual depletion of effective reserves when the currency

data are obviously unavailable to confirm the anticipation of monetary growth, the failure to close down ailing institutions (due to political economy compulsions) implied the government could be expected to continue to infuse liquidity into the economy via these institutions (see discussion in section 5.2). MacIntyre (1999) succinctly summarized the play of events in Thailand during this period:

(a) side effect of injecting large scale emergency funding into the...failing finance companies was blowing out the money supply...This served to sharpen the fundamental contradiction in the government's overall macroeconomic position. At the same time as it was pumping money into insolvent finance companies to keep them afloat, the central bank was also spending down reserves to prop up the exchange rate...(T)his was not a sustainable strategy (p.14).

Based on the discussion above, the analytics of the crisis in Thailand may be simply noted below using the following two identities (Sachs et al., 1996c):

$$CAD = -\Delta R + \Delta K \quad (10)$$

$$\Delta H = \Delta R + \Delta NDA \quad (11)$$

where: CAD = current account deficit; R = reserves; K = capital stock; H = monetary base; NDA = net domestic assets; Δ = change. Eq. (10) is the balance of payments accounting identity that states that a current account deficit must be financed through reserve decumulation or capital inflows. Eq. (11) states that the monetary base must equal its two components, viz. international reserves and net domestic assets. Sub eq. (10) into (11) derives:

$$CAD + \Delta H = \Delta NDA + \Delta K \quad (12)$$

In the simple KFG story (i.e. ignoring the CAD):

$$\Delta NDA > 0 \text{ and } \Delta H = 0 \text{ (as money demand cannot change)}$$

was "ripe for a successful attack". In any case, our point here is *not* to determine the appropriateness of the fundamentals versus self fulfilling-based models to Thailand, having

so, $\Delta R (\Delta K) < 0$.

Based on our interpretation of the road to the Thai devaluation

$\Delta K < 0$ and $\Delta H = 0$ (given costs of interest rate hike)

so, $\Delta NDA > 0$.

If the capital outflow is sustained, both lead to the same eventual result, viz. the currency is expected to depreciate leading to a rise in domestic interest rates. This causes a fall in money demand, with reserves experiencing a drop to some minimum level and an eventual currency breakdown (as discussed in section 2). In other words, there was evidence in the case of Thailand that the crisis was preceded by a policy conflict between a fixed exchange rate and the monetary stance (which was expected to continue), the latter in turn aimed at averting an outright banking crisis (with all the real economy repercussions). While not done here, the effects of a domestic banking crisis with the central bank acting as a lender of last resort are easily incorporated within the KFG framework (see references in fn 14). The common conclusion that emerges from these extensions is that the currency crisis is brought forward by a domestic banking crisis.

4.3 Case Against the KFG Model?: Critiquing the Main Arguments

The remainder of this section anticipates the main criticisms that could be leveled against the emphasis on the KFG monetary framework⁴³.

Sterilization of Capital Outflows

The monetary base in Thailand did not decline (and actually rose slightly) at the time of the crisis as the BOT sterilized reserve outflows so as to ensure smooth

already provided a number of reasons to favor the fundamentals-based explanation to the Thai devaluation.

⁴³ This section was motivated by the comments of an anonymous referee.

growth of money supply during the crisis period (Chart 15). This contrasts with the original KFG model which requires that the drain in reserves be reflected in a fall in the domestic monetary base (Chart 1)⁴⁴. While full sterilization of outflows is incompatible with the basic KFG model, Flood et al. (1996) have provided a simple bond market modification to the KFG model that ensures the compatibility between sterilization of reserve outflows and the temporary sustenance of a fixed rate (also see Flood and Marion, 1998, 2000). They in essence drop the assumption of perfect asset (bond) substitutability, replacing it with Tobin's (1971) portfolio balance model. This allows the risk premium term to be endogenized as follows:

$$rp_t = \vartheta(b_t - e_t b^*), \quad \vartheta > 0 \quad (13)$$

where: b_t = stock of domestic currency government bonds held by the private sector; b^* = analogous definition of foreign (US) bonds held by the private sector (assumed to be constant); and ϑ = is a constant. Now since neither the money supply nor the exchange rate can jump down (implying constant real money supply), this means that money demand cannot change despite $\hat{e}_t > 0$. Since i^* is constant, this must mean that rp_t falls to offset the rise in \hat{e}_t such that i_t is constant (from eq. 3)⁴⁵. From eq. (13), since b^* and ϑ are constant, this implies that b_t must fall. Intuitively, authorities sterilize the reserve flows, buying back domestic bonds to expand the monetary base, thereby reducing the domestic bond holdings by the private sector. Thus the discrete adjustments due to speculation are shifted from the money market to the bond market⁴⁶.

⁴⁴ This is similar to the Mexican experience in 1994-95 (Flood et al., 1996 and Sachs et al., 1996c).

⁴⁵ This term is explicated in Flood et al. (1996). Flood and Marion (2000) derive the risk premium term from expected utility maximization and show that ϑ is time-dependent (ϑ_t).

⁴⁶ Indeed all that is required for the above analysis to go through is that some other variable be able to jump along with expected exchange rate changes. In this model the risk premium takes on this role. In particular this bond market modification requires that, at the time of

“Probing” Speculative Attacks

Initial speculative attacks in Thailand occurred in January-February 1997 when there were no apparent signs of monetary disequilibrium yet, and then again in May-June 1997 before the actual devaluation in July that year. However recalling the importance of *anticipated future* trends (rather than observed past ones), we note the concerns about the weaknesses in some segments of the financial sector and the expectations of a government bailout in 1996. Thus the announcement of a substantial budget cut also helped to restore foreign investors' confidence (BOT, 1998). The KFG model is also able to account for these pre-devaluation speculative attacks on the currency if one introduces uncertainty of agents regarding the levels of international reserves and how much of it would be used to defend the peg (as originally shown by Krugman, 1979).

There were certainly a number of other sources of reserve uncertainty in the Thai case. One, the stock of *effective* reserves requires that the government's contingent liabilities also be taken into account (see Rajan, 2000 for a simple formalization)⁴⁷. Two, the lack of transparency of economic data in Thailand (and the rest of East Asia) generally, and the fact that the Thai authorities intervened in the forward market (as discussed previously), provided further scope for investor uncertainty regarding the effective (usable) level of reserves. Three, since Thailand is

sterilization, the risk premium on the currency under duress *falls* (to offset the expected exchange rate depreciation). This might provide reason as to why even a fundamentals-based crisis may not necessarily be reflected in widening interest rate spreads.

⁴⁷ Escape clause-based crisis models with a secularly deteriorating trend in fundamentals can also explain such “probing attacks” on a currency prior to devaluation by introducing uncertainty by the speculator of the government's objective function (Krugman, 1996). In an important paper, Drazen (1999) has developed a model in which the government optimizes a welfare function (balancing the objectives of maintaining a fixed exchange rate versus the costs of a sustained high interest rate policy), while speculators solve a complicated dynamic signal extraction problem subject to the evolution of fundamentals (proxied by fall in reserves) and imperfect information regarding the government's objectives. In this model, initial speculative attacks occur as a result of speculators “probing” against the government's commitment to the peg. There always exists some interest rate at which an attack may be warded off (zero speculative demand). However the authorities may allow reserves to decline in the face of a “sufficiently large demand for reserves”, leading eventually to a KFG-type currency crisis.

a member of important regional central bank networks (such as the EMEAP⁴⁸), there was always the possibility of assistance from regional central banks, hence possibly increasing the potential pool of reserves available to defend the baht.

“Mechanical” versus “Rational” Behavior of the Government

Regardless of the empirical validity of the KFG model, some critics might argue that the KFG model is inappropriate/incomplete in light of its seeming asymmetric treatment of private agents and the monetary authorities. Specifically, while private agents are modeled as far-sighted, on the one hand, the monetary authority, on the other, is assumed mechanical in its actions in persistently accommodating the pressures on the exchange rate and allowing for a reserve hemorrhage without regard to the inevitable unsustainability of such a regime. A closely related question pertains to why the monetary authority did not raise interest rates in response to a run on the currency. This is a non-negligible point as defense of a currency is always “technically” feasible as long as governments are willing to reduce the monetary base sufficiently (hence hiking up interest rates, such that there is “zero speculative demand”) (Lahiri and Vegh, 2000 and Obstfeld and Rogoff, 1995).

While these criticisms may be valid in general, in the particular case of Thailand, the well documented prevalence of significant policy paralysis in the Thai government (especially in the finance ministry) during the late 1996-1997 periods led to the pursuit of policies that were understood to be inherently unsustainable. Thus Haggard and MacIntyre (2000) have observed that:

(o)ne of the most striking features of the crisis in Thailand was the failure of the government to take effective pre-emptive or remedial action in the face of clear warning signals...The indecisiveness of

⁴⁸ The EMEAP is the Executives’ Meeting of East Asia-Pacific Central Banks. It is a cooperative organization comprising central banks and monetary authorities of eleven regional countries: Australia, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, New Zealand, the Philippines, Singapore and Thailand. Spurred on by the Tequila crisis, there were substantive moves towards enhanced regional cooperation prior to the East Asian crisis. Some of the regional creditor economies (such as Japan, Hong Kong and Singapore) did step in to help defend the baht just prior to its floatation.

political leadership in Thailand was a function of the fragmentation of the party system and the tendency of weak coalition governments (pp.5-6).

Accordingly, the assumption of mechanical behavior on the part of the monetary authorities - as implicitly assumed in the KFG model - may in fact be quite an accurate portrayal of the Thai authorities pre-crisis considering the weak political base that precluded decisive reforms from being implemented.

Of course the mechanical behavior of the policymaker in the KFG framework provided part of the motivation for the development of the escape clause-based models. As noted, the policymaker in these models trades off the costs and benefits maintaining the peg. The costs of devaluing are modeled as a reputational loss by reneging of the peg, while those of maintaining the peg pertain to the costs of higher interest rates⁴⁹. However in the Thai case with unhedged contingent liabilities, it is unclear as to whether there were significant net benefits from devaluing in the first instance (at least as perceived by Thai policymakers and private sector agents). Indeed the Thai finance minister at that time, Amnuay Viravan, had expressed just this concern (as reported in the Business Times, Singapore, May 5, 1998).

The BOT (1998) report on the Thai crisis also outlined the “official” reasons behind why a devaluation of the baht was perceived as doing more harm than good: high import content of Thai exports implying limited competitiveness benefit from a weakened currency; inflationary effects of devaluation leading to wage-price spiral; unhedged foreign currency debts of corporates leading to bankruptcies and unemployment; deterioration in asset quality of financial institutions due to a weakened corporate sector and a vicious spiral of escalating distress in the corporate and financial sectors, and higher interest rates (to contain inflation) preventing recovery of financial institutions and the real economy. In relation to this, Corsetti (1998) has noted that:

⁴⁹ See Furman and Stiglitz (1998) for a recent discussion of the costs of high interest rate policy.

(a) point that has been somehow left in the background of the current debate on Asia is that, according to the logic of....“second generation” models, the dynamic nature of a crisis cannot be properly understood without clarifying the objectives and preferences of policymakers....What specifications of policymakers’ preferences could capture the prevailing policy models in East Asia?...The literature has not provided, so far, any answer to this question (p.15).

Post-Devaluation Macroeconomic Overshooting

There are two specific issues to be dealt with here. The first is the fact that the baht depreciated non-continuously immediately following flotation, losing almost one fifth of its value vis-à-vis the dollar (Chart 16). This seems in the first instance to be at odds with the KFG model discussed in section 2 where the currency cannot “jump” following the reserve drainage. However this apparent inconsistency is fairly easy to rationalize within the KFG model once uncertainties regarding reserve levels and credit creation are accommodated (Blanco and Garber, 1986 and Flood and Garber, 1984). In addition, recall that the precursor to the devaluation was a change in the government administration. Political uncertainties and early vacillation and policy reversals in the implementation of the IMF conditionality (IMF, 2000c) no doubt added to the generally skittish environment (especially in the third quarter of 1997)⁵⁰.

The second issue is far more troubling as it pertains to the post-devaluation overshooting of various macroeconomic and financial variables. As can be seen, the baht kept depreciating until the baht/dollar rate peaked at about 55 in January 1998 (Chart 16); while the Thai interbank rate differential over LIBOR continued rising well after the speculative attack in July 1997, reflecting an expected depreciation of the baht. In line with this, the share of non-financial private corporations in Thailand with interest expenses in excess of profits rose sharply from one quarter in the second half of 1997 to three fifths by the second half of 1998 (Table 12). In similar spirit a recent study by the Monetary Authority of Singapore (MAS) (1999) concluded that:

(t)he Baht forward discount rose from (January-) February 1997, when

⁵⁰ Haggard and MacIntyre (1999) and MacIntyre (1999) detail the political situation in Thailand during the crisis period. More generally, Willett (2000) discusses how financial markets have a tendency to react “too late” and when they do, they tend to “over-react”.

the currency first came under speculative attack, and it continued to rise as the solvency of a large number of finance and property development companies were increasingly doubted. However, the forward discount did not fully anticipate the magnitude of the actual depreciation that took place following the abandonment of the exchange rate peg” (p.5).

The continued downward pressures on the baht and concomitant upward pressure on the interest rates are, to a certain extent, fairly easy to explain. One, the effects of the region-wide contagion (especially between the last quarter of 1997 and the first quarter of 1998). Two, the BOT’s demand for dollars as it settled its outstanding forward obligations accumulated in the failed defense of the currency (MOF, 1999). Three, dumping of the baht by local investors in February 1998 given the sharp falls in the baht’s dollar value in the preceding months, as well as concerns throughout the region of news that Indonesia was considering the possibility of fixing the rupiah to the dollar via a currency board.

Of more analytical significance was the fact that the overshooting was not just limited to monetary variables. Output in Thailand collapsed *after* the devaluation, and despite rebounding from the third quarter of 1998, it remained lower than the pre-crisis level even towards the end of 1999 (Chart 9). These trends in output growth are mirrored by the dramatic declines in the private investment index between mid 1997 to mid 1999 (Chart 7). These facts are however incompatible with the first two generations of models which predict that a devaluation will be the end of the crisis, as the weaker currency and accompanying macroeconomic policies ought to stimulate real economic activity⁵¹.

Therefore if we are to provide a complete story of the Thai crisis, we need to rationalize the post-devaluation collapse. This is where the third generation model of bank panic becomes pertinent. It is to this issue that we turn to in the next section.

⁵¹ Of course the solvency-based models (such as Chinn and Kletzer, 1999) are able to generate an output collapse. However we have already noted the reason to favor the KFG model emphasizing monetary disequilibrium as an explanation for the original devaluation and will offer evidence in favor of a liquidity-based explanation for the ensuing crash.

However before proceeding, the parallel between the conclusion above and that of the Mexican crisis of 1994-95 by Calvo and Mendoza (1996) warrants highlighting:

the violence of the crisis that erupted once the exchange rate floated requires further explanation, since in our banking-bailout model devaluation marks the end, not the beginning..Thus...(we require)...a second mechanism that links the devaluation to massive runs against domestic assets (p.237).

5. From Devaluation to Outright Collapse: A Case of Bank Panic

For reasons detailed in section 2 our focus is on the bank panic model which emphasizes potential illiquidity *a la* Chang and Velasco (1998, 1999). In support of this stance we first provide data on the foreign asset and liability positions in order to determine its *ex-ante* vulnerability to an external shock (such as a devaluation), and then discuss the movements in capital withdrawals from the country following the shock (section 5.1). The devaluation followed by collapse scenario is closely intertwined with the important issue of the *illiquidity* versus the *insolvency* of domestic financial institutions (section 5.2). Finally we examine the consequences of the systemic liquidity crisis post devaluation (section 5.3).

5.1 Evidence of an International Bank Panic

Sources of Vulnerability

Table 16 provides data on the foreign asset and liability positions of the individual crisis-hit Southeast Asian economies with BIS-reporting foreign banks. The data are divided on the basis of banks versus non-banks. It is clear that the bulk of liability accumulation in Thailand has been by banks (86 percent in 1996). These high net liability positions by the Thai banks emphasize the existence of significant mismatches in the sense that a large part of the foreign deposits was lent predominantly to domestic investors (referred to as “out-in” transactions). Insofar as foreign borrowing was largely unhedged (given sustained exchange rate stability and the credibility of its continuation), this left the financial system open to grave foreign

currency mismatches⁵². To be sure, financial institutions in Thailand did generally have a natural hedge against exchange rate risks by lending domestically in foreign currencies, thus transferring the risks to the corporate borrowers. Nevertheless all this really implied for the financial institutions was that the foreign currency risks were converted to credit risks in the event of loan default by borrowers.

As the foreign loans were primarily short term and were used to fund long term investments, the financial institutions were also vulnerable to the consequences of a large maturity mismatches. Thus there was a rather dramatic rise in the stock of short term debt, which shot up from \$7 billion in mid 1991 to a peak at \$46 billion by mid 1997 (Table 17)⁵³. The sharp increase in short term external indebtedness caused the country's short term debt to international reserves ratio to rise between 1991 and 1997 despite the large reserve accumulation noted previously, "suggesting a financially fragile situation, in the sense that international reserves would not have been sufficient to repay the short term debt had foreign banks decided not to roll it over" (Chang and Velasco, 1998). While much more comprehensive data on Thailand's external debt and debt service is provided in the Appendix, we note here that these currency and maturity mismatches (so-called "double mismatches") clearly left Thailand vulnerable to abrupt shifts in international creditor confidence.

Of course short term debts are not the only form of liquid liability. An alternative - more complete - measure of the illiquidity is given by the ratio of "mobile capital" to international reserves. Mobile capital refers to short term bank credit (of all banks), accumulated portfolio investment, NRBA's and trade credits (Athukorala and Warr, 1999). This ratio rose sharply from 0.4 in 1990 to 2.2 by 1997 (Table 17). Once again we see that, quite distinct from the problems of the productive deployment of resources and *solvency* considerations, were those of internationally *illiquidity*.

⁵² See Burnside et al. (1999) for a formalization of this point.

⁵³ These mismatches in turn can be traced to financial liberalization following the establishment of the BIBF institutions in 1993 (see section 3 and especially fn 24).

But why is this of any consequence? Calvo (1996b) has noted that:

if there is a “bad” equilibrium lurking in the background, a devaluation - especially, an unscheduled devaluation - could coordinate expectations and help push the economy to the “bad” equilibrium (p.219)⁵⁴.

The preceding data emphasize that Thailand left itself deeply exposed to the possibility of a post-devaluation “bad equilibrium” (i.e. financial and economic collapse) in light of the large double mismatches of external obligations. But what evidence is there of such an international bank panic-induced outflow actually having actually occurred?

Capital Withdrawals

The post devaluation empirical trends in key macroeconomic variables have their counterpart in capital flows from Thailand during that period. In the period leading up to the devaluation (i.e. first quarter of 1997) only the non-bank sector experienced capital outflows (Tables 5 and 18). More precisely it was the NRBA's in particular, but also the “other loans” component that recorded net outflows. While net FDI inflows remained positive throughout 1997, portfolio flows too only changed direction in November and December 1997. Private bank capital flows saw a sharp turnaround by over \$10 billion between the first half and second halves of 1997. This reversal intensified in 1998, outflows almost reaching \$14 billion in that year. Of significance though is the fact that funds were still flowing into the country during the first half of 1997 right up to the devaluation, and it was only *after* the devaluation that there was a massive exodus of these banking sector flows. Capital outflows from NRBA's were \$3.5 billion in the first half of 1997, over \$2 billion in the second half of the year and slowed to about \$2.7 billion for the 1998 as a whole. Thailand was,

⁵⁴ It is actually interesting to recall the debate prior to the Mexican crisis. While Dornbusch and Werner (1994) had proposed a devaluation of the peso of about 20 percent prior to the Mexican crisis, Calvo (1994) was on record as opposing the peso devaluation, arguing that:

(t)his is not the time to implement a Dornbusch-Werner devaluation. The forces that have held together the “good” equilibrium...may dissipate overnight (p.303).

according to some reports, pulled back from the brink of national bankruptcy at the end of 1997 only because creditors agreed to roll over their foreign loans to local firms, with over 80 percent of the total amount of foreign loans being rolled over (Bangkok Post, December 22, 1997).

Mirroring these sharp capital withdrawals and the consequent financial and economic repercussions on the domestic economy, Moody's reduced Thailand's credit ratings of Thailand's sovereign risk from "Prime-2" to "Prime-3" on October 2, 1997 and again to below "Investment" or "Prime" grade on November 28, 1997; while Standard and Poor's downgraded Thailand's currency ratings on October 24. These downgrades in turn intensified the already bearish conditions, capital reversals from the banking sector sharpening in 1998 (Table 18). To the extent that the NRBA's are essentially bank deposits, we may conclude that the severe post-devaluation reversals in capital flows were overwhelmingly due to withdrawals by depositors and creditors, i.e. bank-related. The abrupt turnaround in private capital flows was well in excess of the official disbursements through the IMF-supported rescue package (along with other regional initiatives) and the depletion of international reserves. This implied the need for a sudden and drastic adjustment in the current account deficit (Chart 17), the inevitable consequence being a sharp output compression (Chart 9).

5.2 *Illiquidity versus Insolvency*

While most observers agree that weaknesses in the financial system played a key role in the crisis in East Asia, there has been limited progress on the debate as to whether the difficulties have been due to *insolvency* or *illiquidity* of financial institutions. The consequences for economic policy will vary greatly depending on what the problem is perceived as being⁵⁵. Our reading of the Thai data suggests that

⁵⁵ For instance, as noted by an anonymous referee, on the one hand, "in the case of a liquidity crisis coordination (through a central bank lender of last resort, moratorium or standstill on debt, or bondholder's committees) can avoid sharp real losses." On the other hand, in the case where banks are insolvent, allowing them to continue operating without

both elements operated in Thailand. More specifically, it is clear that the solvency problems in a number of finance companies and weaker banks (such as the BBC) led to the currency crisis (via monetary disequilibrium due to an FIDF-induced bail out). Reflecting this, the spreads of finance company borrowing over commercial bank deposits of similar maturity rose between early 1996 to mid 1997. However the premium has been on a declining trend post-devaluation (IMF, 2000b), suggesting a general worsening in the condition of the overall financial system brought about by the illiquidity due to an international bank panic. The BOT (1999) itself has noted that:

(i)n June and August, a total of 58 finance companies were suspended due to their heavy reliance on borrowing from the FIDF, high non-performing loans and negative net worth. After the separation of weak financial institutions from the sound ones, FIDF has provided full liquidity support in accordance with the government policy of providing guarantee to depositors and creditors. The role of FIDF, has, therefore, emerged from *solvency* guarantee to *liquidity* guarantee, as normally practiced in a number of countries (p.6) (emphasis added)⁵⁶.

This distinction between insolvency initially of a group of finance companies pre-devaluation followed by a systemic liquidity crisis (leading to a vicious spiral culminating with financial and economic collapse) is further confirmed by the time line of the problems in Thai finance companies and commercial banks which we briefly highlight.

Prior to the IMF Stand-by arrangement in August 1997, the BOT recognized the necessity to segregate solvent/viable financial institutions from non-viable ones. Thus the BOT and the Ministry of Finance (MOF) announced that 10 (unnamed finance companies) would need to raise capital, failing which the FIDF would

restructuring will magnify market distortions and the concomitant fiscal costs of bailout and rehabilitation.

⁵⁶ Of course, the distinction between *solvency* and *liquidity* is very fine. As noted by Lindgren et al. (1999) of the Thai debacle:

(t)he selection of nonviable institutions to be closed relied largely on liquidity indicators, such as borrowing from the central banks...The liquidity triggers typically included the size of central bank credit as a multiple of bank capital. Only later, as more information became available either through special audits or the supervisory process, could solvency indicators be used as criteria for choosing nonviable institutions (p.34).

effectively take control of the institutions in March 1997. Public confidence in finance companies eroded between March and June 1997 as there were deposit withdrawals by the public (but not an outright panic of the entire financial system). The FIDF provided liquidity support to 66 (of a total of 91) finance companies. The BOT suspended 16 finance companies in June (7 of which were from the March list). Notably 43 percent of loans of these suspended companies were to the real estate sector (IMF, 2000b).

With the intensifying economic recession and growing loss of confidence in the financial system, blanket guarantees were provided to banks and the remaining finance companies by the FIDF in order to maintain public confidence in the financial system. The MOF and BOT also issued a joint statement detailing measures to strengthen confidence government and announced that no more finance companies would be suspended beyond the 16. Such blanket guarantees obviously entail very large sovereign contingent liabilities. All these events occurred *prior to* the devaluation, at a time when external capital was still flowing into the domestic financial system.

The Financial Restructuring Authority (FRA) was established in October 1997, to review the rehabilitation plans of the 58 suspended finance companies and oversee their liquidation process, all but two of which were shut down. An asset management company (AMC) was also set up and entrusted with the responsibility of bidding for the lowest quality assets as a buyer or bidder of last resort so as to prevent fire sale of assets of the 56 closed finance companies (which in turn could undermine the intrinsic collateral values of the financial system in general). As capital outflows accelerated (discussed in the preceding section), some weaker banks were intervened in December 1997 and January 1998 (Bangkok Metropolitan Bank, First Bangkok City Bank and Siam City Bank). These three banks were together responsible for 10 percent of banking system deposits. Other banks (Thai Danu and Bank Asia) were acquired later in the year. 7 more finance companies were

intervened in May 1998 and merged with a state owned finance company while two other banks (Union Bank of Bangkok and Laem Thong Bank were intervened in August 1998). These interventions, suspensions, mergers and interventions continued into 1999. The existing financial institutions were encouraged to restructure their holdings of corporate debt. Table 19 documents the extent of domestic financial system consolidation. The government also introduced measures to re-capitalize banks, privatize intervened banks, improve prudential regulations and supervision and formulate bankruptcy and foreclosure laws⁵⁷. Unlike the single public AMC for finance companies, banks were individually responsible for establishing their own AMCs to remove NPLs from the bank balance sheets. The FRA auctioned most of the assets of the closed institutions and recovered about 180 billion baht by mid 1999 (MOF, 1999).

5.3 Consequences of Systemic Liquidity Crisis Post Devaluation⁵⁸

Equity markets are often seen as leading barometers of economic activity. Stock market data reveal that the overall index, which was on a downward trend since early 1996, reached a trough in mid 1998 before rebounding. Banking stocks, while also having hit lows in mid 1998, declined much more steeply, an indication of the depth of problems in and continued investor pessimism about the prospects of the financial institutions (Chart 10). The real estate (property development) related stocks, which had started falling much earlier (third quarter of 1994), remained very sluggish even into mid 1999. As would be expected, these trends have been broadly replicated by the finance company stocks in light of the heavy real estate exposures of the finance companies. More direct evidence of the magnitude of the problems in the financial sector is proxied by the fiscal costs of restructuring (Table 20). It is

⁵⁷ See IMF (2000b), Lindgren et al. (1999) and Moretti (1998) for detailed discussions of the financial restructuring programs in East Asia.

⁵⁸ This section draws on reports by the Asian Development Bank (ADB) (2000) and the IMF

important to keep in mind the caveat that such estimations of fiscal costs are undoubtedly fraught with difficulties, as they are heavily dependent on a number of assumptions. This being said, it is instructive to note that the bailout and restructuring costs in Thailand are conservatively estimated at around 30 percent of GDP⁵⁹. This figure is much lower than the estimated costs in Indonesia (58 percent of GDP), but much higher than those in South Korea and Malaysia (16 and 10 percent respectively) (ADB, 2000).

The solvency crisis of selected institutions followed by the systemic liquidity crisis and resulting virtual collapse of the domestic financial system inevitably led to a large-scale domestic “credit rationing” in Thailand. We do not enter here into the controversial debate of defining what is meant by a “credit crunch” and how it is most appropriately measured, only recognizing that credit growth reflects both the demand for and supply of credit⁶⁰. However available evidence points to a high and growing risk aversion on the part of Thai financial institutions towards lending as they have been burdened by large NPLs and remain undercapitalized (IMF, 2000b). This may in turn reflect the fact that the Thai government has favored a more market-oriented approach to the restructuring of financial institutions, with the primary responsibility for finding new capital and resolving NPLs having been left with the private banks themselves (Table 21).

The adoption of international banking standards and tightening of provision and regulatory requirements in the midst of the crisis (aimed at reducing the vulnerability to future crises), along with the consolidation/contraction of the domestic financial system, seems to have added to the inability/unwillingness of financial

(2000b).

⁵⁹ Asher (2000) provides a wide-ranging discussion of the fiscal implications of the regional crisis and necessary fiscal reforms for sustained growth in the crisis-hit economies.

⁶⁰ For example, see IMF (2000b), Lane et al. (1999), Lindgren et al. (1999), Stiglitz and Furman (1998).

institutions to return to “normal” lending operations. Commercial banks have seemed keener on trying to recover as much of their outstanding loans as possible (through foreclosing on assets which creditors had pledged as collateral and such) rather than on evaluating the commercial viability of projects and the debt service capabilities of the potential borrowers. Direct evidence of this conservatism in lending is seen by the sharp decline in BIBF lending from January 1998 onwards (Chart 13). Financial institutions have also been reluctant to engage in the workouts of weak but potentially viable corporations, as this would inevitably increase balance sheet holdings of NPLs (which have been hovering in the range of about 40 percent). A simultaneous tightening of regulatory changes in equity markets exacerbated the credit situation. Most of these involved stringent requirements for new entrants, which in turn have invariably had a particularly detrimental impact on small and medium-sized enterprises (which dominate economic activity in Thailand).

There was, not surprisingly, a severe investment and output curtailment in 1997-98. Domestic demand overall experienced an even sharper decline due to a fall in private consumption, which in turn was the result of a combination of factors. These have included reduced credit availability, an actual or perceived fall in permanent income, the negative wealth effect arising from a fall in capital markets and property values, and general heightened economic insecurity of households. Specifically the BOT's composite consumption index fell sharply in mid 1997, with consumer durables being especially hard hit. While investment demand fell across-the-board, construction was worst affected, its share falling from half of total investment before the crisis to just 35 percent by 1999. Of course, there was an added dimension in Thailand, viz. the unhedged nature of the external liabilities of corporates. Thus the rise in the baht value of external debts following the initial devaluation substantially worsened the balance sheet positions of domestic corporates and banks. Indeed Calvo (1998) and Calvo and Reinhart (1999) remind

us that the central difference between financial crises in emerging markets and developed ones is that output did not collapse in the latter⁶¹.

While detailed discussions of the recent macroeconomic trends (1999 and 2000) in Thailand are well beyond the scope of this paper, we do note that the stabilization of exchange rates following a gradual return in investor confidence (or at least an abatement of the acute pessimism) allowed interest rates to be reduced⁶². Fiscal policy stance too has been highly supportive of economic recovery, though this has resulted in a sustained fiscal deficit since 1996 with consequent implications for and concerns about public debt sustainability (IMF, 2000b). Increased consumer confidence and a reduction in the value added tax (VAT) rate helped boost consumption demand; while export demand was buoyed by a depreciated currency, strong growth in the US, Europe and economic recovery in the regional trading partners. However investment demand has remained depressed until late 1999 (Table 22 and Chart 7) owing to the existence of excess capacity (particularly in the construction sector) and corporate debt overhang.

6. Concluding Remarks

Thailand has developed a notoriety of sorts for being the epicenter of the East Asian crisis of 1997-98, with the devaluation of the Thai baht in July 1997 marking the date that sparked off the regional financial and economic collapse. In this paper we have concentrated on determining the extent to which the existing currency crisis

⁶¹ The contractionary impact of a devaluation is of course not a new issue, having been formally explored early on in an insightful but relatively neglected paper by van Wijnbergen (1986). Moreno (1999) finds that there was a negative relationship between real exchange rate depreciations and economic activity in East Asia even before the crisis. Nidhiprabha (1998b) discusses and formalizes the issue of contractionary devaluation in the context of the crisis in Thailand; and Krugman (1999c) revisits the issue and discusses policy options in light of the East Asian crisis.

⁶² For recent discussions of macroeconomic developments in Thailand, see the BOT's Quarterly Bulletin: (http://www.bot.or.th/bothomepage/databank/ArticlesAndPublications/quarter_report_e.htm) and the World Bank's quarterly Thailand Economic Monitor: (<http://www.worldbank.or.th/economic/index.html>).

literature might be useful in explaining the Thai crisis of 1997-98. Our reading of the evidence is that the Thai crisis is most appropriately seen as consisting of two distinct but related components: first, a “fundamentals-based” crisis arising from an actual and anticipated banking system bailout and consequent monetary disequilibrium; second, a bank panic following the initial devaluation of the baht (on July 2nd 1997) which led to an outright currency and economic collapse by the end of that year and into 1998. Using the terminology of Flood and Marion (1998), Thailand was originally “pushed” into devaluation because of secularly deteriorating fundamentals but was then “pulled” into an outright economic collapse due an international bank panic⁶³.

Informed observers have recognized that realistically (if not theoretically), the bank panic model cannot stand on its own and requires the existence of “bad fundamentals” (Corsetti et al., 1999c)⁶⁴. Our argument above is that the initial crisis was the trigger leading to an outright collapse. To be more specific, with regard to the fundamentals, while the size of Thailand’s current account sustainability, real exchange rate overvaluation and export and growth prospects all showed signs of weakness, the central thread of our interpretation of the Thai crisis is that the initial devaluation was “inevitable” in light of the underlying monetary and financial imbalances. We also offered various forms of evidence of the “panic” associated with financial distress and attempted to clearly distinguish it from the initial fundamentals-based devaluation. Thailand’s heavy reliance on a bank-based financial system and the high leverage of corporations made the economic distress particularly acute.

While this important distinction between the initial devaluation and ensuing

⁶³ Alternatively, as Dollar and Hallward-Driemeir (2000) note, Thailand was initially impacted (i.e. devaluation) because of “bad policy” but was then led into an outright collapse because of “bad luck” (due to a “confidence crisis”). However this “bad luck” is not independent of the domestic policy regime, premature financial liberalization in the absence of prudential regulation and a soft dollar peg being a major part of the reason for the rapid build up of large scale, short term external debt without cover in Thailand pre-crisis. This in turn made Thailand susceptible to a post-devaluation financial panic and collapse.

⁶⁴ Indeed, Chang and Velasco (1998) themselves attempted to couch the bank panic model within a second generation genre of models where “bad fundamentals” are necessary but insufficient for a crisis to occur.

financial and economic collapse appears to be missing from the existing debate on the causes and consequences of the East Asian crisis in general, both Calvo and Mendoza (1996) and Sachs et al. (1996) have concluded that Mexican crisis of 1994-95 ought also to be seen in terms of these two distinct stages⁶⁵. It is however important to emphasize that our conclusion pertains solely to Thailand, the crises situations of the other regional crisis-hit East Asian economies yet to be carefully evaluated. In other words, the conclusion drawn by Krugman (1999b) - which is no doubt shared by many others - that there is no way “to make sense of the..(East Asian)..contagion of 1997-98 without supposing the existence of multiple equilibria, with countries vulnerable to self-validating collapses in confidence” (pp.8-9) may well be true. It however remains to be conclusively proven, and this can best be done by detailed and data-intensive individual country studies of the type undertaken here.

⁶⁵ In the case of Mexico though, the emphasis was more on *equity flows* than *bank lending*. There also remains some disagreement as to whether the initial devaluation of the peso was self-validating (Sachs et al., 1996) or fundamentals-based *a la* KFG (Calvo, 1996a and Calvo and Mendoza, 1996). Focusing on Mexico and Thailand, Montiel (1999) also stresses the importance of bad fundamentals leading to a devaluation, which if postponed, could precipitate an outright liquidity crisis.

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Table 1
Net Capital Flows to Developing Economies (US\$ billions), 1984-1997

	1984-89 ^a	1990-96 ^a	1994	1995	1996	1997
Private Capital Flows	17.8	129.4	133.8	148.2	190.4	139.0
Foreign Direct Investment	12.2	57.9	76.5	86.5	108.5	126.5
Portfolio Investment	4.9	51.1	85.7	22.2	52.7	55.5
Other Investment ^b	0.6	20.4	-28.4	39.5	29.3	-43.0
Official Flows	27.2	16.8	10.3	32.1	3.2	-3.3
Change in Reserves ^c	5.1	-54.8	-42.3	-67.1	-95.2	-57.8

Notes: a) annual average for the period; b) may include official flows ; c) minus implies an increase
Source: IMF

Table 2
SEA4 and South Korea: Aggregate Net Capital Flows (US\$ billions), 1995-1999

Type of Capital Flow	1995	1996	1997	1998 ^e	1999 ^f
Current Account Balance	-40.6	-54.8	-26.1	69.2	44.6
External Financing	83.0	99.0	28.3	-4.2	7.8
Private Flows	80.4	102.3	0.2	-27.6	0.3
Equity Investment	15.3	18.6	4.4	13.7	18.5
Direct	4.2	4.7	5.9	9.5	12.5
Portfolio	11.0	13.9	-1.5	4.3	6.0
Private Creditors	65.1	83.7	-4.2	-41.3	-18.2
Commercial Banks	53.2	62.7	-21.2	-36.1	-16.0
Nonbanks	12.0	21.0	17.1	-5.3	-2.3
Official Flows	2.6	-35.3	28.1	23.4	7.6
Resident Lending/Others ^a	-28.3	-27.3	-33.7	-22.9	-21.0
Reserves (exc. Gold) ^{a,b}	-14.1	-16.9	31.5	-42.1	-31.4

Notes: a) minus denotes increase; b) includes resident net lending, monetary gold and errors and omissions

Source: IIF (1999)

Table 3
SEA-4: Selected Macroeconomic Indicators (%), 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997
Indonesia								
GDP growth ^a	9.0	8.9	7.2	7.3	7.5	8.2	8.0	4.6
Inflation rate	7.8	9.4	7.5	9.7	8.5	9.4	7.9	6.6
Fiscal bal. ^b	1.3	0.0	-1.2	-0.7	0.0	0.8	1.2	-0.7
CAB ^c	-2.8	-3.4	-2.2	-1.5	-1.7	-3.3	-3.2	-3.0
I/GDP ^d	28.3	27.0	25.8	26.3	27.6	28.4	28.1	26.5
S/GDP ^e	27.9	28.7	27.3	31.4	29.2	29.0	28.8	27.3
Export growth ^f	16.7	10.5	14.0	8.3	9.9	18.0	5.8	12.2
Import growth ^g	31.5	15.7	7.8	6.0	13.9	26.6	8.1	4.5
U.E. rate ^h	2.5	2.6	2.7	2.8	4.4	7.2	4.9	4.7
EBS ⁱ	8.3	8.4	8.7	8.5	8.6	8.5	9.0	10.5
Malaysia								
GDP growth ^a	9.6	8.6	7.8	8.3	9.2	9.5	8.6	7.7
Inflation rate	2.8	2.6	4.7	3.5	3.7	3.4	3.5	2.7
Fiscal bal. ^b	-3.1	-2.5	0.1	0.5	1.5	1.3	1.1	2.6
CAB ^c	-2.1	-8.8	-3.8	-4.8	-7.8	-10.0	-4.9	-5.1
I/GDP ^d	32.4	33.4	36.0	38.4	40.2	43.1	41.8	42.7
S/GDP ^e	29.2	26.3	30.2	31.1	33.9	n.a.	n.a.	37.0
Export growth ^f	16.2	17.1	18.1	16.1	23.1	26.4	7.4	0.7
Import growth ^g	28.4	26.9	9.8	18.1	28.3	30.2	1.9	1.2
U.E. rate ^h	5.1	4.3	3.7	3.0	3.0	2.8	2.5	2.5
EBS ⁱ	6.9	5.9	5.6	6.1	5.2	6.6	5.4	8.4
Philippines								
GDP growth ^a	3.0	-0.6	0.3	2.1	4.4	4.8	5.7	5.1
Inflation rate	12.7	18.7	8.9	7.6	9.0	8.1	8.4	5.0
Fiscal bal. ^b	-3.5	-2.1	-1.2	-1.6	-1.6	-1.4	-0.4	-0.9
CAB ^c	-6.1	-2.3	-1.6	-5.5	-4.6	-4.4	-4.7	-5.3
I/GDP ^d	24.0	20.0	20.9	23.8	23.6	22.2	23.2	25.1
S/GDP ^e	18.7	18.0	19.5	18.4	19.4	17.8	19.7	21.0
Export growth ^f	4.7	8.0	11.1	15.8	18.5	29.4	17.7	22.8
Import growth ^g	17.2	-1.3	20.5	23.7	18.8	23.7	20.8	14.0
U.E. rate ^h	8.4	10.6	9.6	9.4	9.5	9.4	8.4	8.9
EBS ⁱ	8.1	9.0	7.2	7.8	7.2	6.5	7.3	6.0
Thailand								
GDP growth ^a		8.1	8.2	8.5	8.6	8.8	5.5	-0.4
Inflation rate	11.6	5.7	4.1	3.4	5.1	5.8	5.9	5.6
Fiscal bal. ^b	6.0	4.1	2.5	2.0	2.0	2.5	1.0	-1.6
CAB ^c	4.6	-7.5	-5.5	-5.0	-5.4	-7.9	-7.9	-1.9
I/GDP ^d	-8.3	41.6	39.2	39.4	39.9	41.8	40.8	35.8
S/GDP ^e	40.2	35.2	34.3	34.9	34.6	34.3	33.1	31.8
Export growth ^f	32.6	23.8	13.7	10.3	25.7	24.7	-1.9	4.1
Import growth ^g	15.1	15.8	6.0	12.2	18.5	31.5	0.8	-13.8
U.E. rate ^h	29.9	2.1	2.8	2.6	2.6	1.7	1.5	1.5
EBS ⁱ	3.4	4.0	4.3	4.4	4.8	5.0	5.4	7.1

Notes: a) real GDP growth; b) fiscal balance to GDP ratio; c) current account balance to GDP ratio; d) fixed capital formation to GDP ratio; e) savings to GDP ratio; f) merchandise export growth; g) merchandise import growth; h) unemployment rate; i) external debt service

Sources: IMF and ADB

Table 4
SEA4: Composition of Net Private Capital Inflows (% of GDP), 1991-1996

	1991	1992	1993	1994	1995	1996	Simple Average ^b
Indonesia:							
Total Private Capital Flows	4.6	2.5	3.1	3.9	6.2	6.3	5.1
Direct investment	1.2	1.2	1.2	1.4	2.3	2.8	1.7
Portfolio Investment	0.0	0.0	1.1	0.6	0.7	0.8	0.5
Other Investment	3.5	1.4	0.7	1.9	3.1	2.7	3.0
Official Flows	1.1	1.1	0.9	0.1	-0.2	-0.7	0.7
Change in Reserves ^a	-2.4	-3.0	-1.3	0.4	-0.7	-2.3	-1.7
Malaysia:							
Total Private Capital Flows	11.2	15.1	17.4	1.5	8.8	9.6	10.2
Direct investment	8.3	8.9	7.8	5.7	4.8	5.1	7.2
Portfolio Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Investment	2.9	6.2	9.7	-4.2	4.1	4.5	2.9
Official Flows	0.4	-0.1	-0.6	0.2	-0.1	-0.1	0.0
Change in Reserves ^a	-2.6	-11.3	-17.7	4.3	2.0	-2.5	-5.1
Philippines:							
Total Private Capital Flows	1.6	2.0	2.6	5.0	4.6	9.8	4.1
Direct investment	2.0	1.3	1.6	2.0	1.8	1.6	1.8
Portfolio Investment	0.3	0.1	-0.1	0.4	0.3	-0.2	0.2
Other Investment	0.2	0.6	1.1	2.5	2.4	8.5	2.1
Official Flows	3.3	1.9	2.3	0.8	1.4	0.2	2.0
Change in Reserves ^a	-2.3	-1.5	-1.1	-1.9	-0.9	-4.8	-1.8
Thailand:							
Total Private Capital Flows	10.7	8.7	8.4	8.6	12.7	9.3	11.5
Direct investment	1.5	1.4	1.1	0.7	0.7	0.9	1.6
Portfolio Investment	0.0	0.5	3.2	0.9	1.9	0.6	1.4
Other Investment	9.2	6.8	4.1	7.0	10.0	7.7	8.5
Official Flows	1.1	0.1	0.2	0.1	0.7	0.7	0.1
Change in Reserves ^a	-4.3	-2.8	-3.2	-3.0	-4.4	-1.2	-4.3

Notes: a) minus sign denotes a rise and vice versa; b) 1989 to 1996

Source: IMF

Table 5
Thailand: Composition of Net Private Capital Flows (US\$ billions), 1990-1997

	1990	1991	1992	1993	1994	1995	1996	1997	
								1 st half	2 nd half
Bank	1,594	-259	1,933	3,599	13,925	11,236	5,002	2,374	-7,792
Commercial bank	1,594	-259	1,933	-4039	3,837	3,103	428	n.a	n.a
BIBF	0	0	0	7,638	10,087	8,133	4,574	n.a	n.a
Non Bank	9,333	10,544	7,415	6,717	-1,910	9,561	13,170	-1,465	-387
Direct Investment	2,391	1,848	1,979	1,439	902	1,168	1,453	1,097	2,079
Foreign Direct Investment	2,531	2,016	2,116	1,732	1,323	2,004	2,268	n.a	n.a
Thai Direct Investment	-140	-168	-136	-293	-421	-837	-815	n.a	n.a
Other Loans	4,495	5,638	2,725	-2,420	-5,838	1,530	5,446	-948	-2,928
Portfolio Investment	450	151	556	4,848	1,095	3,283	3,482	1,742	2,821
Equity Securities	450	36	454	2,682	-409	2,120	1,122	n.a	n.a
Debt Securities	0	115	102	2,166	1,504	1,164	2,360	n.a	n.a
Non-Resident Baht Account	1,342	2,057	1,754	2,682	2,036	3,381	2,911	-3,487	-2,267
Trade Credits	655	745	307	539	456	256	-146	186	-392
Others	0	105	92	-370	-560	-58	25	-55	300
Total Private Capital	10,927	10,284	9,348	10,316	12,014	20,797	18,172	909	-8,179

Source: BOT

Table 6
SEA4: Real Bank Credit to the Private Sector (%), 1990-1997^a

	Growth Rate (%), 1990-95 ^b	Growth Rate (%), 1996	Growth Rate (%), 1997	Bank Credit to Private Sector ^{b,c} (% of GDP), 1991	Bank Credit to Private Sector ^{b,c} (% of GDP), 1996	Bank Credit to Private Sector ^{b,c} (% of GDP), 1997
Indonesia	18.8	11.5	19.2	45.8	55.4	61.0
Malaysia	13.5	24.5	23.3	75.3	89.8	100.4
Philippines	12.7	39.9	27.7	18.9	50.0	57.6
Thailand	20.2	11.6	8.6	67.7	100.0	116.3

Notes: a) deflated by consumer prices; b) annual average; c) credit other than to central bank
Source: Bisignano (1999) and IMF

Table 7
SEA4: "Effects" of Capital Inflows (%), 1989-1995

	Inflow Episode	Cumulative Inflows/GDP at end of period	Mean Ratio	GDP Growth ^a	Inflation Rate ^a	Current Account Deficit ^{a,b}	Change in Investment ^{a,b}	Change in Consumption ^{a,b}
Indonesia	1990-95	8.3	1.8	2.2	1.3	0.2	5.7	-5.2
Malaysia	1989-95	45.8	9.4	4.0	1.4	2.9	4.8	-1.8
Philippines	1989-95	23.1	4.3	2.2	-3.1	0.7	1.7	6.1
Thailand	1988-95	51.5	9.9	3.9	-1.1	2.3	13.4	-11.2
<u>Memo Item:</u> Mexico	1989-94	27.1	5.3	2.9	-74.4	7.1	2.4	6.7

Notes: a) change from immediately preceding period of equal length; b) as percent of GDP
Sources: Lopez-Mejia (1999) and World Bank (1997)

Table 8
Thailand: Growth in Property Credits (%), 1991-1997

Sector	1991	1992	1993	1994	1995	1996	1997
Real Estate	22.8	21.1	25.8	29.2	20.2	8.7	-22.1
Commercial Banks	16.6	21.2	21.0	19.9	9.9	11.3	15.1
Finance Companies	38.1	21.0	35.7	46.4	36.0	6.5	-65.8
Housing	32.8	30.6	38.7	36.6	22.6	16.6	-2.3
Commercial Banks	31.2	32.3	36.5	35.4	21.2	16.8	5.2
Finance Companies	47.4	16.4	58.8	45.6	33.3	15.5	-54.2

Source: BOT

Table 9
Thailand: Loan Portfolio Composition Financial System
(% of Total Lending), 1988 and 1996

	End of Year 1988		End of Year 1996	
	Commercial Banks	Finance Companies	Commercial Banks	Finance Companies
Agriculture	7.1	1.3	3.9	0.9
Manufacturing	25.8	21.8	26.8	15.3
Construction	4.3	3.5	4.6	3.7
Real Estate	6.3	14.8	9.1	24.3
Imports	5.3	2.8	3.2	1.7
Exports	8.3	1.3	4.2	0.8
Wholesale/Retail	18.9	12.7	17.8	7.8
Public Utilities/Services	7.3	7.3	10.6	7.6
Banking and Finance	6.3	9.1	7.5	11.0
Personal Consumption	10.3	25.5	12.3	27.0
Total	100.0	100.0	100.0	100.0

Source: Renaud et al. (1998)

Table 10
SEA4 and South Korea: Derived Currency Weights, 1979-1995

Currency	Frankel and Wei (1994) ^a		Kwan (1995) ^b	
	US dollar	yen	US dollar	yen
Indonesian rupiah	0.95	0.16	0.99	0.00
Malaysian ringgit	0.78	0.07	0.84	0.04
Philippine peso	1.07	-0.01	1.15	-0.24
Singapore dollar	0.75	0.13	0.64	0.11
Thailand baht	0.91	0.05	0.82	0.11

Notes: a) Based on weekly movements for the period January 1979 to May 1992
b) Based on weekly movements for the period January 1991 to May 1995

Table 11
Thailand: Trade Indices and Terms of Trade, 1996-1999^a
(1995 = 100)

	1996	1997	1998	1999 ^b
Exports ^c	98.10	105.56	113.89	116.86
Volume	96.20	99.86	93.07	93.72
Value	102.10	98.73	112.36	110.22
Unit Value				
Imports ^c	93.60	83.66	60.94	70.88
Volume	100.60	87.15	57.73	60.85
Value	107.60	104.01	94.89	86.07
Unit Value				
Terms of Trade	94.89	94.93	118.40	128.07
	Percent change			
<u>Memo Items:</u>				
Exports ^c	-1.9	7.6	7.9	2.6
Volume	-3.8	3.8	-6.8	0.7
Value	2.1	-3.3	13.8	-1.9
Unit Value				
Imports ^c	-6.4	-10.6	-27.2	16.3
Volume	0.6	-13.4	-33.8	5.4
Value	7.6	-3.3	-8.8	-9.3
Unit Value				
Terms of Trade	-5.1	0.0	24.7	8.2

Notes: a) in terms of US\$ and based on customs data; b) first half of the year;
c) from January 1996 onwards, for both export and import categories,
unit value indices are calculated by using Fisher chained method (1995 = 100)

Sources: IMF (2000b)

Table 12
Thailand: Performance of Non-financial Private Firms

Period	Number of Firms	Total Loans of Firms (billions of baht)	Profits over Interest Expenses ^a (%)	Share of Firms with Profits < Interest Expenses	Loans of Companies with Profits < Interest Expenses (% of total loans)	Profits over Liabilities (%)	Debt/Equity Ratio
1999:Q2	244	1,780	1.9	34	41.1	13.6	2.9
1999:Q1	244	1,809	1.6	38	46.8	12.1	2.9
1998:Q4	244	1,816	1.3	47	46.6	9.5	2.8
1998:Q3	244	1,941	1.1	50	50.3	8.6	3.3
1998:Q2	244	2,036	1.2	58	54.0	8.4	3.7
1998 Q1	244	1,983	1.4	36	40.5	9.3	3.7
1997:Q4	244	2,092	1.0	25	28.2	7.4	4.6
1997:Q3	244	1,711	1.2	39	49.2	9.0	3.1
1997:Q2	244	1,455	1.6	20	16.2	15.1	2.2
1997:Q1	244	1,403	2.7	18	19.0	19.5	2.1
1996	240	1,333	3.5	10	11.3	15.3	2.0
1995	240	1,038	4.4	7	4.9	18.9	1.7
1994	239	776	6.1	4	2.6	24.3	1.5

Notes: a) profit is defined as earnings before interest, taxes, depreciation and amortization (EBITDA)

Source: IMF (2000b)

Table 13
Thailand: Performance of Listed Finance and Real Estate Companies
(baht billions), 1994-1997

	1994	1995	1996	1997
Profit of listed real estate companies	14.7	10.9	7.8	-71.6
Growth (%)	(32.9)	(-26.0)	(-28.5)	(-1506.5)
Profit of listed finance companies	25.0	18.6	15.8	-45.6
Growth (%)	(26.2)	(-25.8)	(-14.9)	(-520.3)

Source: BOT

Table 14
SEA4: Selected Indicators of Financial Sector Development
(% of GDP), 1994-1996

	Credit of Banking System (1995)	Bank Assets (1994)	Bank Share in Financial Intermediation (1994) ^a	Stock Market Capitalization (1996)	Bond Market Capitalization (1996)
Indonesia	50	57	91	10	6
Malaysia	132	100	64	33	56
Philippines	63	54	n.a.	n.a.	39
Thailand	137	110	75	4	14

Notes: a) assets of banks as a percent of the assets of banks and nonbank financial institutions
Sources: Compiled by author from various sources

Table 15
SEA-4: Claims by Monetary Authorities on Domestic Financial Institutions,
Q1:1996-Q3:1997^a

	Q1:1996	Q2:1996	Q3:1996	Q4:1996	Q1:1997	Q2:1997	Q3:1997	Q4:1997
Indonesia ^b	15295	15930	16531	15182	16084	19154	21245	67313
Malaysia ^c	6585	6867	5679	5249	5325	5284	5411	5032
Philippines ^d	13.1	13.2	13.6	14.2	14.3	16.1	20.0	34.5
Thailand ^e	38.4	66.0	72.0	90.1	194.0	353.9	597.9	723.4

Notes: a) end of period; b) billions of rupiah; c) millions of ringgit; d) billions of peso; e) billions of baht
Source: IMF

Table 16
SEA4: Foreign Assets and Liabilities Towards BIS Reporting Banks (US\$ billions),
1993, 1996 and 1997

	1993	1996	1997
<u>Indonesia</u>			
Foreign Liabilities	37.20	57.85	62.76
Foreign Assets	12.58	13.64	11.55
Net Liabilities (Total)	24.63	44.21	51.21
Foreign Liabilities (Nonbanks)	22.23	34.36	38.70
Foreign Assets (Nonbanks)	3.61	2.68	3.32
Net Liabilities (Nonbanks)	18.63	31.69	35.37
Foreign Liabilities (Banks)	14.97	23.49	24.07
Foreign Assets (Banks)	8.97	10.97	8.23
Net Liabilities (Banks)	6.00	12.52	15.84
<u>Malaysia</u>			
Foreign Liabilities	16.02	25.91	29.08
Foreign Assets	19.24	17.49	13.07
Net Liabilities (Total)	-3.21	8.41	16.01
Foreign Liabilities (Nonbanks)	4.26	6.92	6.46
Foreign Assets (Nonbanks)	1.94	2.75	3.46
Net Liabilities (Nonbanks)	2.31	4.17	3.00
Foreign Liabilities (Banks)	11.77	18.99	22.62
Foreign Assets (Banks)	17.29	14.74	9.61
Net Liabilities (Banks)	-5.53	4.25	13.01
<u>Philippines</u>			
Foreign Liabilities	6.61	13.51	16.61
Foreign Assets	5.81	7.84	9.70
Net Liabilities (Total)	0.80	5.67	6.91
Foreign Liabilities (Nonbanks)	3.37	4.15	6.34
Foreign Assets (Nonbanks)	2.96	3.06	3.14
Net Liabilities (Nonbanks)	0.42	1.09	3.20
Foreign Liabilities (Banks)	3.24	9.36	10.27
Foreign Assets (Banks)	2.85	4.78	6.56
Net Liabilities (Banks)	0.29	4.58	3.72
<u>Thailand</u>			
Foreign Liabilities	34.73	99.27	79.66
Foreign Assets	5.01	9.00	9.81
Net Liabilities (Total)	29.72	90.27	69.84
Foreign Liabilities (Nonbanks)	9.14	14.13	12.00
Foreign Assets (Nonbanks)	1.63	1.90	2.06
Net Liabilities (Nonbanks)	7.50	12.22	9.94
Foreign Liabilities (Banks)	25.59	85.15	67.66
Foreign Assets (Banks)	3.38	7.10	7.75
Net Liabilities (Banks)	22.22	78.05	59.90

Source: BIS

Table 17
SEA4: Measures of External Vulnerability

<u>Total Debt (US\$ millions)</u>	
June 1990	11,675
June 1994	36,545
June 1997	69,382
<u>Local Currency (% of Total Debt)^a</u>	
1990	5.82
1994	5.97
1997	5.63
<u>Short Term Debt (US\$ million)^a</u>	
1990	7,026
1994	27,151
1997	45,567
<u>Short Term Debt (% of Total Debt)^a</u>	
1990	60.2
1994	74.3
1997	65.7
<u>Short Term Debt to International Reserves^a</u>	
June 1990	0.59
June 1994	0.99
June 1997	1.45
<u>Mobile Capital to International Reserves^{b,c}</u>	
1990	0.44
1993	0.95
1995	1.63
1996	1.85
1997	2.22

Notes: a) as of June; b) as of year end; "mobile capital" refers to short term bank credit (of all banks); c) accumulated portfolio investment and balances of nonresident bank accounts and trade credits

Source: BIS, Chang and Velasco (1998) and Athukorala and Warr (1999)

Table 18
Thailand: Composition of Net Private Capital Inflows (US\$ billions), 1997-1999

	1997	1998	1998				1999		
			Q1	Q2	Q3	Q4	Q1	April ^e	May ^e
Banks	-6,640	-13,944	-1,244	-3,799	-4,368	-4,163	-5,497	-1,871	-478
Commercial bank	-1,727	-4,310	881	-1,680	-2,445	-684	-3,375	-760	47
of which Recapitalization	0	1,986	952	1,172	0	0	21	0	974
BIBFs	-1,913	-9,634	-2,125	-2,118	-1,924	-3,479	-2,123	-1,111	-525
Non-Banks	-1,912	-2,024	-2,777	1,731	1,248	-2,222	-469	155	-709
Direct Investment	3,201	4,688	1,066	1,478	1,218	965	902	295	222
Foreign direct investment ^a	3,641	4,810	1,067	1,489	1,248	1,045	996	303	403
Thai direct investment abroad	-440	-123	-1	-11	-30	-80	-94	-8	-181
Other Loans	-3,783	-4,279	-1,981	-814	-734	-673	-1,239	-305	-333
Portfolio investment	4,494	539	437	40	-15	62	221	125	44
Equity securities	3,869	354	434	-150	-75	121	230	130	44
Debt securities	625	185	3	190	60	-59	-9	-5	0
Nonresident baht account	-5,839	-2,714	-2,269	1,177	779	-2,475	-315	-50	-628
Trade Credits	-242	-494	-186	-101	-160	-57	0	30	-4
Others	256	237	156	-50	160	-43	-38	60	-10
Total	-8,552	-15,967	-4,021	-2,067	-3,120	-6,385	-5,966	-1,716	-1,187

Notes: a) excluding \$2.1 billion in bank recapitalization

Source: BOT

Table 19
Thailand: Consolidation of the Financial System

	Finance Companies		Commercial Banks	
	Number	Share of Assets	Number	Share of Assets
June 1997	91	18	15	60
Total assets of \$240 billion ^a	State share < 1 percent of total assets		State share = 8 percent of total assets Majority foreign owned = 0 percent	
Closures	56	11	1	2
BOT Interventions	12	2	5	10
Mergers	13	13	5	3
December 1999^b	23	4	13	71
Total assets of \$236 billion ^a	State share < 1 percent of total assets		State share = 23 percent of total assets ^c Majority foreign owned = 3 percent ^d	

Notes a) dollar figures are at constant exchange rate of 37 baht per dollar. Other financial institutions (foreign bank branches and BIBFs) account for the residual 22 to 25 percent of total assets; b) figures on assets as of end September 1999; c) this is projected to decline to 15 percent after the privatization of the two remaining intervened banks; d) the three largest private banks, with over one third of total assets have high foreign ownership (30 to 49 percent)

Source: IMF (2000a)

Table 20
Thailand: Fiscal Costs of Restructuring and Nonperforming Loans
(% of 1998 GDP unless otherwise stated)

	Amount (% of GDP)
Public debt, 1997	6.5
Fiscal recapitalization cost to date	17.4
Expected additional fiscal cost	15.4
Total expected public debt burden	39.3
Annual interest payment on this burden	1.2
Interest payment (% of 1998 revenue)	6.5
<u>Memo Items:</u>	
Fiscal deficit	5.0
Interest rate used (%)	3.0
Revenue	18.4
<u>NPLs</u>	
Share of NPLs to total loans (official; end 1997)	19.8
Share of NPLs to total loans (official; end 1998)	45.0
Share of NPLs to total loans (official; September 1999)	44.7
Share of NPLs to total loans (unofficial; peak level)	50-70

Notes: a) NPLs are measured on a three-month basis, and the official estimates include assets carved out for sale by the AMCs

Source: ADB (2000) and Claessens et al. (1999)

Table 21
SEA4 and South Korea: Summary of Measures to Deal with the Financial Crisis

Measure	Indonesia	Korea	Malaysia	Philippines	Thailand
Emergency Measures					
Liquidity support	Yes	Yes	Yes	Yes	Yes
Introduction of a blanket guarantee	Yes	Yes	Yes	No	Yes
Institutional measures					
Establishment of an over-arching restructuring authority	Yes	Yes	Yes ^a	No	No
Establishment of a separate bank restructuring authority	Yes	No	Yes	No	No
Establishment of a centralized asset management corporation	Yes	Yes ^b	Yes	No	No ^c
Adoption of a special corporate debt restructuring framework	Yes	Yes	Yes	No	Yes
Operational autonomy of restructuring Agencies	Limited	Yes	Yes	n.a.	n.a.
Restructuring measures					
Intervention in financial institutions that were weak or insolvent. This would include:	Yes	Yes	Yes	Yes	Yes
- Mergers of weak institutions	Yes ^d	Yes	Yes	Yes	Yes ^d
- Closure of insolvent institutions	Yes	Yes	No	Yes	Yes
Use of public funds to purchase nonperforming assets	Yes	Yes	Yes	No	No
Use of public funds to recapitalize institutions including:	Yes	Yes	Yes	No	Yes
- State intervention in banks	Yes	Yes	Yes	No	Yes
Elimination or dilution of current shareholder stakes of insolvent banks	Yes	Yes	Yes	Yes	Yes
New foreign direct investment	Yes	Yes	Limited ^e	Yes	Yes
Other measures					
Measures to encourage corporate restructuring	Yes	Yes	Yes	Yes	Yes
Steps to improve prudential supervision and regulation	Yes	Yes	Yes	Yes	Yes

Notes: a) steering committee chaired by the central banks; b) the powers of pre-existing AMC were substantially increased; c) the FRA was established to illiquidate 56 closed finance companies, and the AMC to deal with residual FRA assets; d) between government owned intervened institutions; e) foreign banks are allowed to purchase up to a 30 percent stake

Sources: Lindgren et al. (1999)

Appendix
Thailand: External Debt and Debt Service (US\$ millions), 1994-1999

	1994	1995	1996	1997	1998	1999 ^a
Total outstanding debt ^b	64,366	82,568	90,536	93,416	86,160	80,655
Outstanding medium and long term debt ^c	35,687	41,472	52,923	59,158	62,637	63,088
Public Sector	15,534	16,317	16,751	24,303	31,344	33,760
<i>by lender</i>	15,534	16,317	16,751	24,303	31,344	33,760
IMF	0	0	0	2,429	3,238	3,343
Other international institutions	2,360	2,469	2,545	3,832	4,757	5,390
Foreign governments	7,995	8,395	8,178	11,995	17,035	18,700
Foreign banks	4,767	5,099	5,747	5,821	6,085	6,122
Suppliers credits	412	354	281	226	229	205
<i>by borrower</i>	15,534	16,317	16,751	24,303	31,344	33,760
Bank of Thailand	0	0	0	7,157	11,204	11,903
Central government	4,639	4,791	5,119	5,667	6,737	8,667
Public enterprises	10,895	11,526	11,632	11,479	13,403	13,190
Nonbank private sector	13,733	16,913	23,161	20,136	20,594	20,205
Loans	11,021	14,060	19,551	14,130	14,663	14,275
Suppliers credits	572	422	340	333	198	198
Debt securities	2,140	2,431	3,270	5,673	5,733	5,732
Commercial Banks	6,420	8,242	13,011	14,719	10,699	9,123
BIBFs	2,969	3,799	10,697	10,895	6,946	5,676
Non-BIBF	3,451	4,443	2,314	3,824	3,753	3,447
Outstanding short term debt (disbursed)	29,179	41,096	37,613	34,258	23,523	17,567
Public Sector	180	85	54	20	150	130
Non-bank private sector	7,443	7,314	8,701	9,390	5,106	3,848
Commercial banks	21,556	33,697	28,858	24,848	18,267	13,589
BIBF	15,142	23,704	20,490	19,184	14,946	10,901
Non-BIBF	6,414	9,993	8,368	5,664	3,321	2,688
Total debt service payments	6,707	8,278	9,024	11,630	14,046	7,070
Amortization, medium and long term debt	3,933	4,084	3,822	6,072	8,694	4,586
Public sector ^d	1,106	1,150	987	1,077	906	535
of which: IMF	0	0	0	0	0	0
Nonbank private sector	2,387	1,915	2,288	3,079	3,472	2,090
Commercial banks	440	1,019	547	1,916	4,315	1,962
BIBF	440	1,019	547	1,916	43,15	1,416
Non-BIBF	545.7
Interest, medium and long term debt	2,082	2,651	3,095	3,447	2,916	1,653
Public sector	829	900	858	881	1,276	763
of which: IMF	0	0	0	15	367	261
Private sector	1,253	1,751	2,237	2,566	1,641	891
Nonbank	1,253	1,751	2,237	2,566	1,641	891
Banks	0	0	0	0	0	0
Interest, short term debt	692	1,543	2,107	2,111	2,436	830
of which: Commercial banks	684	1,539	2,107	2,110	1,770	690
BIBF	494	1,248	1,646	1,745	1,415	585
Non-BIBF	190	291	461	365	355	105
Average maturity of medium and long term debt contracted (years) ^e						
Public sector	20.7	20.3	19.6	19.2	20.1	18.6
Private sector	5.2	5.1	5.0	4.8	4.9	4.7
Average interest rate on medium and long term debt contracted (percent)						
Public sector ^e	5.0	4.9	4.5	4.6	4.5	4.3
Private sector	5.6	6.7	7.3	6.7	6.5	6.4
Total debt service ratio ^f	11.7	11.4	12.3	15.7	20.8	20.3

Notes: a) first half of year; b) excludes loans (estimated at about \$4 billion at end 1997) contracted by Thai corporations but not brought into Thailand; c) debt with original maturity of more than one year; d) includes repayments of bonds locally issued by the Thai government that are held by nonresidents; e) excludes borrowing from the IMF and official bilateral creditors under the financing package; f) percent of exports of goods and services (including workers remittances)

Source: IMF (2000b)

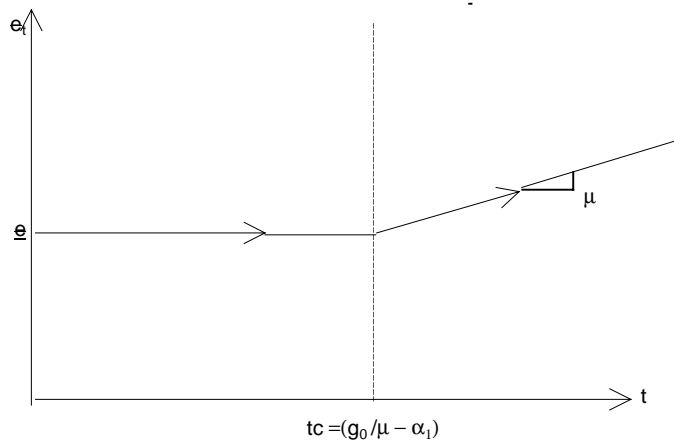
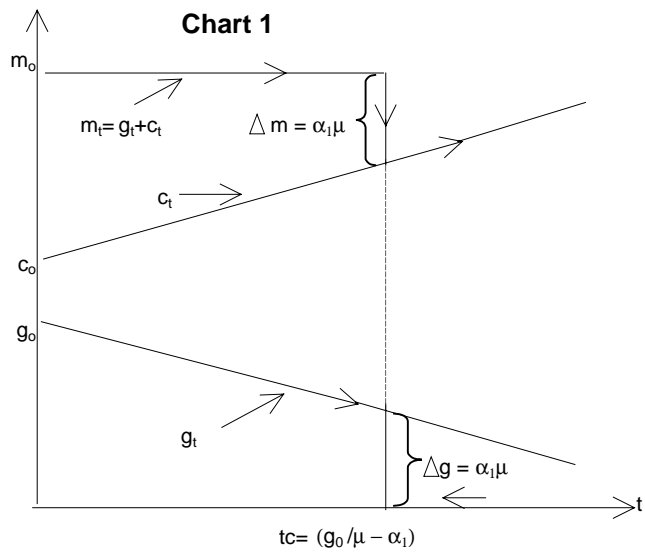


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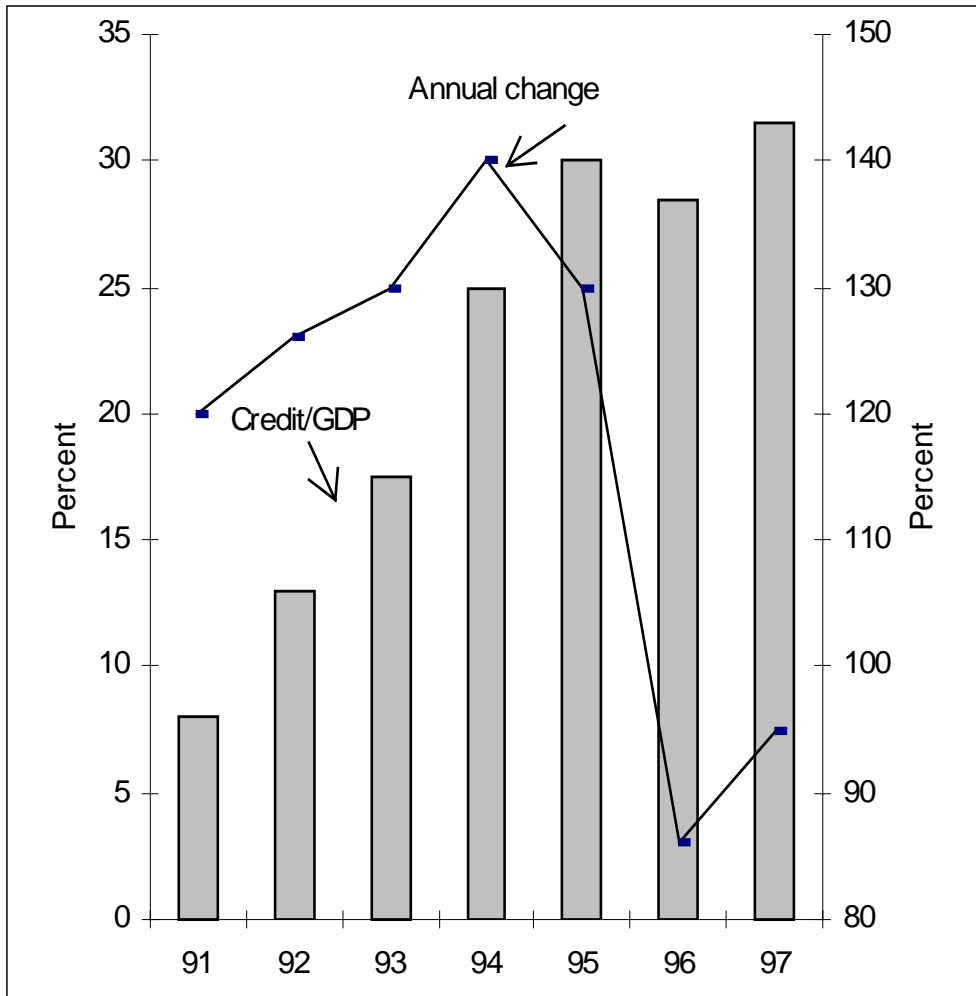


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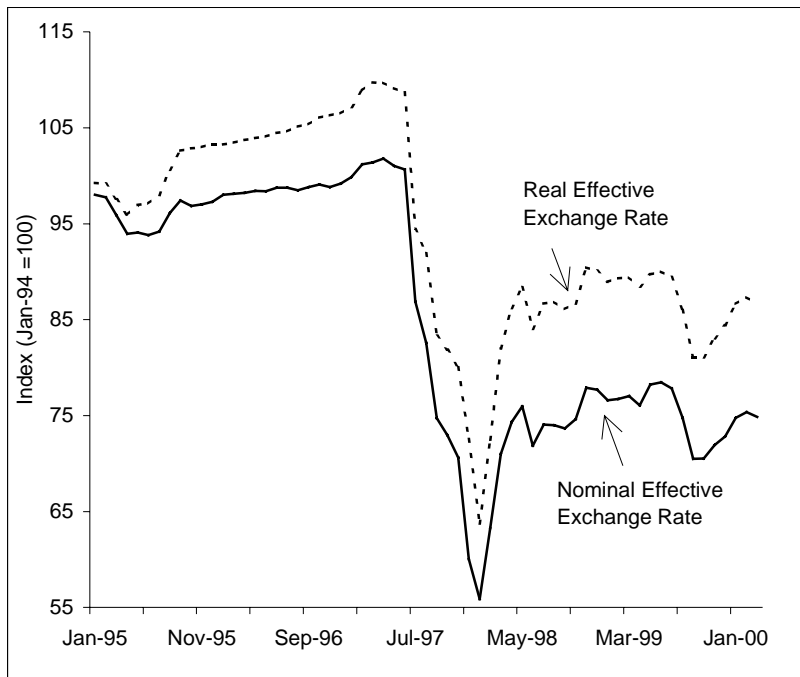


Chart 4

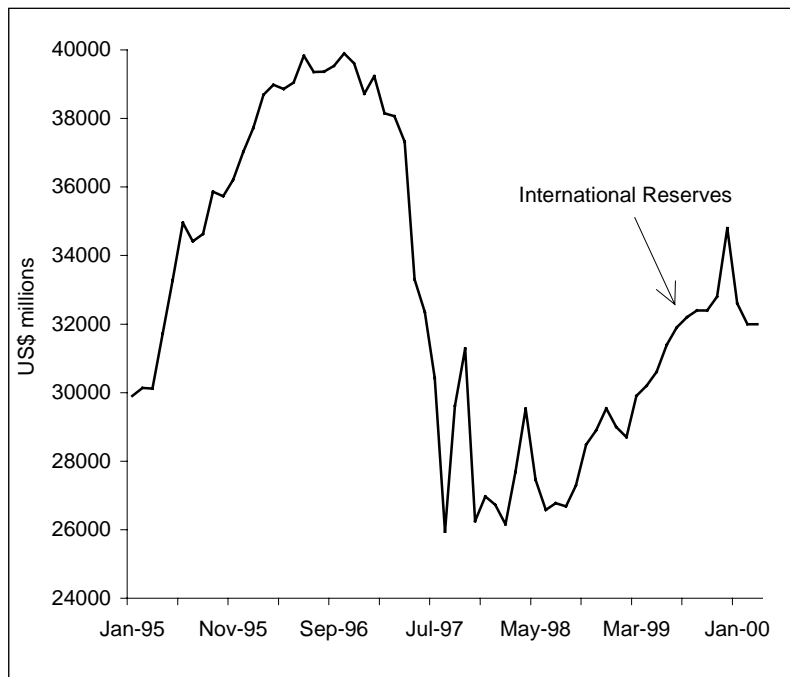


Chart 5



Chart 6

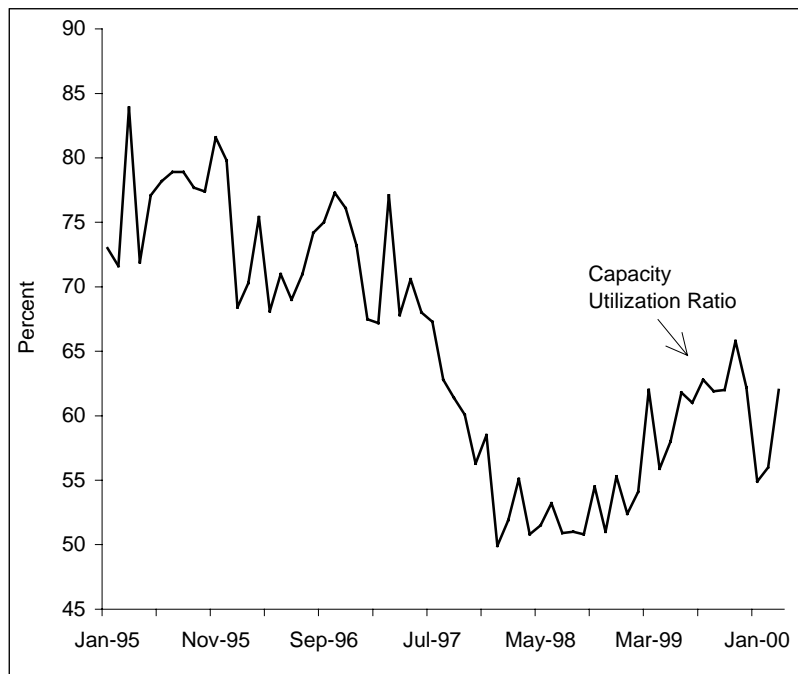


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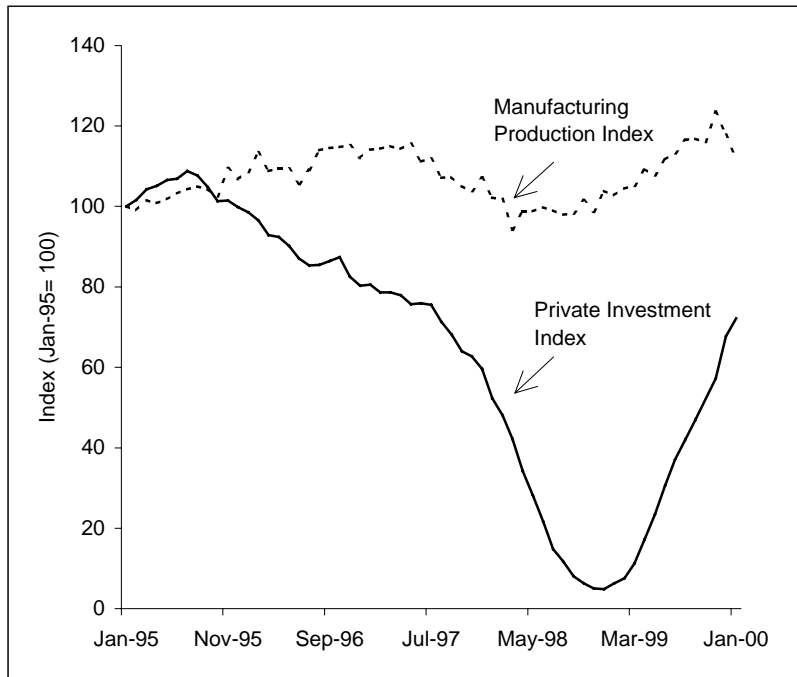


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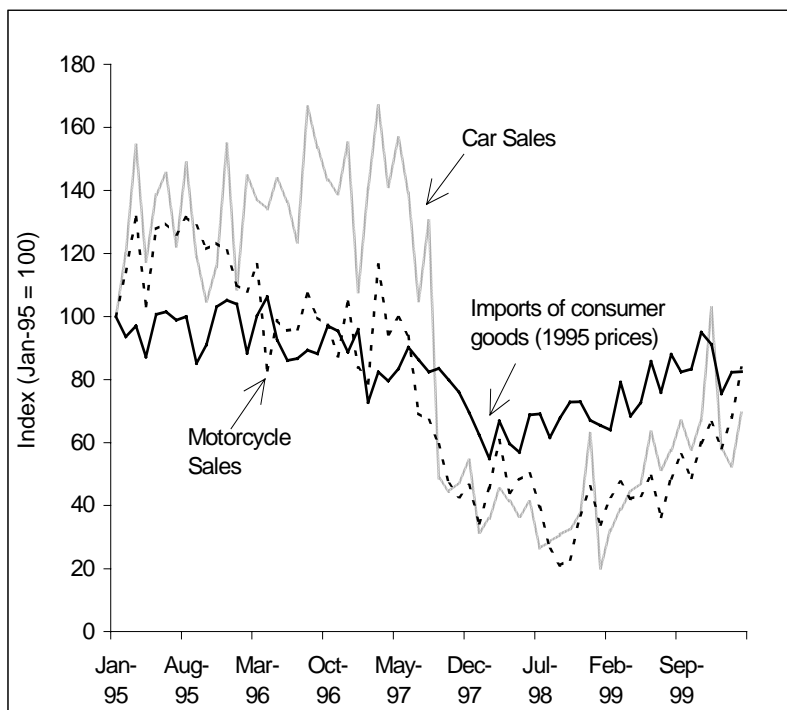


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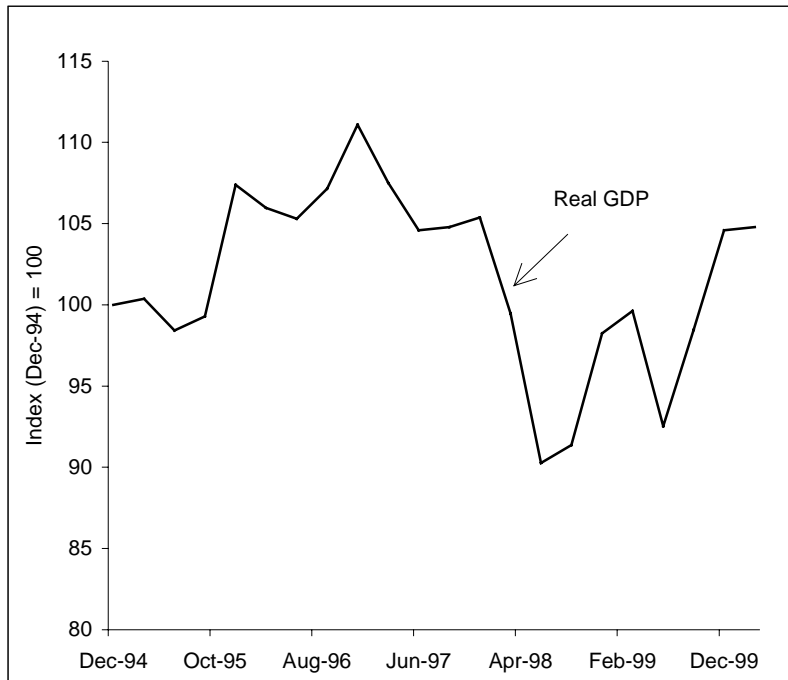


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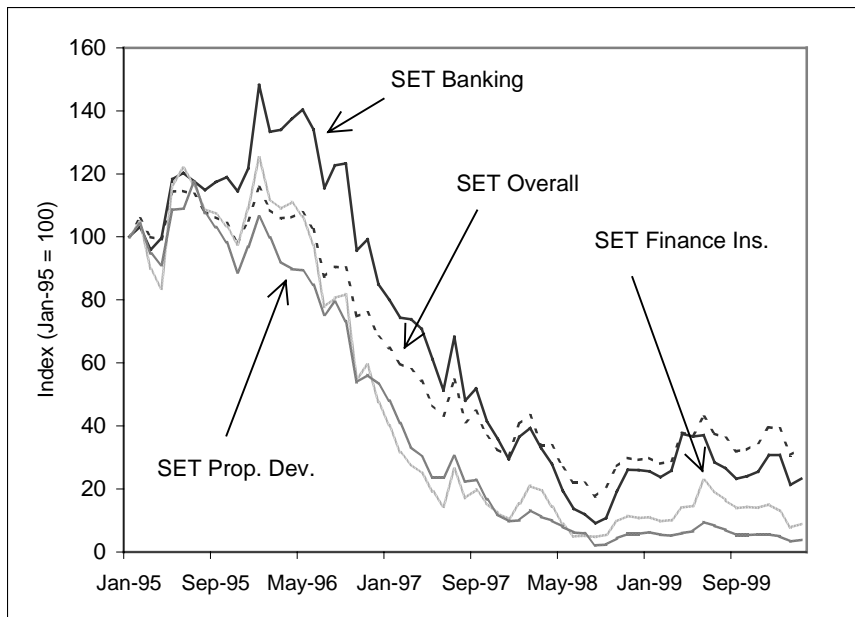


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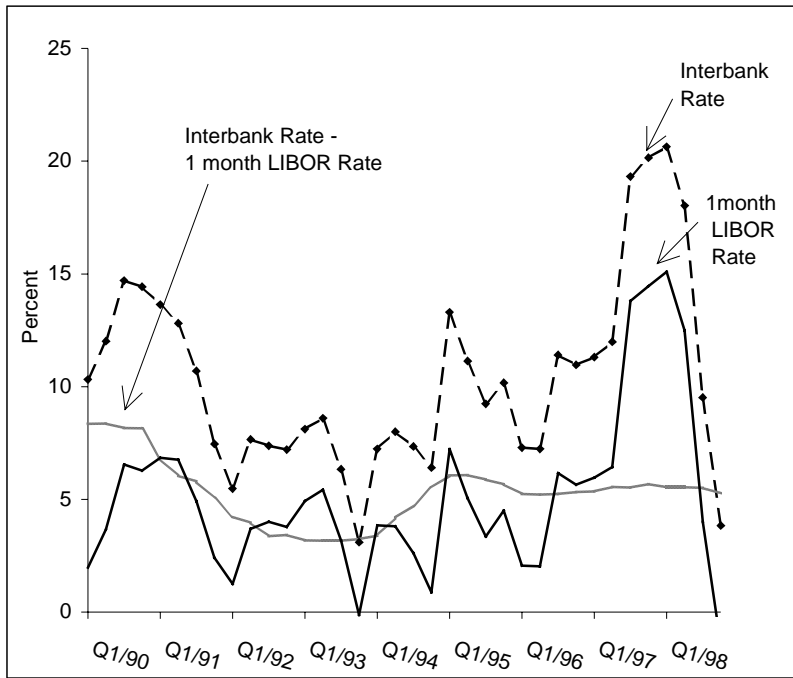


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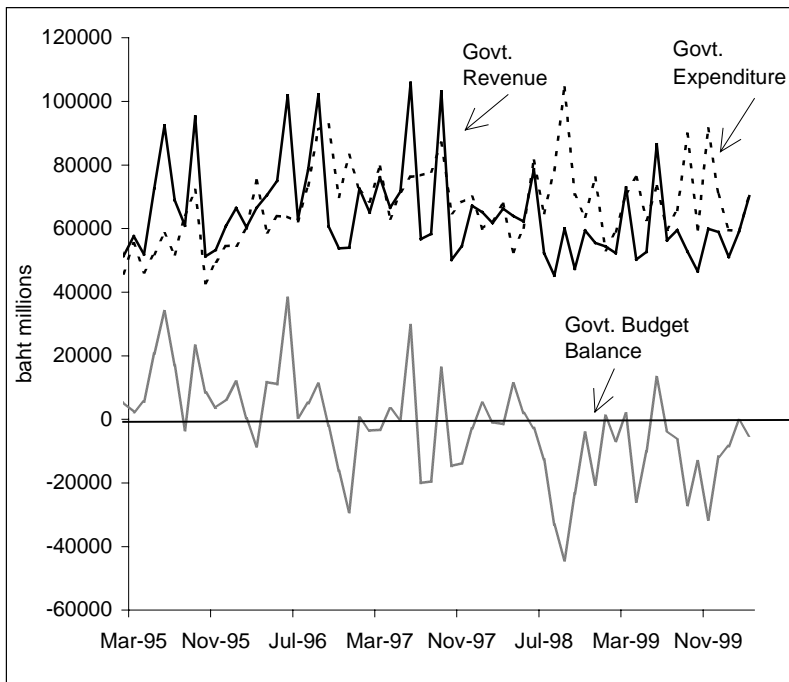


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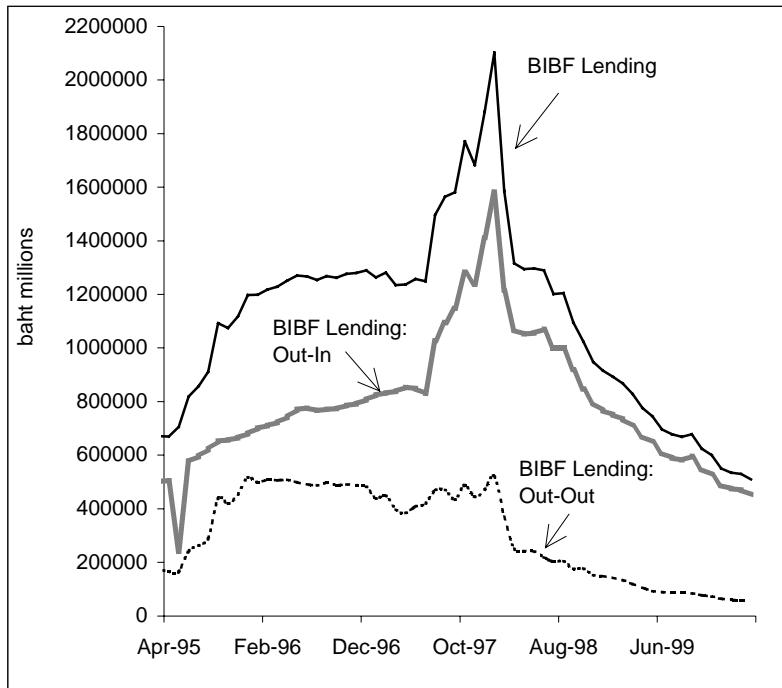


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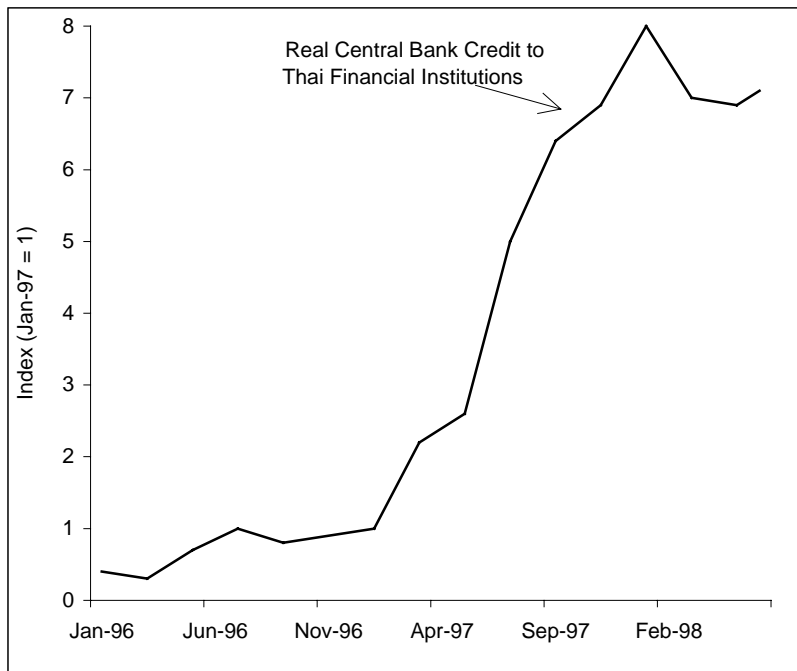


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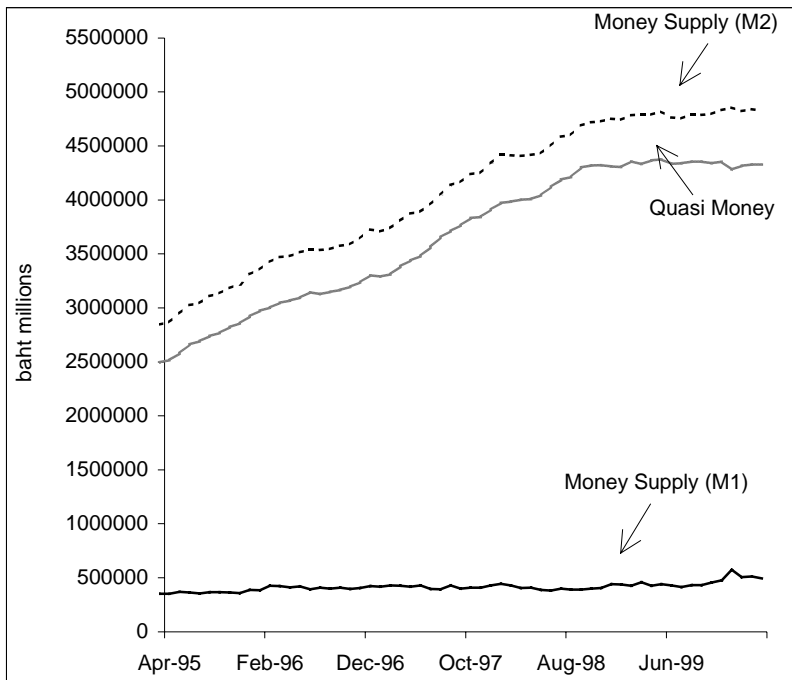


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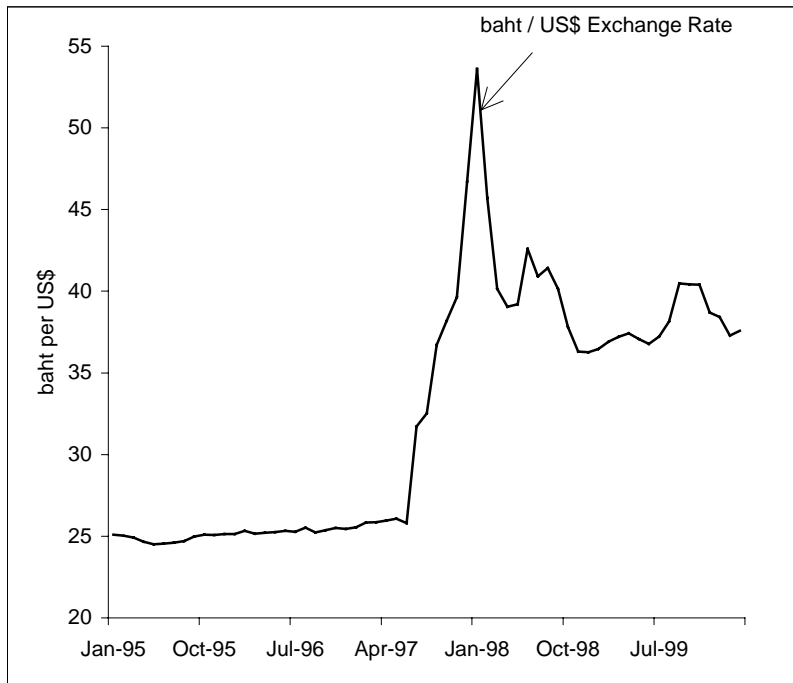
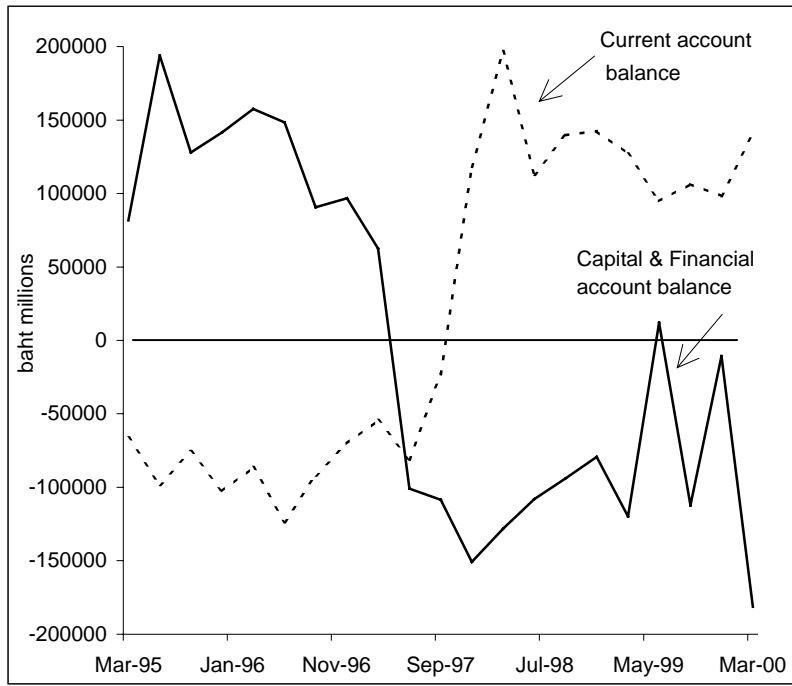


Chart 17



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