

PRINCETON STUDIES IN INTERNATIONAL ECONOMICS

No. 88, February 2001

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

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INTERNATIONAL ECONOMICS SECTION

DEPARTMENT OF ECONOMICS
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IN INTERNATIONAL ECONOMICS

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GENE M. GROSSMAN, *Director*
International Economics Section

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Library of Congress Cataloging-in-Publication Data

Rajan, Ramkishen S..

(Ir)relevance of currency-crisis theory to the devaluation and collapse of the Thai baht / Ramkishen S. Rajan.

p. cm. — (Princeton studies in international economics ; no. 88)

Includes bibliographical references.

ISBN 0-88165-260-1

1. Currency question—Thailand. 2. Devaluation of currency—Thailand. 3. Financial crises—Thailand. I. Title: (Ir)relevance of currency-crisis theory to the devaluation and collapse of the Thai baht. II. Title. III. Series.

HG1250.55.R35 2001

2001024123

332'.09593'09049—dc21

CIP

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Printed in the United States of America by Princeton University Printing Services at Princeton, New Jersey

International Standard Serial Number: 0081-8070

International Standard Book Number: 0-88165-260-1

Library of Congress Catalog Card Number: 2001024123

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CONTENTS

1	BACKGROUND AND INTRODUCTION	1
2	CATEGORIES OF CURRENCY-CRISIS MODELS	5
	First- and Second-Generation Crisis Models	5
	The Krugman-Flood-Garber Model	7
	Third-Generation Crisis Models	11
	The Bank-Panic Model	14
3	THE BOOM-AND-BUST CYCLE IN THAILAND, 1990 TO MID-1997	16
	The Capital-Inflow Boom	16
	Crisis Scenario	25
4	THE DEVALUATION OF THE BAHT: FUNDAMENTALS OR SELF-FULFILLING EXPECTATIONS?	30
	The Thai Devaluation: A Case of “Bad” Fundamentals	30
	The Relevance of the KFG Model to the Devaluation of the Thai Baht	37
	Evidence in Favor of the KFG Model	40
	The Case against the KFG Model?	46
5	FROM DEVALUATION TO OUTRIGHT COLLAPSE: A CASE OF BANK PANIC	53
	Evidence of an International Bank Panic	53
	Illiquidity or Insolvency?	60
	Consequences of the Systemic Liquidity Crisis Following the Devaluation	64
6	CONCLUDING REMARKS	69
	REFERENCES	71

TABLES

1 Net Capital Flows to Developing Economies, 1984-1997	2
2 Aggregate Net Capital Flows to Indonesia, Malaysia, the Philippines, South Korea, and Thailand, 1995-1999	13
3 Selected Macroeconomic Indicators for Indonesia, Malaysia, the Philippines, and Thailand, 1990-1997	17
4 Composition of Net Private-Capital Inflows to Indonesia, Malaysia, the Philippines, and Thailand, 1991-1996	19
5 Composition of Net Private-Capital Inflows to Thailand, 1990-1997	21
6 Real Bank Credit to the Private Sector in Indonesia, Malaysia, the Philippines, and Thailand, 1990-1997	22
7 "Effects" of Capital Inflows to Indonesia, Malaysia, the Philippines, and Thailand, 1989-1995	23
8 Growth of Property Credits in Thailand, 1991-1997	25
9 Sectoral Composition of Loans by Thai Financial Institutions, 1988 and 1996	25
10 Derived Currency Weights in Indonesia, Malaysia, the Philippines, and Thailand, 1979-1995	27
11 Trade Indices and Terms of Trade in Thailand, 1996-1999	28
12 Performance of Nonfinancial Private Firms in Thailand, 1994-1999	35
13 Performance of Listed Finance and Real-Estate Companies in Thailand, 1994-1997	41

14	Selected Indicators of Financial-Sector Development in Indonesia, Malaysia, the Philippines, and Thailand, 1994-1996	42
15	Claims by Monetary Authorities on Domestic Financial Institutions in Indonesia, Malaysia, the Philippines, and Thailand, 1996-1997	44
16	Foreign Assets and Liabilities of BIS Reporting Banks in Indonesia, Malaysia, the Philippines, and Thailand, 1993, 1996, and 1997	53
17	Measures of External Vulnerability in Indonesia, Malaysia, the Philippines, and Thailand, 1990-1997	55
18	External Debt and Debt Service in Thailand, 1994-1999	57
19	Composition of Net Private-Capital Inflows to Thailand, 1997-1999	59
20	Consolidation of the Financial System in Thailand, June 1997 and December 1999	63
21	Fiscal Costs of Restructuring and of Nonperforming Loans in Thailand, 1997-1999	64
22	Summary of Measures to Address the Financial Crisis in Indonesia, Malaysia, the Philippines, South Korea, and Thailand	66
23	Components of GDP Growth in Thailand, 1991-1999	68

FIGURES

1	The KFG First-Generation Model	9
2	Private-Sector Credit Growth in Thailand, 1991-1997	22
3	Nominal and Real Effective Exchange Rates in Thailand, 1991-1997	27
4	International Reserves in Thailand, 1995-1999	29

5 Bank of Thailand Leading Index of Economic Activity, 1995–1999	31
6 Capacity-Utilization Ratio in Thailand, 1995-1999	31
7 Indices of Manufacturing Production and Private Investment in Thailand, 1995–1999	32
8 Indicators of Private Consumption in Thailand, 1995-1999	32
9 Real Gross Domestic Product in Thailand, 1995-1999	33
10 Stock Exchange of Thailand Index, 1995-1999	33
11 Interest Rates in Thailand, 1990-1998	34
12 Government Expenditures and Revenues in Thailand, 1995-1999	38
13 Lending in Thailand through the Bangkok International Banking Facility, 1995-1999	42
14 Central-Bank Credit to Financial Institutions in Thailand, 1996–1998	44
15 Money Supply in Thailand, 1995–1999	47
16 The Baht-Dollar Exchange Rate, 1995-1999	51
17 Balance of Payments in Thailand, 1995–2000	60

1 BACKGROUND AND INTRODUCTION

The process of liberalization and integration of global financial markets that began in the 1980s accelerated after 1990. In 1996, capital inflows to developing countries reached an all-time high of \$190 billion, more than ten times the average annual flow between 1984 and 1989 (Table 1).¹ This increasing globalization of finance and capital flows has not been an unmitigated blessing, however; the 1990s have also seen several episodes of severe financial turbulence. Indeed, since 1992, currency crises seem to have been the norm rather than the exception.²

Notable among these crises was the breakdown of the European Exchange Rate Mechanism (ERM) in 1992–93, when the Italian lira and the British pound were withdrawn from the ERM, three other currencies were devalued, and the bands within which the currencies could fluctuate were widened substantially. The Mexican crisis in 1994–95 saw a steep devaluation of the peso, put Mexico at the brink of default, and spilled over into Argentina and Brazil through the so-called “Tequila effect.” The East Asian crisis from mid-1997 to mid-1998 started somewhat innocuously with a run on the Thai baht, but it, too, spread swiftly to a number of other regional currencies, most notably the Indonesian rupiah, Malaysian ringgit, Philippine peso, and Korean won.

The author greatly appreciates detailed comments and suggestions on earlier versions of this study by Sven Arndt, Arthur Denzau, Gene Grossman, Thomas Willett, and two anonymous referees. Excellent research assistance by Harminder Chyle and Regan Engelhardt ensured the timely completion of the study. Thanks also go to Sakulrat Montreevat for help with the interpretation of some of the Bank of Thailand data. The author gratefully acknowledges partial financial support from the University of Adelaide, the Claremont Graduate University, and the Institute of Southeast Asian Studies in Singapore. Part of the work for this study was done at the Lowe Institute of Political Economy, Claremont McKenna College. The author gratefully acknowledges the excellent research facilities provided. The author is solely responsible for any remaining errors.

¹ Here and throughout, “billion” equals one thousand million. “Dollars” (\$) are U.S. dollars.

² I use the terms “currency crisis,” “exchange-rate crisis,” and “balance-of-payments crisis” interchangeably in the study. I also use “speculators” and “speculative attacks” rather loosely to denote both arbitragers and arbitrage activities (terms that are probably more appropriate in many instances). I make no distinction between fiscal and monetary (central-banking) authorities, assuming that the policymaker, government, and monetary authority constitute a monolithic body.

TABLE 1
NET CAPITAL FLOWS TO DEVELOPING ECONOMIES, 1984–1997
(US\$ billions)

	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

^a Annual average.

^b May include official flows.

^c Minus denotes an increase.

SOURCE: International Monetary Fund (1997a, 1997b, 1998).

In 1998 and 1999, the currencies of several other large emerging-market countries also experienced periods of intense market selling and required the assistance of the International Monetary Fund (IMF). The Russian ruble was devalued in August 1998, and the Brazilian real's peg was eventually broken in January 1999. Some smaller emerging countries, such as Ecuador and Turkey, also experienced currency crises during the 1990s.

These waves of currency crises have inspired widespread interest in currency-crisis models and in their implications for economic policy. The East Asian crisis of 1997–98, coming 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. This literature falls into three broad categories. First are the burgeoning empirical papers that attempt to develop a set of indicators—early warnings or distress signals—to “predict” currency and banking crises (Frankel and Rose, 1996; Kaminsky, Lizondo, and Reinhart, 1998; Berg and Patillo, 1999; Kaminsky, 1999). Second are the theoretical papers that attempt to capture seemingly important facets of recent crises, such as government guarantees and the role of the financial sector in emerging economies. Third are the descriptive studies about the East Asian crisis in general (Radelet and Sachs, 1998a, 1998b; World Bank, 1998; Berg, 1999; Corsetti, Pesenti, and Roubini, 1999a; Rajan, 1999a), or studies about individual crisis-hit East Asian countries.

There are important limitations to each of these categories. On the one hand, by making theoretical and empirical generalizations about 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 among individual regional economies (Corsetti, 1998). On the other hand, the individual country descriptions are open to the criticism of having been conducted within a vacuum, rather than within the context or confines of the currency-crisis literature.

With these limitations in mind, this study provides a detailed review of the crisis in Thailand in an effort to determine the applicability of existing currency-crisis theory to the breakdown of the baht's de facto dollar peg in 1997–98. The study neither attempts to provide a comprehensive survey of the currency-crisis literature nor adds directly to the empirical and theoretical literatures on currency crises. Its goal, rather, is to examine, through the lens of the existing currency-crisis literature, the sequence of events culminating with the devaluation of the Thai baht on July 2, 1997, and the financial and economic collapse thereafter. Such a discussion takes on added significance, given the growing skepticism voiced by some observers about currency-crisis models. Dani Rodrik (1998, p. 58), for example, 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.”

But why concentrate on Thailand in particular?³ First, the devaluation of the baht is widely acknowledged as the dawn of the East Asian crisis. Second, because Thailand was the first domino to fall, there is considerable debate about whether the Thai crisis was caused by fundamentals or by self-fulfilling expectations. This study will address that debate, but it will not pursue the issues of contagion beyond Thailand or of the widening and deepening of the crisis.³

³ With regard to contagion in East Asia, the regional crisis might be divided into four subperiods. The first was the devaluation of the Thai baht in July 1997. The second was the spread of the contagion to Indonesia, Malaysia, and the Philippines between July and mid-October 1997. The third was the engulfment of the larger East Asian region (Hong Kong, Singapore, South Korea, and Taiwan) following the preemptive devaluation of the new Taiwan dollar in October 1997. The fourth was the reverberation in the region of the effects of the South Korean won's devaluation in November 1997 (Berg, 1999). The crisis deepened in mid-1998, but this deepening was attributable to a pronounced liquidity crunch in emerging markets as a whole following the Russian debt moratorium (IMF, 1999b). See Dornbusch, Park, and Claessens (2000) for an overview of the recent contagion literature and Pritsker (1997) and Forbes and Rigobon (1999), respectively, for recent surveys on the theoretical and empirical aspects of contagion. The World Bank has assembled a comprehensive collection of recent papers on contagion on its website at www.worldbank.org/economicpolicy/managing%20volatility/contagion/index.html.

The study is organized as follows: Chapter 2 highlights the currency-crisis models under consideration and specifies the scope and definitions of the various categories of models. Chapter 3 examines the macroeconomic data on the boom-and-bust sequence of capital flows experienced by Thailand in order to determine the relevance—or lack thereof—of the currency-crisis literature to the Thai crisis. Chapters 4 and 5 argue that the Thai crisis may be divided into two distinct but related events, the initial devaluation and the ensuing financial panic. Although the initial devaluation was based largely on poor fundamentals (that is, a case of unique equilibrium) caused primarily by financial and monetary considerations, it provoked a confidence crisis and an international bank panic, the end result of which was financial and economic collapse. Chapter 6 summarizes the conclusions of the study.

2 CATEGORIES OF CURRENCY-CRISIS MODELS

It is important to clarify and classify at the outset the various models of currency crisis considered in this study. Three broad groups, or “generations,” of currency-crisis models may be delineated.

First- and Second-Generation Crisis Models

The classic approach to balance-of-payments crises was laid out by Krugman (1979) and Flood and Garber (1984). 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 in the face of a policymaker’s attempt to monetize a persistent fiscal deficit.

In contrast to this first-generation model, second-generation models are highly varied. They all share, however, two basic motives: (1) the policymaker is tempted to opt out of defending the parity (that is, to avoid the interest costs of defending the peg and the payoffs to devaluation), and (2) the policymaker would like to hang on to the fixed exchange rate (that is, to gain political credibility and reputation). There is a tension between the two motives. Abandonment of the peg is ultimately a policy decision, in that the exchange rate is used as an optimization tool as the policymaker weighs the costs and benefits of devaluing the currency. In other words, the models in this class all have “escape clauses,” in which the policymaker uses discretion in the event of exceptional circumstances (that is, the escape clause is invoked) but otherwise follows a policy rule (Flood and Isard, 1989; Obstfeld, 1997).

Models of this genre show that there is a zone of weak fundamentals, the “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 example) will rise, undermining the policymaker’s ability and commitment to defend the exchange rate; if investors perceive that the policymaker’s defense of the parity is credible, however, the costs will fall. This circularity 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 crisis.¹

It is not uncommon to contrast the above two generations of models by arguing that the former is monetary-based and shows a *unique equilibrium* and that the latter explicitly optimizes a policymaker's loss function and has *multiple equilibria*. Such a distinction, however, is neither helpful in applying currency-crisis theory to actual country experiences nor entirely accurate. The earliest multiple-equilibria models, for example, were based on the Krugman-Flood-Garber (KFG) monetary framework and showed growth in domestic credit as 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 Krugman, Flood, and Garber.² To be sure, multiple equilibria arise, not because an optimizing policymaker is assumed to exist, but because nonlinearities in private-sector behavior occur, based on participants' beliefs about the probable responses of the authorities to a speculative attack.³ The characterization that the first-generation models pertain solely to monetary disequilibrium, but that the second-generation models maintain the importance of an entire gamut of economic indicators, is also incorrect. These escape-clause-based models reduce to unique (crisis) equilibrium once one allows for a secular deterioration in fundamentals (Krugman, 1996).

In light of the foregoing discussion, the first-generation crisis models are understood to be those models that involve a progressive deterioration of economic or financial fundamentals leading to a currency crisis caused by fundamentals-based policy inconsistencies. By contrast, second-generation models are those in which a crisis is self-validating

¹ Obstfeld (1994, 1996b) is responsible for the pioneering escape-clause-based second-generation model, in which the government attempts to offset adverse shocks to employment and competitiveness.

² See Obstfeld (1986) and Dellas and 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 to 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. See also Flood and Marion (2000).

³ This fact in turn emphasizes the importance of institutional mechanisms and safeguards that enhance the reputation of policymakers. Drazen and Masson (1994) have illustrated the complexities of this goal, making the important distinction between the credibility of *policies* and the credibility of *policymakers*.

when a shift in market expectations triggers a crisis; the crisis itself is neither inevitable nor predictable. The KFG model is a special case of a fundamentals-based model that highlights monetary disequilibrium as an example of the underlying policy inconsistency. The essential characteristics of this model are described below.⁴

The Krugman-Flood-Garber Model

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

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

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

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

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

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

where all variables other than those for interest rates, growth rates, and $r p_t$ are in natural logarithms; m_t is nominal domestic money (high-powered) supply; y_t is real output, or income (which is assumed, for simplicity, to be constant); p_t is domestic price level; p_t^* is the foreign price level; c_t is domestic assets (in nominal terms); i_t is domestic real interest rates; i_t^* is foreign real interest rates; \hat{e}_t is the expected rate of

⁴ There have been a number of general surveys of the first- and second-generation currency-crisis literature. Agénor, Bhandari, and Flood (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 an informal review of the first-generation model and suggests a way in which banks may be incorporated into the basic KFG framework. Kenen (1996) reviews the first- and second-generation models and emphasizes policy options for managing currency crises. Krugman (1996), in his NBER paper, attempts to synthesize the first- and second-generation models without explicitly reviewing the available literature on either group of models. In his “Currency Crises” paper, he (Krugman, 1998) offers a highly readable and informal discussion of both sets of models. Obstfeld (1996a, 1996b) presents useful insights on the second-generation models. Flood and Marion (1998) and Cavallari and Corsetti (1999) review both first- and second-generation models with an eye toward developing a common framework for these two sets.

depreciation; e_t is the exchange rate (in foreign-currency terms); def_t is the 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 nonnegative parameters.

Equation (1) is the conventional real-money demand function, with real-money balances being positively related to income and negatively related to interest rates. Equation (2) states that money supply (monetary base) equals domestic assets plus foreign assets.⁵ Equation (3) is the international-asset-market arbitrage condition, that is, the uncovered-interest-parity theorem plus a country or currency risk premium (rp), the latter taken to be exogenous and constant. Equation (4) is the purchasing-power-parity (PPP) condition. Equation (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 equations (1) and (3) into equation (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 ($\hat{e}_t = 0$), using equation (2) and totally differentiating the resulting equation, we get

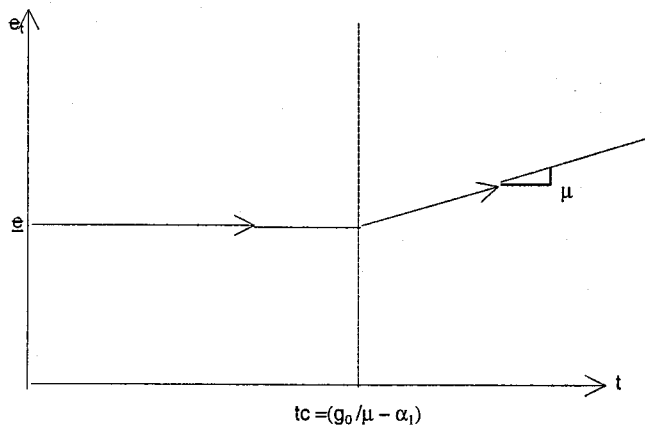
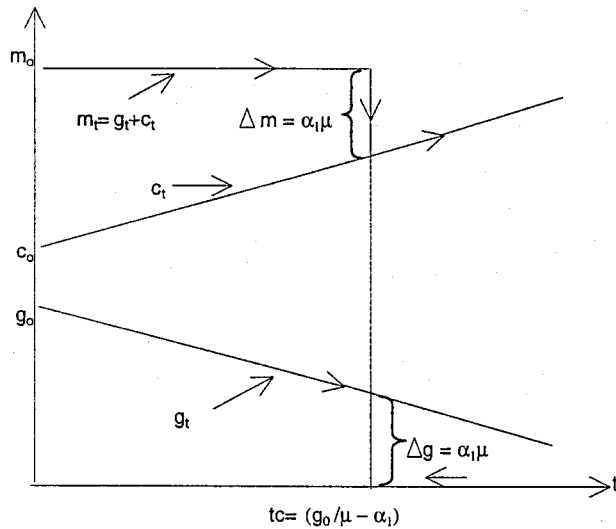
$$\dot{g}_t = -\dot{c}_t = -\mu, \quad (7)$$

where g_t is foreign assets or reserves (which, for simplicity, are assumed to earn no interest). Equation (7) simply states that the simultaneous combination of a fixed-exchange-rate regime and an open capital account must imply the loss of monetary autonomy, that is, the impossible- (or inconsistent-) trilogy 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 Figure 1, which reveals that the constant credit growth (from c_o) is mirrored by a decline in international reserves (from g_o) at a similar rate (μ), and the monetary base remains constant (at m_o).

Agents are assumed to have perfect foresight and to understand that the peg is unsustainable in light of the prevailing fiscal (and therefore monetary) stance. They thus expect reserves to fall eventually to some minimum level, and the currency to depreciate (that is, $\hat{e}_t > 0$). From

⁵ This is a logarithmic approximation of the original linear identity. I normalize the spot exchange rate to 1, so that g_t is the domestic price of foreign reserves.

FIGURE 1
THE KFG FIRST-GENERATION MODEL



equation (3), the international-interest-parity condition produces a rise in domestic interest rates. From equation (1), this implies a consequent reduction in real-money demand. Specifically, real-money demand experiences a discrete decline. Noting that domestic prices are held by world prices through the PPP assumption, from equation (6), one way to reequilibrate the system would be through a discontinuous upward jump in the actual exchange rate. Under the zero-profit condition,

however, such exchange-rate jumps are ruled out, because they automatically give rise to the possibility of capital gains (losses). The nominal money base must jump, given the restriction of continuity.

Because 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 depreciation.⁶ 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 reserves.⁷ Abstracting from speculative bubbles by imposing the transversality condition and making use of the idea of a shadow exchange rate (Flood and Garber, 1984),⁸ the exact time at which the peg is broken—the switch time (tc)—is easily derived:

$$tc = g_0/\mu - \alpha_1 , \quad (9)$$

where g_0 is the initial stock of foreign reserves. Equation (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 equation (8), we see that there is no discrete jump in reserves in this case. Rather, the reserves experience a gradual

⁶ It is not necessary that there be persistent past trends in a monetized deficit; an expected future trend will suffice to accomplish the above result. This is a point of some significance and is noted again in Chapter 4.

⁷ 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 authorities have sufficient reserves to stave off an attack, flotation of the currency will lead to its appreciation, because speculators who sell the currency short will need to close out their positions by purchasing the currency in the forward market. This appreciation will consequently lead to capital losses by those who attempt to speculate against a currency. Second, there might be nonnegligible transactions costs, including interest costs of short-selling the currency in question.

⁸ 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).

depletion at the rate of the excess credit growth until they reach the minimum level (assumed here to be zero), after which the peg gives way (“natural collapse”). Conversely, the greater the α_1 parameter—that is, 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 accelerate the breakup of a fixed-exchange-rate regime that was inherently unsustainable.

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 that emphasize or attempt to rationalize the overreaction or “overshooting” of markets and the degeneration of a currency crisis into an outright financial and economic collapse (that is, the punishment far outweighs the crime). Thus, with reference to East Asia, the IMF (2000c, p. 2) stresses the “new breed of economic crisis” in a “globalized financial market.” These third-generation models may, more specifically, be characterized as emphasizing the capital account, whereas the first two generations of models focus on the current account (Yoshitomi and Ohno, 1999).⁹ In a similar vein, Caballero and Krishnamurthy (1998, p. 2) observe 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.”

It has arguably become somewhat common to interpret these models as taking a bank-centered view of currency crises (see Krugman, 1999a). A characterization of the first two generations of models as being non-financial would be incorrect, however, because the role of (weak) banks may be quite easily included within a KFG style of model (Velasco, 1987; Calvo, 1996a; Calvo and Mendoza, 1996; Rajan, 1999b). Conversely, not all third-generation models are necessarily bank based. For instance, Calvo has developed a model that focuses on portfolio equity flows (Calvo (1996a; Calvo and Mendoza, 1996)).¹⁰ This being said, I

⁹ This distinction has come into vogue in East Asia. For instance, the Japanese finance minister, Kiichi Miyazawa, notes that the East Asian crisis was “a new form of capital account crisis rather than the traditional current account crisis” (*Asian Development Bank Institute Newsletter*, January 2000).

¹⁰ The Calvo capital-crisis model is a simple one-period mean-variance model of optimal portfolio diversification and allocation. It shows that the marginal gain from gathering information about any single country diminishes as portfolios become increasingly diversified internationally. Thus, just a rumor or some other adverse event—such as

concentrate in this study on the Chang-Velasco (1998) bank-panic model, which is essentially an open-economy extension of the Diamond-Dybvig (1983) model of illiquidity.¹¹ By so doing, I admittedly exclude two other subclasses of models, namely, the Calvo capital-crisis model noted above, and the bank-based models emphasizing insolvency, rather than illiquidity.¹² How do I justify this narrow focus on the bank-panic model, or what Dornbusch (1999) refers to as the “fast-action” crisis model?

The models of insolvency have been inspired by the KFG first-generation model and will more appropriately be discussed in Chapter 4 along with the KFG model.¹³ The Calvo capital-crisis model is omitted, because 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. In the case of East Asia, however, the collapse of the baht and of the regional currencies was primarily caused by reversals in capital flows from the banking sector rather than by reversals in portfolio equity investments. Indeed, the five 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 attributable to net

a devaluation—may be sufficient to generate a 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 recently been developed to explain herding behavior in domestic financial markets (as in Scharfstein and Stein, 1990; Banerjee, 1992; and others). Bikhchandani and Sharma (2000) provide a succinct discussion of the various kinds of recent herding models in financial markets.

¹¹ Also see Goldfajn and Valdes (1997) for a mechanism similar to the Chang-Velasco framework but without multiple equilibria. (I thank an anonymous referee for pointing this out). The Goldfajn-Valdes model depicts a bank run as being caused either by a rise in international interest rates or a fall in investment productivity, and emphasizes the ways in which bank intermediation may generate bank runs, capital outflows, and currency crises.

¹² There are a number of closely related insolvency models, although the ones referred to here are those from Burnside, Eichenbaum, and Rebelo (1998), Corsetti, Pesenti, and Roubini (1999b), Chinn and Kletzer (2000), and Dooley (2000); see also Chinn, Dooley, and Shrestha (1999). These models are discussed briefly in Chapter 5. Related models (of lending driven by moral hazard) include those by McKinnon and Pill (1998, 1999) and Krugman (1999c).

¹³ Corsetti (1998), however, does not even use the term “third generation,” preferring, instead, to lump financial-panic models together with the escape-clause-based second-generation models.

TABLE 2
 AGGREGATE NET CAPITAL FLOWS TO INDONESIA, MALAYSIA, THE PHILIPPINES,
 SOUTH KOREA, AND THAILAND, 1995–1999
 (US\$ billions)

Type of Capital Flow	1995	1996	1997	1998	1999
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 (excluding gold) ^b	-14.1	-16.9	31.5	-42.1	-31.4

^a Minus denotes an increase.

^b Includes resident net lending, monetary gold and errors and omissions; minus denotes an increase.

SOURCE: Institute of International Finance (1999).

(short-term) lending by foreign commercial banks, which averaged about \$55 billion in inflows between 1995 and 1996 but shifted to almost \$30 billion in net outflows during 1997 and 1998, as international banks became unwilling to roll over short-term debt in the region.¹⁴

The Calvo model, with its emphasis on equity investment, as opposed to bank lending, appears to have limited relevance to the Thai crisis or to other crises in the region.¹⁵ This being the case, I consider a highly simplified, but intuitively appealing, version of the Chang-Velasco bank-panic model (Chang and Velasco, 1998).

¹⁴ 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, flows from foreign direct investment (FDI) have been remarkably stable. Specific data for Thailand are discussed in the following chapters.

¹⁵ 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 crises are far more pervasive in developing countries than in industrial countries.

The Bank-Panic Model

Assume a small open economy with identical agents and three distinct periods: $t = 0$ (planning period), $t = 1$ (short-term) and $t = 2$ (long-term). Each agent is endowed with e units of consumption with world price normalized to 1. The agent is indifferent to whether she or he consumes in the short or long term. Domestic residents, in addition to their endowment, have access to international capital markets and are able to borrow a maximum of d units. A technology exists in the planning period that yields R units of consumption in the long term or r units of consumption if liquidated in the short term, where $0 < r < 1 < R$. Indivisibilities, however, prevent agents from using the technology as individuals, allowing access only if they pool their resources, that is, if they coalesce and form a bank. If agents do form a bank, the relationship or contract between each bank and the domestic resident or owner is as follows: the agents surrender their endowment (e) and capacity to borrow (d) to the bank and, in exchange, may withdraw either the initial deposit (e) in the short term or an amount (y) in the long term. Both deposits and loans are assumed to be short term, needing to be renewed at $t = 1$. The banks operate in a perfectly competitive environment, so that long-term profits are zero, and they distribute all their remaining value to the depositors and owners at $t = 2$. Banks are faced with a reserve requirement of b per depositor. These reserves are held in liquid form (that is, the world asset). Given these assumptions, at $t = 2$, investment by each bank (k) = $e + d - b > 0$ per depositor.¹⁶ Consequently, $y = R(e + d - b) - d + b = Re + (d - b)(R - 1)$.

Because $R > 1$ and as long as b is small compared to d , $y > e$, thus providing the incentive for the depositor to invest in the banks. As Chang and Velasco (1998, p. 20) note, “the 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.” Thus, banks, in this model, channel the liquid assets of their owners (depositors) into illiquid but high-yielding (productive) investments, helping to increase inflows to the economy, boosting consumption and growth (“good equilibrium”).

The maturity transformation role, however, makes banks susceptible to panic withdrawals (“bad equilibrium”). Assume that some trigger causes depositors and creditors to panic and to attempt to withdraw

¹⁶ Because the depositor is indifferent between consuming in the short or long term, the bank will maintain only the required amount of reserves (b), the rest being invested in the high-yielding asset. This might imply that no excess reserves are being held.

funds from the banks at $t = 1$. To be precise, creditors will recall d units, whereas 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 units from “premature” liquidation of the project. Because $r < 1$ 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*, because the foreign-currency revenues obtainable in the short term are still less than the corresponding short-term potential foreign-currency obligations. The sudden termination of bank finance also forces the abandonment of potentially solvent investment projects. The consequent decline in capital formation—indeed, capital destruction—leads to a sudden collapse in economic output. Conversely, other things being equal, the resumption of liquidity ought 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, it will be useful to review Thailand's macroeconomic fundamentals, in particular, trends with regard to money, credit, and capital flows. Although the focus of this study is on Thailand, which was the epicenter of the crisis, data for the other crisis-hit countries in the region—Indonesia, Malaysia, and the Philippines—are provided for comparison.¹

The Capital-Inflow Boom

Radelet and Sachs (1998a, p. 8) have observed that “at the core of the (East) Asian financial crisis were the massive capital inflows that were attracted into the region during the 1990s.” A proper perspective of the Thai crisis may therefore be gained only by considering the precrisis boom period.² Table 3 summarizes selected “conventional” macroeconomic data for the countries concerned. As can be seen, Thailand ran persistent current-account deficits that averaged 7.5 percent of gross domestic product (GDP) for the entire period from 1990 to 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 more than 30 percent of GDP. Because current-account deficits were a consequence of high rates of private investment, they were regarded as benign, even capacity enhancing. The large and persistent current-account deficits experienced by Thailand during the 1990s suggest that they were being financed through either a sustained drain in international reserves or infusions of foreign capital.

¹ The peculiar industrial structure in South Korea (dominated by a small number of chaebols) and the fact that South Korea is the only member of the Organisation for Economic Co-operation and Development (OECD) among the crisis-hit East Asian countries (and the only member in Asia, other than Japan), provides 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.

² Dooley (2000) has made the more general observation that the speculative attacks in emerging economies have usually been preceded by very large private-capital inflows into the country.

TABLE 3
 SELECTED MACROECONOMIC INDICATORS FOR INDONESIA, MALAYSIA,
 THE PHILIPPINES, AND THAILAND, 1990–1997
 (Percent)

	1990	1991	1992	1993	1994	1995	1996	1997
Indonesia								
Real GDP growth	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 balance to GDP ratio	1.3	0.0	-1.2	-0.7	0.0	0.8	1.2	-0.7
Current-account balance to GDP ratio	-2.8	-3.4	-2.2	-1.5	-1.7	-3.3	-3.2	-3.0
Fixed-capital formation to GDP ratio	28.3	27.0	25.8	26.3	27.6	28.4	28.1	26.5
Savings to GDP ratio	27.9	28.7	27.3	31.4	29.2	29.0	28.8	27.3
Merchandise export growth	16.7	10.5	14.0	8.3	9.9	18.0	5.8	12.2
Merchandise import growth	31.5	15.7	7.8	6.0	13.9	26.6	8.1	4.5
Unemployment rate	2.5	2.6	2.7	2.8	4.4	7.2	4.9	4.7
External debt service	8.3	8.4	8.7	8.5	8.6	8.5	9.0	10.5
Malaysia								
Real GDP growth	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 balance to GDP ratio	-3.1	-2.5	0.1	0.5	1.5	1.3	1.1	2.6
Current-account balance to GDP ratio	-2.1	-8.8	-3.8	-4.8	-7.8	-10.0	-4.9	-5.1
Fixed-capital formation to GDP ratio	32.4	33.4	36.0	38.4	40.2	43.1	41.8	42.7
Savings to GDP ratio	29.2	26.3	30.2	31.1	33.9	n.a.	n.a.	37.0
Merchandise export growth	16.2	17.1	18.1	16.1	23.1	26.4	7.4	0.7
Merchandise import growth	28.4	26.9	9.8	18.1	28.3	30.2	1.9	1.2
Unemployment rate	5.1	4.3	3.7	3.0	3.0	2.8	2.5	2.5
External debt service	6.9	5.9	5.6	6.1	5.2	6.6	5.4	8.4
Philippines								
Real GDP growth	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 balance to GDP ratio	-3.5	-2.1	-1.2	-1.6	-1.6	-1.4	-0.4	-0.9
Current-account balance to GDP ratio	-6.1	-2.3	-1.6	-5.5	-4.6	-4.4	-4.7	-5.3
Fixed-capital formation to GDP ratio	24.0	20.0	20.9	23.8	23.6	22.2	23.2	25.1
Savings to GDP ratio	18.7	18.0	19.5	18.4	19.4	17.8	17.7	22.8
Merchandise export growth	4.7	8.0	11.1	15.8	18.5	29.4	20.8	14.0
Merchandise import growth	17.2	-1.3	20.5	23.7	18.8	23.7	8.4	8.9
Unemployment rate	8.4	10.6	9.6	9.4	9.5	9.4	7.3	6.0
External debt service	8.1	9.0	7.2	7.8	7.2	6.5		

TABLE 3 *continued*

	1990	1991	1992	1993	1994	1995	1996	1997
	Thailand							
Real GDP growth	11.6	8.1	8.2	8.5	8.6	8.8	5.5	-0.4
Inflation rate	6.0	5.7	4.1	3.4	5.1	5.8	5.9	5.6
Fiscal balance to GDP ratio	4.6	4.1	2.5	2.0	2.0	2.5	1.0	-1.6
Current-account balance to GDP ratio	-8.3	-7.5	-5.5	-5.0	-5.4	-7.9	-7.9	-1.9
Fixed-capital formation to GDP ratio	40.2	41.6	39.2	39.4	39.9	41.8	40.8	35.8
Savings to GDP ratio	32.6	35.2	34.3	34.9	34.6	34.3	33.1	31.8
Merchandise export growth	15.1	23.8	13.7	10.3	25.7	24.7	-1.9	4.1
Merchandise import growth	29.9	15.8	6.0	12.2	18.5	31.5	0.8	-13.8
Unemployment rate	3.4	2.1	2.8	2.6	2.6	1.7	1.5	1.5
External debt service	3.8	4.0	4.3	4.4	4.8	5.0	5.4	7.1

SOURCE: Rajan (1999a).

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 (together with Malaysia and Indonesia) was among the ten largest emerging-market recipients of net private-capital flows during the period under consideration (World Bank, 1997; Lopez-Mejia, 1999). This period of capital-inflow surges corresponded to the time during which 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, to extend loans to both overseas and (mainly) local markets—so-called “out-in” lending—and to engage in cross-currency foreign-currency trading and loan syndication. Foreign-capital inflows were encouraged by the fact that loans through the BIBF were exempt from the 10 percent withholding tax. The BIBF institutions also benefited from reduced corporate income-tax rates (down from 30 to 10 percent) and exemptions from stamp duties, the permanent establishment tax, and a number of sales taxes (Bank of Thailand [BOT], 1996, 1999).³

³ This emphasis on financial liberalization prior to the crisis is consistent with recent empirical studies. For example, in a recent study using a sample of lending-boom episodes involving ninety-one countries from 1960 to 1996, Gourinchas, Valdes, and Landerretche (1999) conclude that the probability of experiencing a currency crisis is significantly greater

TABLE 4
COMPOSITION OF NET PRIVATE-CAPITAL INFLOWS TO INDONESIA, MALAYSIA,
THE PHILIPPINES, AND THAILAND, 1991–1996
(Percent of GDP)

	1991	1992	1993	1994	1995	1996	1989–1996 ^a
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 ^b	-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 ^b	-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 ^b	-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 ^b	-4.3	-2.8	-3.2	-3.0	-4.4	-1.2	-4.3

^a Simple average.

^b Minus denotes an increase.

SOURCE: International Monetary Fund (1997a, 1997b, 1998).

following a lending boom. Empirical investigations of fifty-three countries from 1980 to 1995 by Demirgüç-Kunt and Detragiache (1998) and of ninety-seven countries from 1975 to 1997 by Hutchison and McDill (1999) reveal that a banking crisis is more likely to occur in a liberalized financial system, particularly when the institutional support is weak. A study by Kaminsky and Reinhart (1999) concludes that in eighteen of twenty-six banking crises, the financial sector had been liberalized some time during the five years preceding the crisis. Sachs, Tornell, and Velasco (1996b), Chinn, Dooley, and Shrestha (1999), and Tornell (2001)

Of significance is the fact that the “other investment” component shown in Table 4 constituted, on average, about 75 percent of the private-capital inflows to Thailand. This category of capital flows includes short- and long-term credits (including use of IMF credit), currency, and deposits and other accounts receivable and payable.⁴ A more detailed breakdown of capital flows to Thailand is provided in Table 5. Capital flows are broadly divided into the bank and nonbank sectors. The banking-sector flows are further subdivided into banks and the BIBF institutions, which, as noted, began to play an active role in 1993. The sharp rise in the bank component of capital flows from 1994 to 1996 corresponded to the inflows to the BIBF. The nonbank categories include FDI, portfolio investment, loans, nonresident baht accounts (NRBAs) and trade credit (which we include in the “others” capital-flows component). Nonresident baht accounts, essentially deposits held by foreigners in domestic banks in Thailand, serve various transactions, including baht clearing for foreign-currency-related transactions and stock-market transactions by foreigners. Given their multifunctional roles, NRBA have been highly volatile, particularly because most of the transactions involved are of relatively short-term maturities. Although FDI flows did decline during this period, it is instructive to note that some part of the transactions measured as BIBF (“out-in”) lending reflected the “rebooking” of intracompany loans as BIBF transactions in order to benefit from the tax advantage afforded to BIBF institutions (BOT, 1998). This might explain, in small part, the decline in the FDI component of Thailand’s total capital inflows.

Also of significance is the fact that sharp net outflows of portfolio investments caused the rise in total private-capital inflows in 1994 to be much smaller than the increase in bank lending to Thailand through the BIBF. Private-capital inflows did rise markedly in 1995 and 1996, however, because of continued bank lending and a recovery in portfolio flows to all emerging economies following the Mexican peso crisis. Funds intermediated through the NRBA remained important throughout the period. The corresponding boom in bank lending to the private

are among those who emphasize that bank-lending booms are important predictors of currency crises; Gavin and Hausmann (1996) document this relationship for Latin America.

⁴ This component of capital flows has been found to be the most volatile, and direct investment has been found to be the most stable (World Bank, 1999a; Bird and Rajan, 2001). The accumulation of increasing debt during these periods may have been partly attributable to the fact that the emerging-market bond and syndicated-loan spreads fell between mid-1995 and mid-1997 (Cline and Barnes, 1997; Eichengreen and Mody, 1998).

TABLE 5
COMPOSITION OF NET PRIVATE-CAPITAL INFLOWS TO THAILAND, 1990-1997
(US\$ billions)

	1990	1991	1992	1993	1994	1995	1996	1997:1	1997:2
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	-4,039	3,837	3,103	428	n.a	n.a
Bangkok International Banking Facility	0	0	0	7,638	10,087	8,133	4,574	n.a	n.a
Nonbank	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
Nonresident baht accounts	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

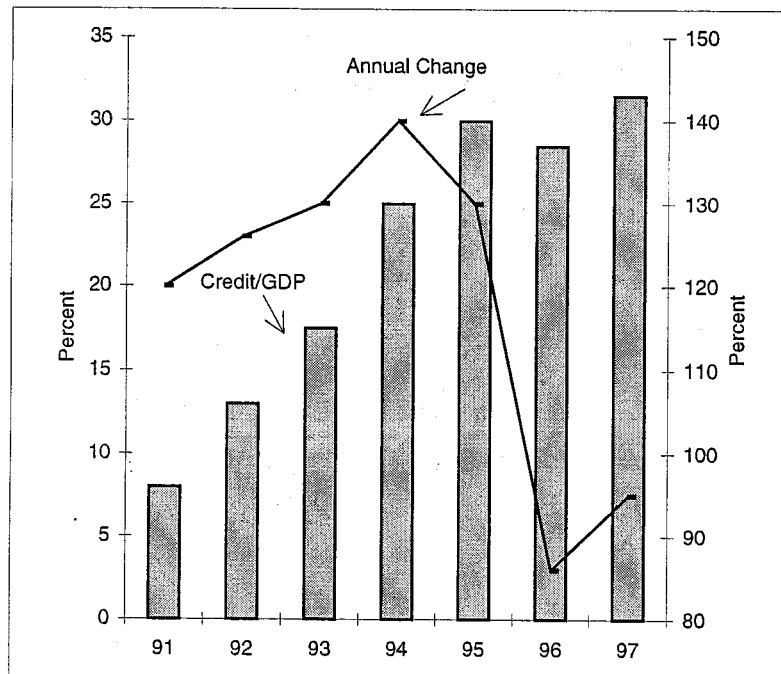
SOURCE: Bank of Thailand (1998).

TABLE 6
 REAL BANK CREDIT TO THE PRIVATE SECTOR IN INDONESIA,
 MALAYSIA, THE PHILIPPINES, AND THAILAND, 1990-1997
 (Percent, deflated by consumer prices)

	Growth Rate			Other than to Central Bank (% of GDP)		
	1990-95 ^a	1996	1997	1991	1996	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

^a Annual average.
 SOURCE: Bisignano (1999).

FIGURE 2
 PRIVATE-SECTOR CREDIT GROWTH IN THAILAND, 1991-1997



SOURCES: Bank of Thailand; CEIC database.

sector is captured in Table 6 and Figure 2. These capital inflows were intermediated through the domestic banking system, resulting in the growth of real bank credit 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 in 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, continuing from 1988 to 1995. During these years, Thailand saw its GDP growth rate increase by an average of about 4 percent over the corresponding preboom period. Moreover, in contrast to Mexico during its boom period before the Tequila crisis (1989 to 1994)—where a capital inflow fueled a consumption boom—average consumption (as a percent of GDP) actually fell in Thailand; average investment in Thailand, however, saw a sharp increase.⁵ This rise in productive capacity ensured that the growth was relatively noninflationary.

There were, however, growing concerns about, and some signs of, the misallocation of funds—as shown, for instance, by declining rates of

TABLE 7
 “EFFECTS” OF CAPITAL INFLOWS TO INDONESIA, MALAYSIA, THE PHILIPPINES,
 AND THAILAND, 1989–1995
(Percent change from preceding period of equal length)

	Inflow Episode	Ratio of Total Inflows to GDP at period's end	Mean Ratio	GDP Growth	Inflation Rate	Current-Account Deficit ^a	Change in Investment ^a	Change in Consumption ^a
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
Memorandum item:								
Mexico	1989–94	27.1	5.3	2.9	-74.4	7.1	2.4	6.7

SOURCES: Lopez-Mejia (1999); World Bank (1997).

⁵ The aggregate data must be interpreted with some caution, however. Disaggregated savings data reveal that household savings in Thailand collapsed during the boom period (Thanompongphan et al., 1999).

investment efficiency (Tinakorn and Sussangkarn, 1998; World Bank, 1998, 1999b; Corsetti, Pesenti, Roubini, 1999a). Although this decline may have been partly attributable to investments in failed prestige projects, it is also true that a large and growing proportion of credit was being channeled into the real-estate sector (Table 8), which is notoriously prone to speculative booms caused by euphoria-induced buying and dramatic busts caused by panic-induced selling (Kindleberger, 1989). By 1996, almost 33 percent of the loan portfolios of Thai finance companies were in the real-estate and construction sectors; this figure accounted for about 13 percent of commercial-bank lending (Table 9 and IMF, 2000b). Large as these figures may seem, they underestimate the de facto exposure of the financial system to the real-estate sector for two reasons: 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, although the Bank of Thailand set a limit for the overall exposure of commercial banks to the property sector, commercial banks faced large indirect exposures to the property sector, because they were large net creditors to the finance companies.

Construction constituted about half of total fixed investment during the 1990–94 period (IMF, 2000b). The channeling of capital inflows (through the financial system) to the nontradables sector (such as real estate) inevitably led to a persistent fall in the relative price ratio of tradables to nontradables (Warr, 1999). This decline suggested the need for a contraction of the “over-expanded” nontradable sector and the “crowding-in” of the production and sale of tradable goods (IMF, 2000b). Thai financial institutions lent aggressively for property development for a number of reasons, including attractive market prospects, a belief that real-estate collateral was safe, confidence in the country’s land-based collateral system, and lax prudential supervision.⁶ The IMF (2000b, p. 29) has noted, in this regard, that “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).”

Chapter 4 will have much more to say about the link between Thailand’s financial system and real-estate sector, and Chapter 5 will examine the vulnerability caused by foreign-currency and maturity

⁶ Overexposure to the property sector existed in Thailand in the early 1990s (Khan and Reinhart, 1995), and the BIBF institutions significantly exacerbated the situation.

TABLE 8
GROWTH OF PROPERTY CREDITS IN THAILAND, 1991–1997
(Percent)

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

SOURCES: Bank of Thailand; CEIC database.

TABLE 9
SECTORAL COMPOSITION OF LOANS BY THAI FINANCIAL INSTITUTIONS, 1988 AND 1996
(Percent of total lending)

	Commercial Banks	Finance Companies	Commercial Banks	Finance Companies
	End of Year 1988		End of Year 1996	
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, Zhang, and Koerberle (1998).

mismatches of external assets and liabilities. The remainder of Chapter 3, however, will discuss pertinent aspects of the crisis scenario that led to a devaluation of the Thai baht.

Crisis Scenario

Related to the decline in the price ratio of tradables to nontradables and the implications of that decline for resource allocation is the nearly 50 percent nominal appreciation of the dollar relative to the yen between

June 1995 and April 1997. The de facto dollar peg of the baht and of other East Asian currencies (Table 10) implies that they, too, rose in value relative to the yen. This fact, along with the outpacing of inflation rates in the East Asian countries vis-à-vis their industrial-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 (Figure 3). Studies suggest that Thailand's precrisis REER was overvalued by 11 to 30 percent relative to some measure of equilibrium REERs (Montiel, 1999; see also Lim, 2000, and Rajan, Siregar, and Sen, 2000).

There was also, during this period, a striking slowdown in regional export growth as a result of 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, which 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 among the few East Asian economies that saw a fall in exports growth in terms of both value and volume (Table 11).⁷ 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. 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. In early September 1996, Moody's downgraded Thailand's short-term bonds, notes, and deposits from Prime 1 to Prime 2.

The baht was initially attacked in January and February 1997 on the heels of the Thai prime minister's resignation, 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, chap. 5). Available Bank of Thailand data reveal that there was a capital reversal of \$70 million from BIBF institutions and of about \$78 million from NRBA's in July 1996. Thus, overall private-capital inflows fell dramatically to \$320 million that month, compared to an average inflow of about \$2 billion per month for the previous seven months. This decline in inflows was accompanied by a steady erosion of international reserves, which hemorrhaged gradually from mid-1996 on (Figure 4). The data, however, fail to capture the net reserve position, because the authorities committed

⁷ Although exports fell between 1995 and 1996, Thailand's current-account deficit did not rise, because imports had also stagnated (Table 3).

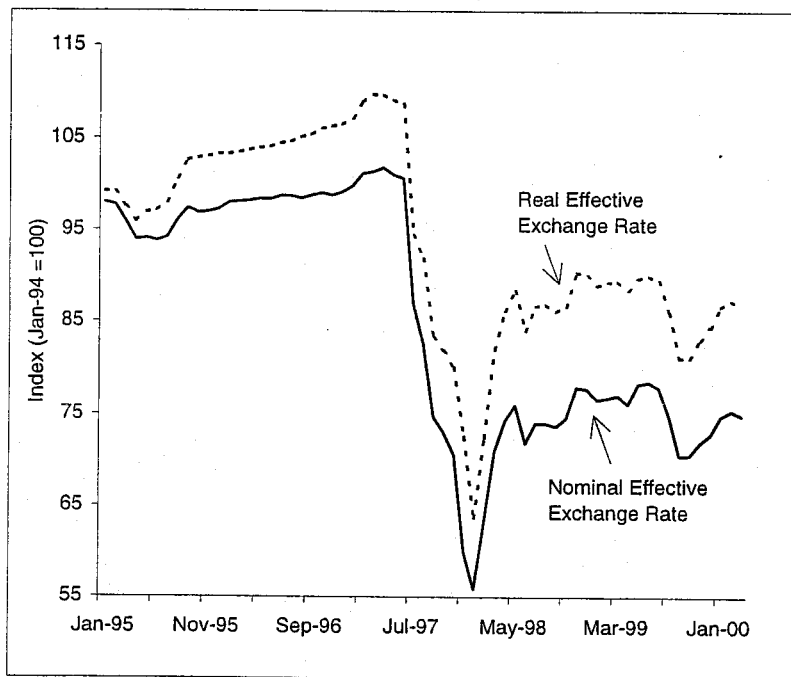
TABLE 10
 DERIVED CURRENCY WEIGHTS IN INDONESIA, MALAYSIA,
 THE PHILIPPINES, AND THAILAND, 1979-1995

	U.S. Dollar		Yen	
	Frankel and Wei (1994) ^a		Kwan (1995) ^b	
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
Thailand baht	0.91	0.05	0.82	0.11
Simple average	0.93	0.07	0.95	0.00

^a Based on weekly movements from January 1979 to May 1992.

^b Based on weekly movements from January 1991 to May 1995.

FIGURE 3
 NOMINAL AND REAL EFFECTIVE EXCHANGE RATES IN THAILAND, 1991-1997



SOURCES: Bank of Thailand; CEIC database.

TABLE 11
 TRADE INDICES AND TERMS OF TRADE IN THAILAND, 1996–1999
 (Index 1995 = 100)

	1996	1997	1998	1999:1
Export volume	98.10	105.56	113.89	116.86
Export value	96.20	99.86	93.07	93.72
Export unit value	102.10	98.73	112.36	110.22
Import volume	93.60	83.66	60.94	70.88
Import value	100.60	87.15	57.73	60.85
Import unit value	107.60	104.01	94.89	86.07
Terms of trade	94.89	94.93	118.40	128.07

	1996	1997	1998	1999:1
Export volume	-1.9	7.6	7.9	2.6
Export value	-3.8	3.8	-6.8	0.7
Export unit value	2.1	-3.3	13.8	-1.9
Import volume	-6.4	83.66	-27.2	16.3
Import value	0.6	87.15	-33.8	5.4
Import unit value	7.6	104.01	-8.8	-9.3
Terms of trade	-5.1	94.93	24.7	8.2

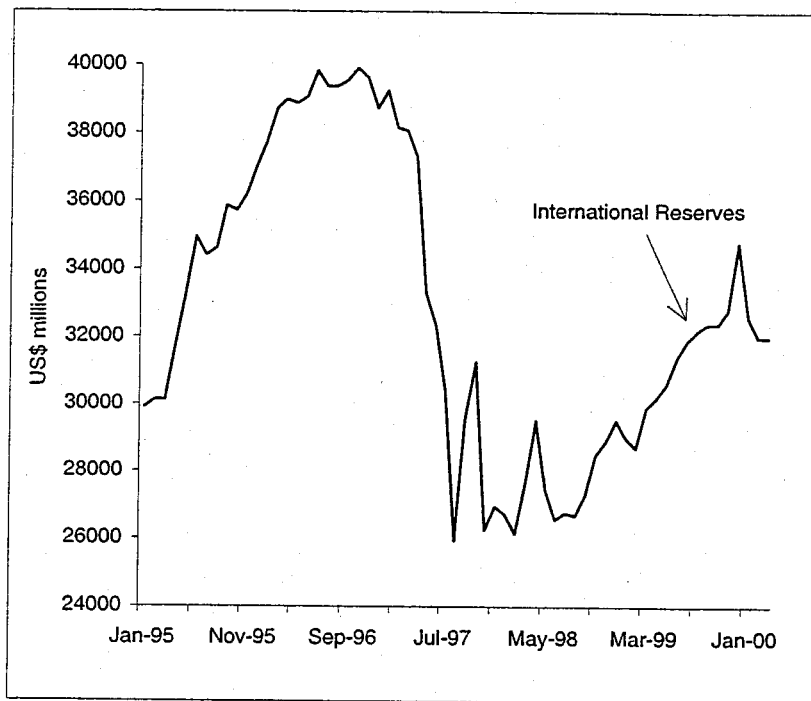
NOTES: In terms of U.S. dollars and based on customs data. From January 1996 onward, unit-value indices for exports and imports are calculated by using the Fisher chained method (1995 = 100).

SOURCE: International Monetary Fund (2000a).

a large amount of the government's reserves in the forward market in November and December 1996. When the forward sales of these reserves came due, selling pressures on the baht intensified. On June 19, 1997, the finance minister, who had steadfastly defended the parity, resigned. Net "usable" international reserves (gross reserves that could be used in defense of the currency minus the forward obligations of the Bank of Thailand that came due) were almost drained by the end of June (MOF, 1999).

On July 2, 1997, the Thai authorities finally succumbed to the speculative pressures and allowed the exchange rate to float. The baht immediately lost about one-fifth of its value against the U.S. dollar. 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 between \$0.5 and \$1 billion each. In total, the IMF-led international-support package reached \$17.2 billion (Lane et al., 1999; IMF, 2000c).

FIGURE 4
INTERNATIONAL RESERVES IN THAILAND, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

4 THE DEVALUATION OF THE BAHT: FUNDAMENTALS OR SELF-FULFILLING EXPECTATIONS?

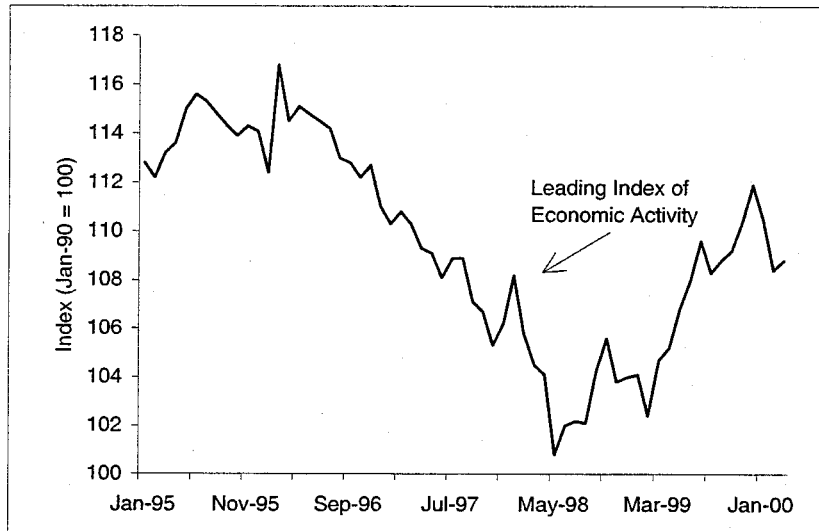
As noted in Chapter 2, the only significant distinction between the currency crises based on fundamentals and those based on self-fulfilling expectations has to do with whether the crisis was predictable or unexpected. This being said, differentiating between the two sets of models is far from straightforward. What is important, for example, with regard to fundamentals-based models, is not a *historical* trend in worsening fundamentals but an *anticipated future* trend (Krugman, 1996; Corsetti, 1998). Corsetti (1998, p. 14) 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.” In addition, 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-based and self-fulfilling theories, the present study takes an eclectic approach, examining different forms of evidence to determine whether the Thai devaluation was a case of sudden death or of death foretold, as in Sachs, Tornell, and Velasco (1999b); for a recent example of attempted econometric testing of a self-fulfilling model, see Jeanne (1997).

The Thai Devaluation: A Case of “Bad” Fundamentals

Most of the key economic variables in Thailand were on definite downward and deteriorating trends after mid-1996. Some evidence of this is captured by movements in the Bank of Thailand Leading Index of Economic Activity (Figure 5),¹ the industrial capacity-utilization ratio (Figure 6), indices of manufacturing production and private investment (Figure 7), various indicators of private consumption (Figure 8), trends in overall economic growth, “growth recession” (Figure 9), and the Thai stock-market price index (Figure 10). Paralleling this worsening of economic fundamentals were the rising concerns by market participants

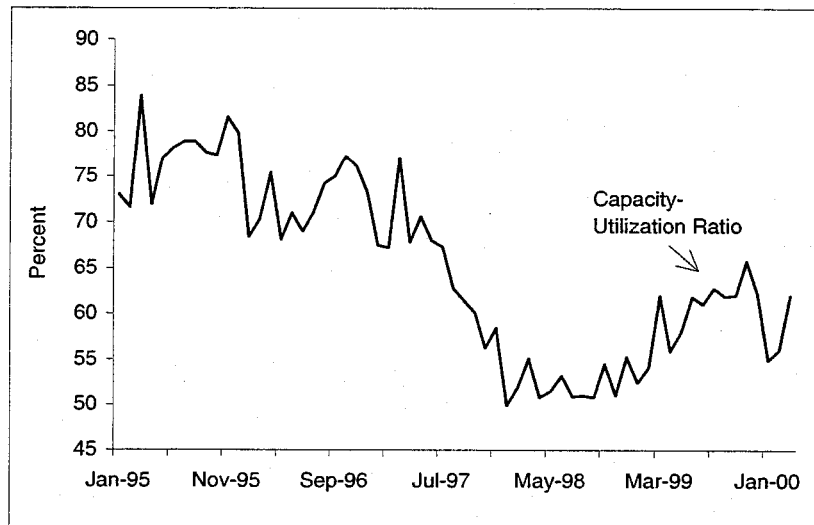
¹ This index, which is meant to signal the direction of Thailand’s future economic growth, tracks variables such as department-store sales, vehicle sales, and trade volumes, as well as the manufacturing index and the stock market.

FIGURE 5
BANK OF THAILAND LEADING INDEX OF ECONOMIC ACTIVITY, 1995-1999



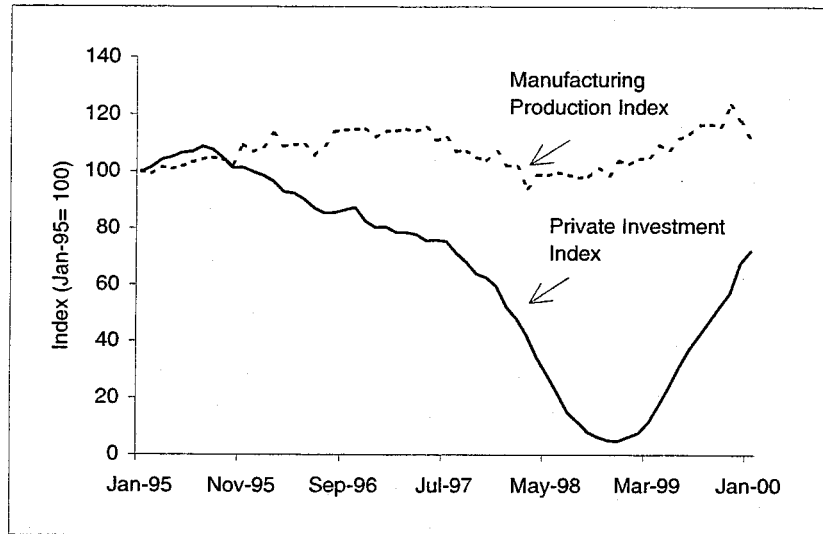
SOURCES: Bank of Thailand; CEIC database.

FIGURE 6
CAPACITY-UTILIZATION RATIO IN THAILAND, 1995-1999



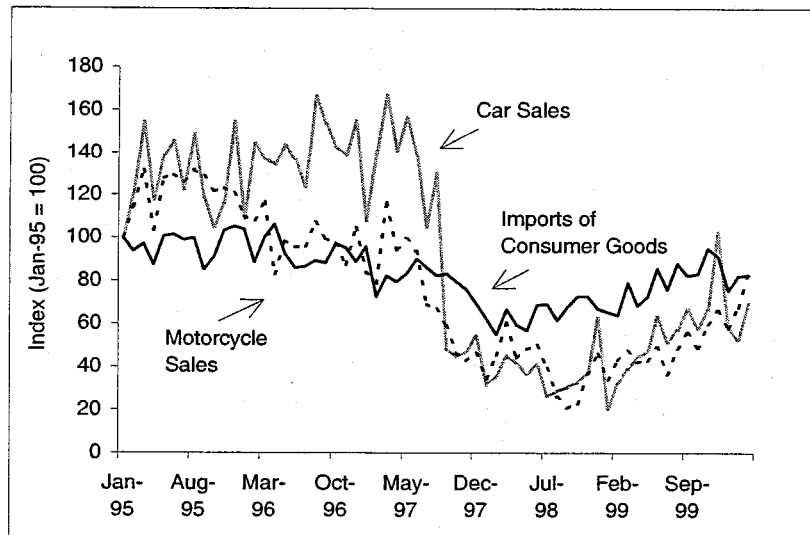
SOURCES: Bank of Thailand; CEIC database.

FIGURE 7
INDICES OF MANUFACTURING PRODUCTION AND PRIVATE INVESTMENT IN THAILAND, 1995-1999



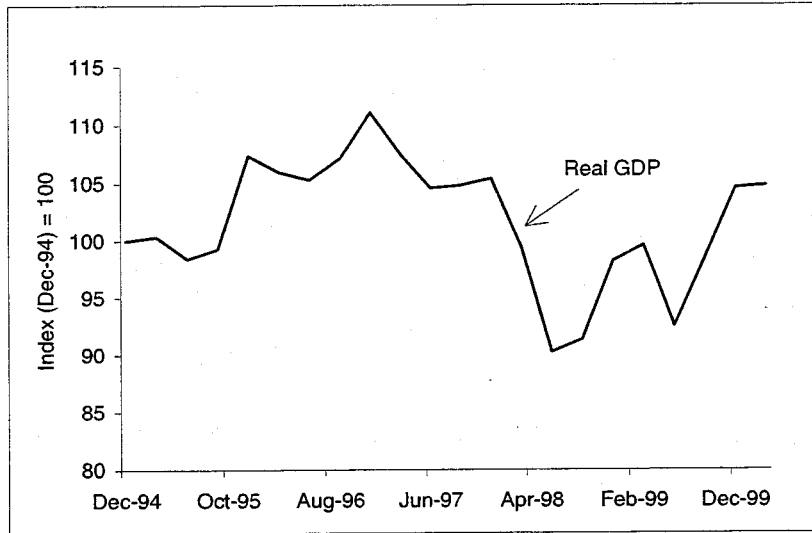
SOURCES: Bank of Thailand; CEIC database.

FIGURE 8
INDICATORS OF PRIVATE CONSUMPTION IN THAILAND, 1995-1999



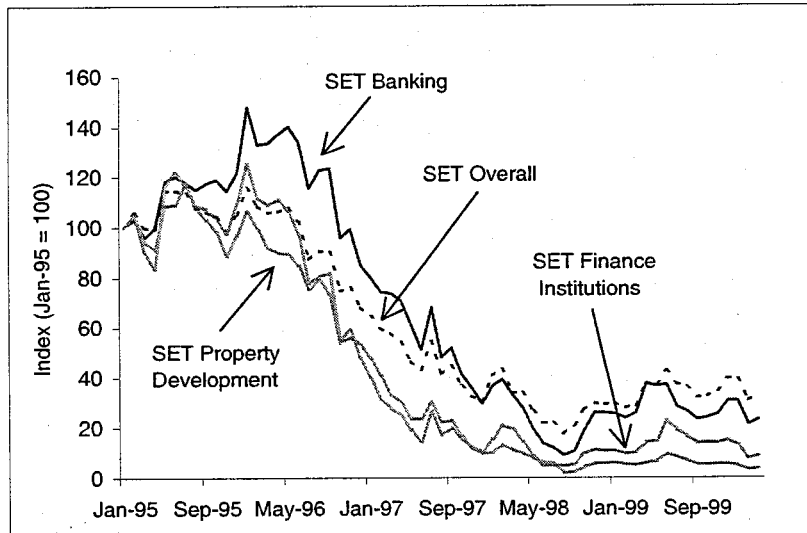
SOURCES: Bank of Thailand; CEIC database.

FIGURE 9
 REAL GROSS DOMESTIC PRODUCT IN THAILAND, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

FIGURE 10
 STOCK EXCHANGE OF THAILAND INDEX, 1995-1999

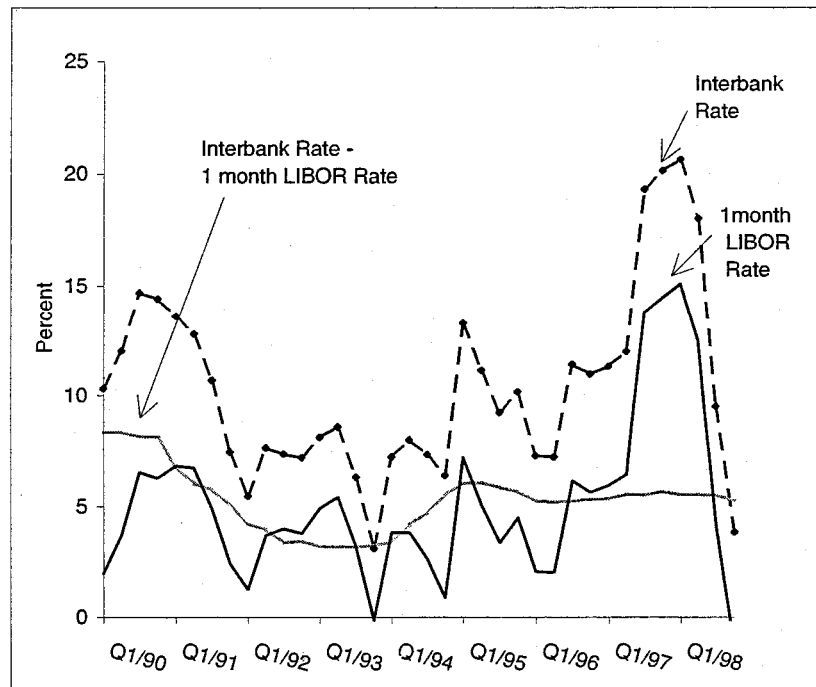


SOURCES: Bank of Thailand; CEIC database.

about the near-term prospects of the Thai economy. In addition to the Moody's downgrade, the regional press—including *Asiaweek*, the *Far Eastern Economic Review* and the *Bangkok Post*—reported significant and swelling unease about Thailand's unsustainable external position and the likelihood of an eventual baht devaluation (see Lauridsen, 1998, for selected quotations). Following its annual consultations with Thailand on June 1996, the IMF expressed concerns about the country's large current-account deficit and its mounting vulnerability to economic shocks and sudden shifts in investor sentiment.

Although 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 rose 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 gradually upward between 1996 and early 1997 before jumping up in mid-1997 (Figure 11), and earnings before interest and depreciation trended downward (Table 12). On the

FIGURE 11
INTEREST RATES IN THAILAND, 1990-1998



SOURCES: Bank of Thailand; CEIC database.

TABLE 12
PERFORMANCE OF NONFINANCIAL PRIVATE FIRMS IN THAILAND, 1994–1999

Period	Number of Firms	Total Loans of Firms (billions of baht)	Ratio of Profits to Interest Expenses ^a	Share of Firms with Profits < Interest Expenses	Loans of Companies with Profits < Interest Expenses (% of total loans)	Profits over Liabilities	Debt to Equity Ratio
1994	239	776	6.1	4	2.6	24.3	1.5
1995	240	1,038	4.4	7	4.9	18.9	1.7
1996	240	1,333	3.5	10	11.3	15.3	2.0
1997:Q1	244	1,403	2.7	18	19.0	19.5	2.1
1997:Q2	244	1,455	1.6	20	16.6	15.1	2.2
1997:Q3	244	1,711	1.2	39	49.2	9.0	3.1
1997:Q4	244	2,092	1.0	25	28.2	7.4	4.6
1998:Q1	244	1,983	1.4	36	40.5	9.3	3.7
1998:Q2	244	2,036	1.2	58	54.0	8.4	3.7
1998:Q3	244	1,941	1.1	50	50.3	8.6	3.3
1998:Q4	244	1,816	1.3	47	46.6	9.5	2.8
1999:Q1	244	1,809	1.6	38	46.8	12.1	2.9
1999:Q2	244	1,780	1.9	34	41.1	13.6	2.9

^a Profits are defined as earnings before interest, taxes, depreciation, and amortization.
SOURCE: International Monetary Fund (2000b).

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 these firms were companies related to property and construction. Similarly, although the profits of Thai firms exceeded their interest expenses by six times by the end of 1994 (as listed on the Thai Stock Exchange), this figure fell to one and a half times by the end of 1997. In addition, profits, which were just under one-quarter of liabilities in 1994, fell to just under one-tenth of liabilities 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*. Berg and Patillo (1999), for example, have estimated out-of-sample crisis probabilities using a probit model of a balance-of-payments crisis on a panel of data for developing countries. Their model makes use of macroeconomic fundamentals such as the size of the current-account deficit, the level 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, p. 20) state that, according to their empirical analysis, “in Thailand, the monthly predicted probability (of a crisis) increases by a 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.” Kaminsky (1999, p. 21) 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 crisis-hit country for which a crisis might have been consistently predictable (Furman and Stiglitz, 1998). Berg (1999, p. 46) concludes that “the 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.”

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

This being said, the evidence is admittedly not completely airtight. For instance, Standard & Poor’s failed to reduce Thailand’s credit ratings, and a number of mutual funds remained overweighted in Thailand right up until May and June of 1997 (*Institutional Investor*, December 1997, pp. 54–55). This apparent heterogeneity of views and uncertainty about Thailand’s economic prospects, however, seems paradoxically to fortify the fundamentals-based explanation. Morris and Shin (1998, 2000) show that multiplicity of equilibria is the result of two modeling assumptions, namely, that fundamentals are common knowledge and that economic agents (speculators) are aware of one another’s actions in equilibrium. Absent these assumptions, the multiple equilibria would be eliminated and the currency would face a definite break of the peg, because the Thai baht would have been successfully attacked at the earliest possible time (that is, as soon as Thailand was in the “crisis zone”).

In the final analysis, although each one of the above pieces of evidence might be questioned in isolation,² together they provide a convincing case for a fundamentals-based (unique-equilibrium) explanation to the devaluation of the Thai baht. Thus, Ito (1999, p. 2) notes 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.” Similarly, Corbett and Vines (1999, pp. 167–168)) conclude that “there does not appear to be a need to appeal to self-fulfilling ideas in order to explain Thailand’s original devaluation. . . . [However], in none of the other economies was overheating or macroeconomic vulnerability nearly as obvious as in the Thai economy.”³

The more challenging question is whether the devaluation of the baht fits the KFG monetary-based framework, which, as noted, is a subset of the fundamentals-based models. I now turn to this issue.

The Relevance of the KFG Model to the Devaluation of the Thai Baht

Chapter 2 noted that prior to the July 2, 1996, devaluation, Thailand was plagued with macroeconomic weaknesses such as an overvalued exchange rate, rapidly rising real wages, a large current-account balance, and declining output growth. All this is fully consistent with a KFG framework appropriately extended through the relaxation of some of the strong monetary assumptions such as PPP or price flexibility (see Goldberg, 1990, and Agénor, Bhandari, and Flood, 1992, for surveys of the KFG model, and Blackburn and Sola, 1993, with accompanying references). Conversely, the fact that the evolution of certain critical variables in Thailand is broadly consistent with the KFG model is not in itself conclusive evidence of the model’s validity for Thailand.

Recall that in the original KFG model, a persistent, monetized, fiscal deficit was the motivation for excess credit growth. This may at first seem

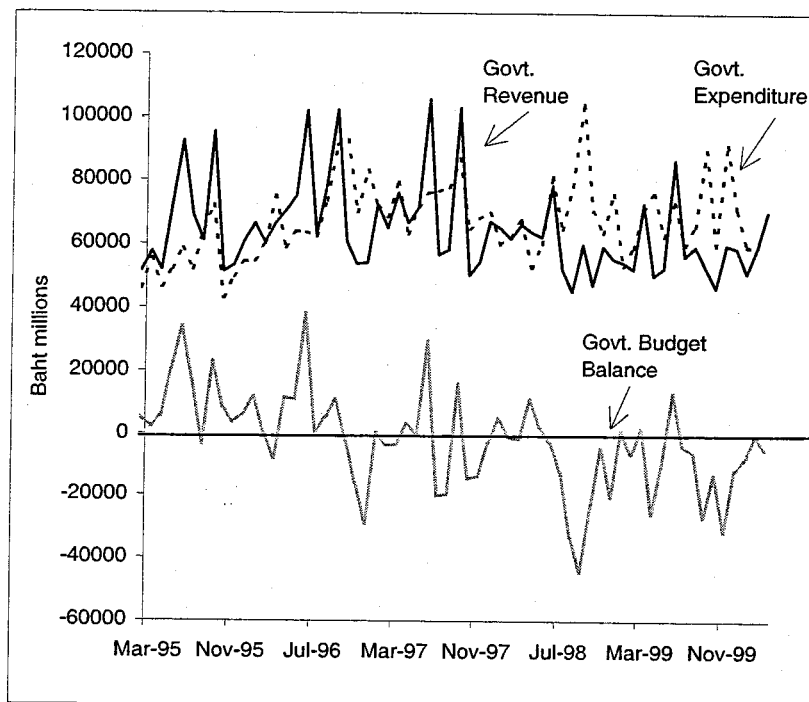
² For example, although badly trending fundamentals are emphasized here, Obstfeld (1996a, p. 399) has taken (the rather strong) position that “even a temporary recession will display a clearly deteriorating trend for a while—without telling us what would have happened in states of the world that did not materialize subsequently.”

³ In what seems to be a contradictory statement, however, Corbett and Vines then go on to maintain that the second-generation genre of models is applicable to all regional economies, *including* Thailand. Burnside, Eichenbaum, and Rebelo (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 that reserves are insufficient to meet existing money stock. They do not consider, however, the (substantial) forward commitments made by the Bank of Thailand.

to be at odds with the experience in Thailand, where the government had run persistent fiscal surpluses until 1996. Two points should be noted, however.. First, there was a substantial weakening in fiscal discipline during this period, which resulted in a budget deficit following the fourth quarter of 1996, after nine consecutive quarters of fiscal surpluses and six consecutive years of annual surpluses (Figure 12).⁴ Second, these conventional fiscal figures fail to incorporate the implicit or contingent liabilities of the government, because a number of finance companies were faced with insolvency following the real-estate and stock-market bust in 1996.

The Thai authorities established the Financial Institutions Development Fund (FIDF) in 1985, following a deep financial crisis in 1983-84,

FIGURE 12
GOVERNMENT EXPENDITURES AND REVENUES IN THAILAND, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

⁴ This is consistent with the "Talvi effect," whereby average fiscal revenue tends to be lower during periods of capital outflows and higher during periods of capital inflows (Talvi, 1997). Calvo (1996a) explicitly incorporates this effect into a currency-crisis framework.

for the purpose 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 struggling institutions. Depositors in, and a number of creditors of, these institutions were generally bailed out. This historical precedent explains why agents may have expected an implicit guarantee and strong government support for the financial system. The Bank of Thailand (1999, p. 6) explicitly stated 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.”

The Thai government’s more recent handling of troubled financial institutions such as the Bangkok Bank of Commerce undoubtedly also fueled these expectations of a government bailout (Siamwalla, 1997). Forward-looking agents ought, therefore, to have been aware of the existence of the contingent liabilities of the government and of the consequent high fiscal costs involved in financial-sector restructuring. Not only were *actual* fiscal balances deteriorating after 1996, but these contingent liabilities implied fairly high *prospective* fiscal deficits (Burnside, Eichenbaum, and Rebelo, 1998).⁵ Empirical analysis by Corsetti, Pesenti, and Roubini (2001) suggests that the fiscal costs of a bailout are a robust predictor of a crisis.⁶

The apparent importance of implicit liabilities in the East Asian crisis has inspired a subclass of models that emphasizes the role of liabilities in a currency crisis (see Chapter 2, footnote 12 for references). Because

⁵ In similar vein, Díaz-Alejandro (1985, p. 372), writing about Chile’s banking and currency crisis of 1982, noted that “the 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.” Daniel (1997), Daniel, Davis, and Wolfe (1997), and Polackova (1999) define and examine the issue of government contingent liabilities and their fiscal costs (particularly with regard to banking crises).

⁶ Tornell (2001), although he proxies the fiscal costs of a bailout by the share of precrisis nonperforming loans (NPLs) to GDP, argues that because 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 footnote 7, p. 41).

the KFG model has been the motivation behind all of these models, they might be regarded as more elegant extensions of the KFG prototype. An important matter that is often overlooked in discussions of the solvency-based models, is the issue of the “road to devaluation.” Corsetti, Pesenti, and Roubini (2001), for instance, argue that the size of the financial liabilities generates expectations of either a drastic policy change (a fiscal reform) or recourse to seigniorage revenues. Burnside, Eichenbaum, and Rebelo (1998), Chinn and Kletzer (2000), and Dooley (2000) suggest that the crisis occurs once the size of fiscal liabilities is eventually matched by the available reserves. All these solvency-based models share an emphasis on the current or anticipated size of the quasi-fiscal deficit.

Although I agree that the contingent liabilities represent an important fiscal problem that was becoming increasingly apparent in Thailand, I suggest that this was not the direct cause of the crisis in Thailand. Rather, the crisis—or more specifically, the original devaluation—was consistent with a classic (unique-equilibrium) KFG style of monetary disequilibrium induced by an expansion of credit by the Bank of Thailand to domestic financial institutions. This position is very similar to that presented by Calvo (1996b, p. 217), who notes that “when 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.”

Evidence in Favor of the KFG Model

What evidence supports a role for monetary disequilibrium? Recall the sharp increase in boom-period bank lending, which was, in large part, channeled to the real-estate sector. In 1994, Thailand experienced a bursting of the asset-price bubble, and the real-estate market remained very soft, with residential vacancy rates of 25 to 30 percent and office vacancy rates of 14 percent (Lauridsen, 1998). A dearth of transactions (particularly because much of the office construction was by companies for their own use), along with the lack of market liquidity, however, meant that very few new transactions prices were registered. The downward correction in real-estate prices was therefore not apparent until sometime later (IMF, 2000b). Because the domestic financial

system had significant exposure to the real-estate sector, the finance companies also showed a deterioration in profits and financial conditions (Table 13).⁷ Capital inflows into Thailand were also down sharply between 1996 and early 1997, mainly because of withdrawals from the NRBA, which were short-term deposits held in domestic banks and other nonbank components (Table 5).

The issue of financial-sector weaknesses and the important distinction between illiquidity and insolvency will be discussed in Chapter 5. For now though, it is sufficient to note that the accumulating losses by the financial institutions inevitably contributed to a stagnation in bank lending in 1996 (Figure 13). As would be expected of most developing countries, bank lending has been the dominant form of funding in Thailand (Table 14).⁸ Thus, there was a sudden decline in the growth rate of overall private-sector credit in Thailand during 1995 and 1996 (Figure 2). Because a sustained drop in bank lending would have been severely detrimental to real economic activity, it is no surprise that the Bank of Thailand attempted to support the ailing financial institutions through a massive liquidity infusion. This can be partly discerned from

TABLE 13
PERFORMANCE OF LISTED FINANCE AND REAL-ESTATE COMPANIES
IN THAILAND, 1994–1997
(Billions of baht)

	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)

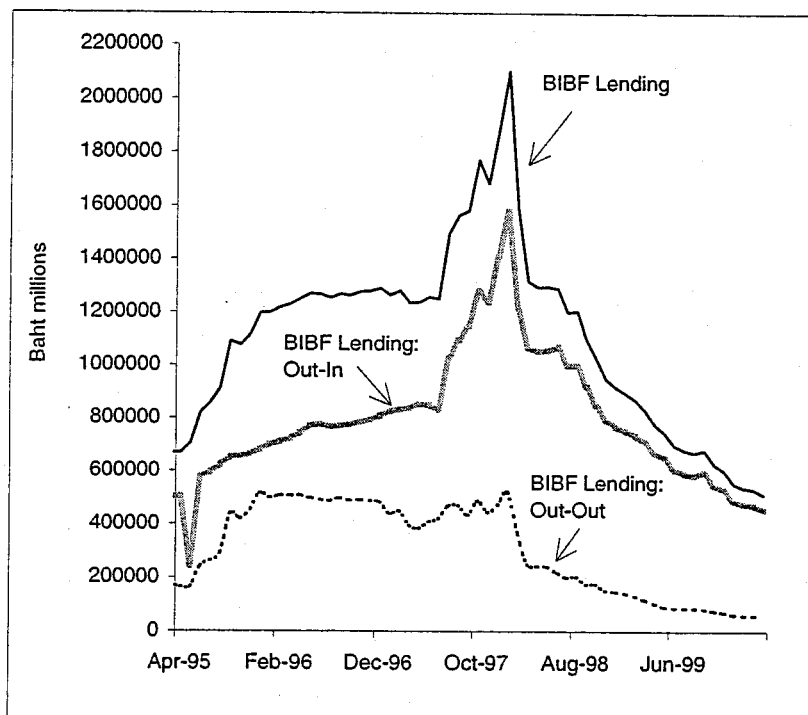
SOURCE: Bank of Thailand (1998).

⁷ 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.” Burnside, Eichenbaum, and Rebelo (1998) and Corsetti, Pesenti, and Roubini (1999a) also provide evidence of the weaknesses in the financial sector.

Although data from the Bank for International Settlements (BIS, 2000) suggest that NPLs in Thailand and the regional countries were in single digits precrisis, this level was probably a reflection of several factors, including data inadequacies and the “evergreening” 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 of the companies’ total loans, whereas NPLs of commercial banks made up 11.5 percent.

⁸ 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, Dwor-Frécaut, and Colaço, 1999).

FIGURE 13
LENDING IN THAILAND THROUGH THE BANGKOK INTERNATIONAL
BANKING FACILITY, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

TABLE 14
SELECTED INDICATORS OF FINANCIAL-SECTOR DEVELOPMENT IN INDONESIA,
MALAYSIA, THE PHILIPPINES, AND THAILAND, 1994-1996
(Percent of GDP)

	Credit of Banking System (1995)	Bank Assets (1994)	Bank Share in Financial Inter- mediation (1994) ^a	Stock Market Capital- ization (1996)	Bond Market Capital- ization (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

^a Assets of banks as a percent of the assets of banks and nonbank financial institutions.
SOURCE: Compiled by author from various sources.

Table 15 and Figure 14, both of which reveal a pointed rise in the claims by the Bank of Thailand over the financial institutions from late 1996 on through the FIDF. There was a sharp rise in the liquidity provided from late 1996, with the Bank of Thailand credit to financial institutions rising from 2 percent of GDP in 1996 to 15 percent by the end of 1997 (World Bank, 1999b). In addition, the World Bank established the Property Loan Management Organization to purchase and manage property loans from financial institutions so as to reduce balance-sheet pressures on those institutions (BOT, 1998; Renaud, Zhang, and Koerberle, 1998). These steps allowed financial institutions to resume lending in early 1997 (Figure 13).

Although the crisis scenario was described in Chapter 2, it is worth noting here that, according to available data, the increase in Bank of Thailand credit to the Thai financial institutions in the second and third quarters of 1996 corresponded almost precisely with the steady loss in reserves during that period. This finding broadly conforms to the KFG model, which shows *actual* and, more importantly, *anticipated* growth in domestic credit, matched by a steady drain in international reserves and a sudden collapse.⁹ Although data are not available to confirm the anticipation of monetary growth, the failure to close down ailing institutions (because of political-economy compulsions) implied that the government could be expected to continue to infuse liquidity into the economy through these institutions (see Chapter 5). MacIntyre (1999, p. 14) 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

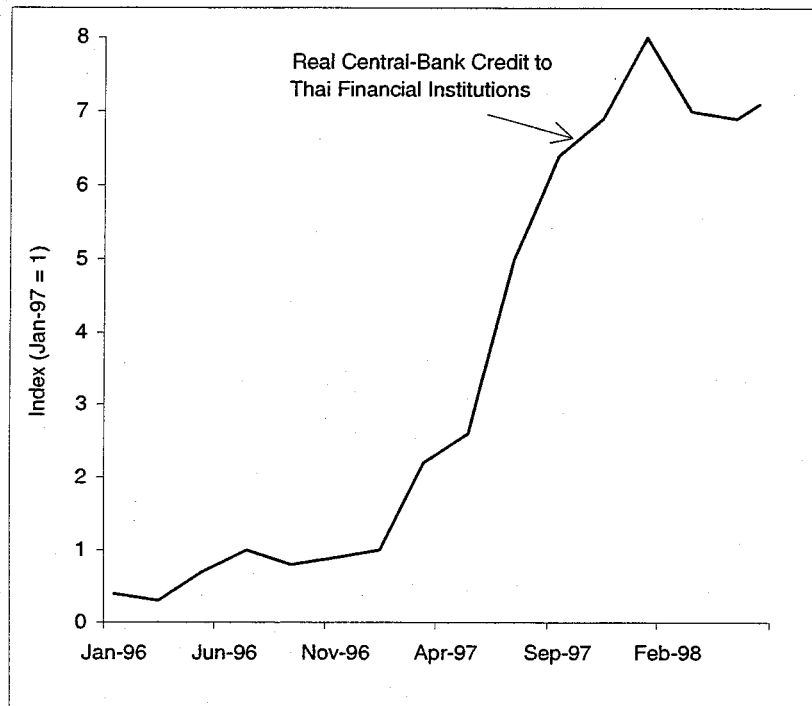
⁹ Calvo (1996a, p. 5) considers the sudden loss of reserves at the switch time, despite perfect foresight of agents, as the “most remarkable feature of a Krugman crisis.” It is interesting to note that the devaluation in Thailand occurred only *after* a collapse of effective reserves. Although this does 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 initial impetus for development of the self-fulfilling models following the ERM crisis, in which reserve depletion did not seem to have played any significant role. If the problems reflected self-validating expectations, the successful run against the currency, and the consequent devaluation, could have occurred any time before the virtual depletion of effective reserves, when the currency was ripe for a successful attack. The point here is not to determine the appropriateness to the Thai devaluation of models based on fundamentals as opposed to self-fulfilling expectations; it has already been shown that a number of reasons favor the fundamentals-based explanation.

TABLE 15
 CLAIMS BY MONETARY AUTHORITIES ON DOMESTIC FINANCIAL INSTITUTIONS
 IN INDONESIA, MALAYSIA, THE PHILIPPINES, AND THAILAND, 1996-1997
 (Billions of rupiahs, pesos, and baht; millions of ringgit)

	1996				1997			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Indonesia	15,295	15,930	16,531	15,182	16,084	19,154	21,245	67,313
Malaysia	6,585	6,867	5,679	5,249	5,325	5,284	5,411	5,032
Philippines	13.1	13.2	13.6	14.2	14.3	16.1	20.0	34.5
Thailand	38.4	66.0	72.0	90.1	194.0	353.9	597.9	723.4

SOURCE: International Monetary Fund (1997a, 1997b, 1998).

FIGURE 14
 CENTRAL-BANK CREDIT TO FINANCIAL INSTITUTIONS IN THAILAND, 1996-1998



SOURCE: World Bank (1999b).

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... this was not a sustainable strategy.”

Based on the discussion above, the analytics of the crisis in Thailand may be noted simply, using the following two identities (Sachs, Tornell, and Velasco, 1996a):

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

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

where CAD is the current-account deficit, R is reserves, K is the capital stock, H is the monetary base, NDA is net domestic assets, and Δ is change. Equation (10) is the balance-of-payments accounting identity that states that a current-account deficit must be financed through reserve distribution or capital inflows. Equation (11) states that the monetary base must equal its two components, namely, international reserves and net domestic assets. Combining equations (10) and (11) yields

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

In the simple KFG story (that is, ignoring the CAD), $\Delta NDA > 0$ and $\Delta H = 0$, because money demand cannot change, so ΔR (ΔK) < 0 . Based on our interpretation of the road to the Thai devaluation, $\Delta K < 0$ and $\Delta H = 0$ (given the costs of an interest-rate hike), so $\Delta NDA > 0$.

If the capital outflow is sustained, the eventual result is similar to the original KFG story, that is, 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. In other words, there is evidence in the case of Thailand that the crisis was preceded by a policy conflict between the 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. The effects of a domestic banking crisis with the central bank acting as a lender of last resort are easily incorporated into the KFG framework, although I have not done that here (see Velasco, 1987; Calvo, 1996a; Calvo and Mendoza, 1996; Rajan, 1999b). The common conclusion that emerges from these extensions is that the currency crisis is hastened by a domestic banking crisis.

The Case against the KFG Model?

The remainder of this chapter anticipates the main criticisms that might be leveled against the emphasis on the KFG monetary framework.¹⁰

Sterilization of capital outflows. The monetary base in Thailand did not decline (it actually rose slightly) during the crisis, because the Bank of Thailand sterilized reserve outflows so as to ensure the smooth growth of money supply during the crisis period (Figure 15). This result contrasts with the original KFG model, which requires that the drain in reserves be reflected in a fall in the domestic monetary base (Figure 1).¹¹ Although full sterilization of outflows is incompatible with the basic KFG model, Flood, Garber, and Kramer (1996) have provided a simple bond-market modification that ensures the compatibility between the sterilization of reserve outflows and the temporary sustenance of a fixed rate (see also Flood and Marion, 1998, 2000). They 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

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

where b_t is the stock of domestic-currency government bonds held by the private sector, b^* is the analogous definition of foreign (U.S.) bonds held by the private sector (assumed to be constant), and ϑ is a constant. Because neither the money supply nor the exchange rate can jump down (implying constant real-money supply), money demand cannot change, despite the fact that $\hat{e}_t > 0$. Because i^* is constant, this must mean that rp_t falls to offset the rise in \hat{e}_t , so that i_t is constant (from equation 3).¹² From equation (13), because b^* and ϑ are constant, 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 attributable to speculation are shifted from the money market to the bond market.¹³

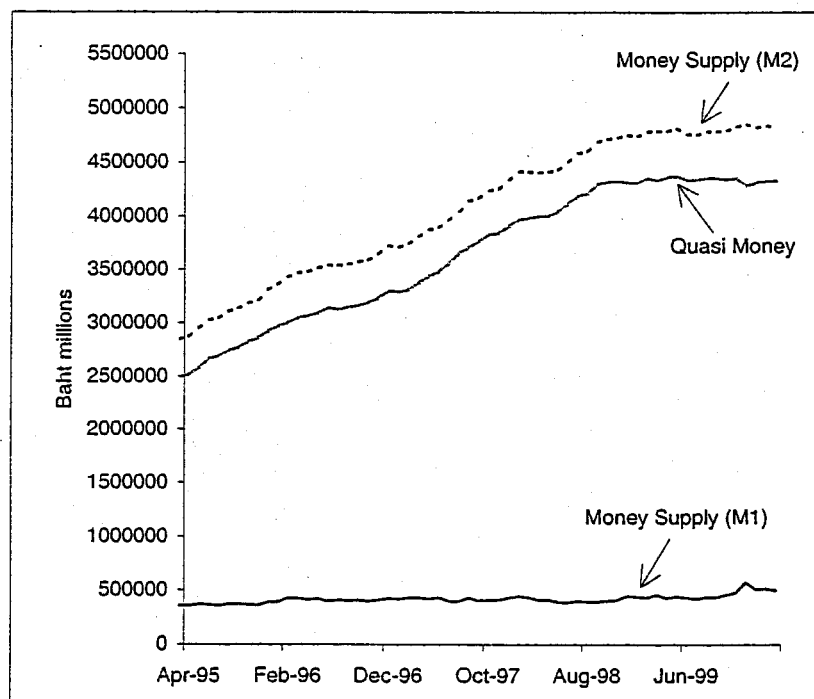
¹⁰ This section was motivated by the comments of an anonymous referee.

¹¹ This is similar to the Mexican experience in 1994–95 (Flood, Garber, and Kramer, 1996; Sachs, Tornell, and Velasco, 1996a).

¹² This term is explained in Flood, Garber, and Kramer (1996). Flood and Marion (2000) derive the risk-premium term from expected utility maximization and show that ϑ is time dependent (ϑ_t).

¹³ Indeed, all that is required for the above analysis to hold 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 the

FIGURE 15
MONEY SUPPLY IN THAILAND, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

“Probing” speculative attacks. Initial speculative attacks in Thailand occurred in January and February 1997 when there were, as yet, no apparent signs of monetary disequilibrium, and then again in May and June 1997, before the actual devaluation in July. Recalling the importance of anticipated future trends, however, 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 predevaluation speculative attacks on the currency if one introduces agents’ uncertainty regarding the levels

risk premium on the currency under duress *fall* at the time of sterilization (to offset the expected exchange-rate depreciation). This might explain why even a fundamentals-based crisis may not necessarily be reflected in widening interest-rate spreads.

of international reserves and the portion of reserves that 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 is that the stock of *effective* reserves requires that the government's contingent liabilities also be taken into account (see Rajan, 1999b, for a simple formalization).¹⁴ A second is that 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, provided further scope for investor uncertainty about the effective (usable) level of reserves. A third is that Thailand's membership in important regional networks such as the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP) ensured that there would always be the possibility of assistance from regional central banks.¹⁵

“Mechanical” as opposed to “rational” government behavior. Regardless of the empirical validity of the KFG model, some critics might argue that the KFG model is inappropriate or incomplete in light of its seemingly asymmetric treatment of private agents and the monetary authorities. Specifically, although private agents are modeled as farsighted, the monetary authority is assumed to be 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

¹⁴ Escape-clause-based crisis models that show a secularly deteriorating trend in fundamentals can also explain such “probing attacks” on a currency prior to devaluation by introducing speculator uncertainty about 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 against 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 a fall in reserves) and imperfect information about the government's objectives. In Drazen's 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 deflected (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 currency crisis of the kind described by Krugman, Flood, and Garber.

¹⁵ The EMEAP is a cooperative organization comprising central banks and monetary authorities of eleven regional economies: Australia, China, Hong Kong, Indonesia, Japan, Malaysia, New Zealand, the Philippines, Singapore, South Korea, and Thailand. Spurred on by the example of the Tequila crisis, substantive moves were made toward enhanced regional cooperation prior to the East Asian crisis. Some of the creditor economies in the region (such as Hong Kong, Japan, and Singapore) did step in to defend the baht just prior to its flotation (Rajan, 2001).

is why the monetary authority did not raise interest rates in response to a run on the currency. This is a nonnegligible point, because defense of a currency is always “technically” feasible as long as governments are willing to reduce the monetary base sufficiently, thus raising interest rates, so that there is “zero speculative demand” (Obstfeld and Rogoff, 1995; Lahiri and Vegh, 2000).

Although these criticisms may be generally valid, in the particular case of Thailand, the well-documented prevalence of significant policy paralysis within the Thai government (especially in the finance ministry) during the period from late 1996 to early 1997 led to the pursuit of policies that were understood to be inherently unsustainable. Thus, Haggard and MacIntyre (2000, pp. 5–6) have observed that “one 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 political leadership in Thailand was a function of the fragmentation of the party system and the tendency of weak coalition governments.” The assumption of mechanical behavior on the part of the monetary authorities—as implicitly assumed in the KFG model—may thus be quite accurate, considering the weak political base that precluded the implementation of decisive reforms.

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 balances the costs and benefits of maintaining the peg. The costs of devaluing are modeled as a reputational loss caused by abandoning the peg; the costs of maintaining the peg pertain to the costs of higher interest rates.¹⁶ In the Thai case, with unhedged contingent liabilities, however, it is unclear 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 (*Business Times*, Singapore, May 5, 1998, pp. 6–7).

The Bank of Thailand (1998) report on the Thai crisis also outlined the “official” reasons why a devaluation of the baht was perceived as doing more harm than good. These included the high import content of Thai exports (which implied a limited competitiveness benefit from a weakened currency), the inflationary effects of devaluation (which led

¹⁶ See Furman and Stiglitz (1998) for a recent discussion of the costs of a high-interest-rate policy.

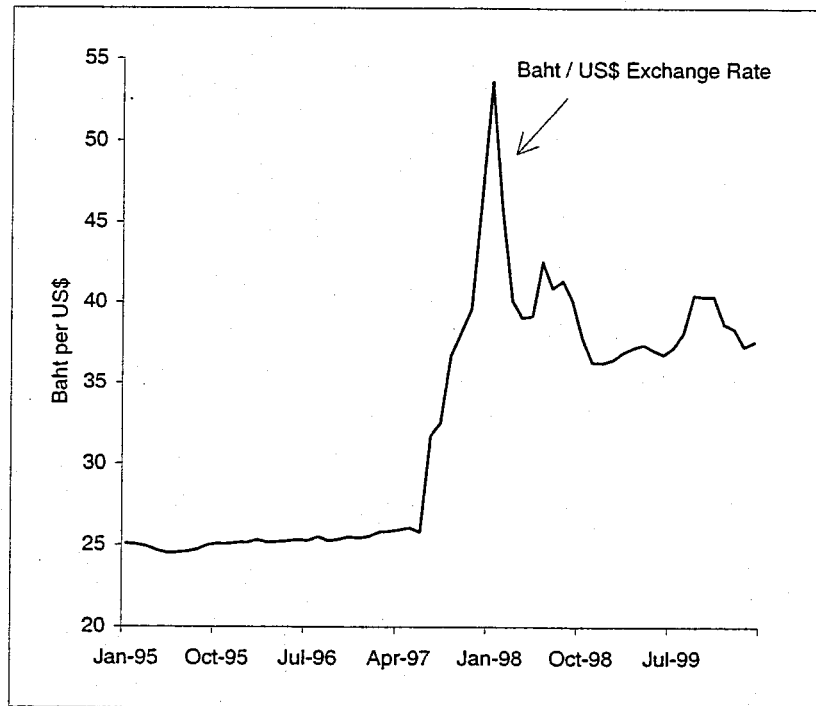
to a wage-price spiral), the presence of unhedged foreign-currency corporate debt (which led to bankruptcies and unemployment), the deterioration in the asset quality of financial institutions (caused by a weakened corporate sector and a vicious spiral of escalating distress in the corporate and financial sectors), and the higher interest rates imposed to contain inflation (which prevented the recovery of financial institutions and the real economy). Corsetti (1998, p. 15) has noted, in this regard, that “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.”

Postdevaluation macroeconomic overshooting. There are two specific issues to be considered here. The first is the fact that the baht depreciated abruptly immediately after floating, losing almost one-fifth of its value vis-à-vis the dollar (Figure 16). This seems, in the first instance, to be at odds with the KFG model, in which the currency cannot “jump” following a drain in reserves. However, this apparent inconsistency is fairly easy to rationalize within the KFG model once uncertainties about reserve levels and credit creation are accommodated (Flood and Garber, 1984; Blanco and Garber, 1986). 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 during the third quarter of 1997.¹⁷

The second, more troubling, issue is the postdevaluation overshooting of various macroeconomic and financial variables. As can be seen, the baht kept depreciating well after the speculative attack in July 1997, until the exchange rate reached a peak at about 55 baht to the dollar in January 1998 (Figure 16). The Thai interbank rate differential with respect to the London interbank offer rate (LIBOR) also rose in anticipation of the expected depreciation of the baht. Similarly, the share of nonfinancial private corporations in Thailand with interest expenses in excess of profits climbed sharply from one-fourth in the second half

¹⁷ MacIntyre (1999) and Haggard and MacIntyre (2000) describe the political situation in Thailand during the crisis period. More generally, Willett (2000) discusses the tendency of financial markets to react “too late,” and when they do, to “overreact.”

FIGURE 16
THE BAHT-DOLLAR EXCHANGE RATE, 1995-1999



SOURCES: Bank of Thailand; CEIC database.

of 1997 to three-fifths by the second half of 1998 (Table 12). A recent study by the Monetary Authority of Singapore (MAS, 1999, p. 5) concluded that "the Baht forward discount rose from [January-] February 1997, when 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 [*sic*] 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."

The continued downward pressure on the baht and concomitant upward pressure on interest rates are fairly easy to explain. They were affected by, first, the effects of the region-wide contagion (especially between the last quarter of 1997 and the first quarter of 1998), second, the Bank of Thailand's demand for dollars as it settled its outstanding forward obligations accumulated in the failed defense of the currency

(MOF, 1999), and third, the dumping of the baht by local investors in February 1998 in response to the sharp falls in the baht's dollar value in the preceding months, as well as to concerns throughout the region that Indonesia was considering fixing the rupiah to the dollar by way of a currency board.

Of more analytical significance was the fact that the overshooting was not solely limited to monetary variables. Output in Thailand collapsed after the devaluation and, despite rebounding from the third quarter of 1998, remained lower than the precrisis level, even toward the end of 1999 (Figure 9). These trends in output growth are mirrored by the dramatic declines in the private-investment index between mid-1997 and mid-1999 (Figure 7). These facts, however, contradict the first two generations of models, which predict that a devaluation signals the end of the crisis, because the weaker currency and accompanying macroeconomic policies can be expected to stimulate real economic activity.¹⁸

If we are to provide a complete story of the Thai crisis, therefore, we need to rationalize the postdevaluation collapse. The third-generation model of bank panic becomes pertinent in this regard and will be addressed in the next chapter. Before proceeding, however, the parallel between the conclusion above and the assessment of the 1994–95 Mexican crisis by Calvo and Mendoza (1996, p. 237) warrants emphasis: “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.”

¹⁸ Although the solvency-based models are able to generate an output collapse (see Chinn and Kletzer, 2000), the KFG model emphasizing monetary disequilibrium offers a better explanation for the original devaluation and provides evidence for a liquidity-based cause for the ensuing crash.

5 FROM DEVALUATION TO OUTRIGHT COLLAPSE: A CASE OF BANK PANIC

For reasons given above, this study focuses on the bank-panic model, which emphasizes potential illiquidity (see Chang and Velasco, 1998, 1999). In support of this stance, the first section of this chapter provides data on the foreign-asset and liability positions, in order to determine their *ex ante* vulnerability to an external shock (such as a devaluation); it then discusses the movements in capital withdrawals from the country following the shock. The second section considers the scenario of devaluation followed by collapse, a scenario that is closely intertwined with the *illiquidity* as opposed to the *insolvency* of domestic financial institutions. The third and final section examines the consequences of the systemic liquidity crisis following the devaluation.

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 Asian economies that have banks reporting to the BIS. The data, divided between banks and

TABLE 16
FOREIGN ASSETS AND LIABILITIES OF BIS REPORTING BANKS IN INDONESIA,
MALAYSIA, THE PHILIPPINES, AND THAILAND, 1993, 1996, AND 1997
(US\$ billions)

	1993	1996	1997
Indonesia			
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

TABLE 16 *continued*

	1993	1996	1997
Malaysia			
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
Philippines			
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
Thailand			
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

SOURCES: Radelet and Sachs (1998a); Bank of Thailand; CEIC database.

nonbanks, show that banks are responsible for the bulk of liability accumulation in Thailand (86 percent in 1996). These high net-liability positions by the Thai banks reveal the existence of significant mismatches in that a large part of the foreign deposits was lent to predominantly 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 pattern left the financial system open to grave foreign-currency mismatches (Burnside, Eichenbaum, and Rebelo, 1999). To be sure, financial institutions in Thailand generally hedged against exchange-rate risks by lending domestically in foreign currencies, thus transferring the risks to the corporate borrowers. Nevertheless, all this meant for the financial institutions was that the foreign-currency risks were converted to credit risks in the event of a loan default by borrowers.

Because 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 large maturity mismatches. Thus, the stock of short-term debt rose from \$7 billion in mid-1991 to \$46 billion by mid-1997 (Table 17).¹ The sharp increase in short-term external indebtedness caused the country's ratio of short-term debt to international reserves to rise between 1990 and 1997, despite the large reserve accumulation noted previously. This change suggested "a financially fragile situation, in the sense that international reserves would not have

TABLE 17
MEASURES OF EXTERNAL VULNERABILITY IN INDONESIA, MALAYSIA,
THE PHILIPPINES, AND THAILAND, 1990–1997

	June 1990	June 1994	June 1995	June 1996	June 1997
Total debt (US\$ millions)	11,675	36,545	n.a.	n.a.	69,382
Local currency (% of total debt)	5.82	5.97	n.a.	n.a.	5.63
Short-term debt (US\$ millions)	7,026	27,151	n.a.	n.a.	45,567
Short-term debt (% of total debt)	60.20	74.3	n.a.	n.a.	65.70
Ratio of short-term debt to international reserves	0.59	0.99	n.a.	n.a.	1.45
	Dec. 1990	Dec. 1993	Dec. 1995	Dec. 1996	Dec. 1997
Ratio of mobile capital to international reserves	0.44	0.95	1.63	1.85	2.22

SOURCES: Chang and Velasco (1998); Athukorala and Warr (1999).

¹ These mismatches can be traced to financial liberalization following the establishment of the BIBF institutions in 1993 (see Chapter 3 and, especially, footnote 3).

been sufficient to repay the short term debt had foreign banks decided not to roll it over” (Chang and Velasco, 1998, p. 25). These currency and maturity mismatches (so-called “double mismatches”) left Thailand vulnerable to abrupt shifts in international creditor confidence. Table 18 provides comprehensive data on Thailand’s external debt and debt service.

Short-term debt, however, is 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, and trade credits (Athukorala and Warr, 1999). Its ratio to international reserves rose sharply from 0.4 in 1990 to 2.2 by 1997 (Table 17). Once again, it is clear that international illiquidity is a problem quite distinct from the problems of solvency or the productive deployment of resources.

But why is this of any consequence? Calvo (1996b, p. 219) 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.”² The preceding ratios emphasize that Thailand left itself deeply exposed to the possibility of a postdevaluation “bad equilibrium” (that is, financial and economic collapse) in light of the large double mismatches of external obligations. But what evidence is there that an outflow induced by panic at the international banks actually occurred?

Capital withdrawals. The postdevaluation empirical trends in key macroeconomic variables have their counterpart in capital flows from Thailand during the period leading up to the devaluation. In the first quarter of 1997, only the nonbank sector experienced capital outflows (Tables 5 and 18). More precisely, it was primarily the NRBA, but also the “other loans” component that recorded net outflows. Net FDI inflows remained positive throughout 1997, and portfolio flows, too, changed direction only in November and December of 1997. Private-bank capital flows saw a sharp turnaround of more than \$10 billion between the first and second halves of 1997. This reversal intensified in 1998, when outflows reached almost \$14 billion. Of significance, though, is the fact that funds were still flowing into the country during the first half of 1997, right up to the time of devaluation, and it was only

² It is interesting to recall the debate prior to the Mexican crisis. Although Dornbusch and Werner (1994) had proposed a devaluation of the peso of about 20 percent, Calvo (1994, p. 303) was on record as opposing the peso devaluation, arguing that “this is not the time to implement a Dornbusch-Werner devaluation. The forces that have held together the ‘good’ equilibrium . . . may dissipate overnight.”

TABLE 18
EXTERNAL DEBT AND DEBT SERVICE IN THAILAND, 1994–1999
(US\$ millions)

	1994	1995	1996	1997	1998	1999:1
Total outstanding debt ^a	64,366	82,568	90,536	93,416	86,160	80,655
Outstanding medium- and long-term debt ^b	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
By lender	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
By borrower	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
BIBF	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
Nonbank 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 ^c	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	4,315	1,416
Non-BIBF	545.7
Interest, medium- and long-term debt	2,082	2,651	3,095	3,447	3,447	1,653
Public sector	829	900	858	881	881	763
of which, IMF	0	0	0	15	15	261
Private sector	1,253	1,751	2,237	2,566	2,566	891
Nonbank	1,253	1,751	2,237	2,566	2,566	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) ^d						
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

TABLE 18 *continued*

	1994	1995	1996	1997	1998	1999:1
Average interest rate on medium- and long-term debt contracted (%)						
Public sector ^d	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 ^e	11.7	11.4	12.3	15.7	20.8	20.3
Memorandum item:						
Nonresident baht deposits	546	395	669	350	376	423

^a Excludes loans (estimated at about \$4 billion at end 1997) contracted by Thai corporations but not brought into Thailand.

^b Debt with original maturity of more than one year.

^c Includes repayments of bonds locally issued by the Thai government that are held by nonresidents.

^d Excludes borrowing from the International Monetary Fund and official bilateral creditors under the financing package.

^e Percent of exports of goods and services (including workers' remittances).

SOURCE: International Monetary Fund (2000a).

after the devaluation that there was a massive exodus of these banking-sector flows. Capital outflows from NRBA were \$3.5 billion in the first half of 1997, more than \$2 billion in the second half of the year, and about \$2.7 billion for all of 1998. According to some reports, Thailand was 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, a process that involved over 80 percent of the total value of foreign loans (*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 sovereign-risk credit ratings, first, from Prime 2 to Prime 3 on October 2, 1997, and then, to below prime (investment grade) on November 28, 1997. Standard and Poor's downgraded Thailand's currency ratings on October 24. These downgrades intensified the already bearish conditions, causing capital reversals from the banking sector to increase in 1998 (Table 19). To the extent that the NRBA are essentially bank deposits, the severe postdevaluation reversals in capital flows can be understood to be overwhelmingly attributable to withdrawals by depositors and creditors—that is, bank-related. The abrupt turnaround in private-capital flows was well in excess of the official disbursements through the IMF-supported rescue package and the depletion of international reserves. This implied the need for a sudden and drastic adjustment in the current-account deficit (Figure 17), the inevitable consequence of which was a sharp drop in output (Figure 9).

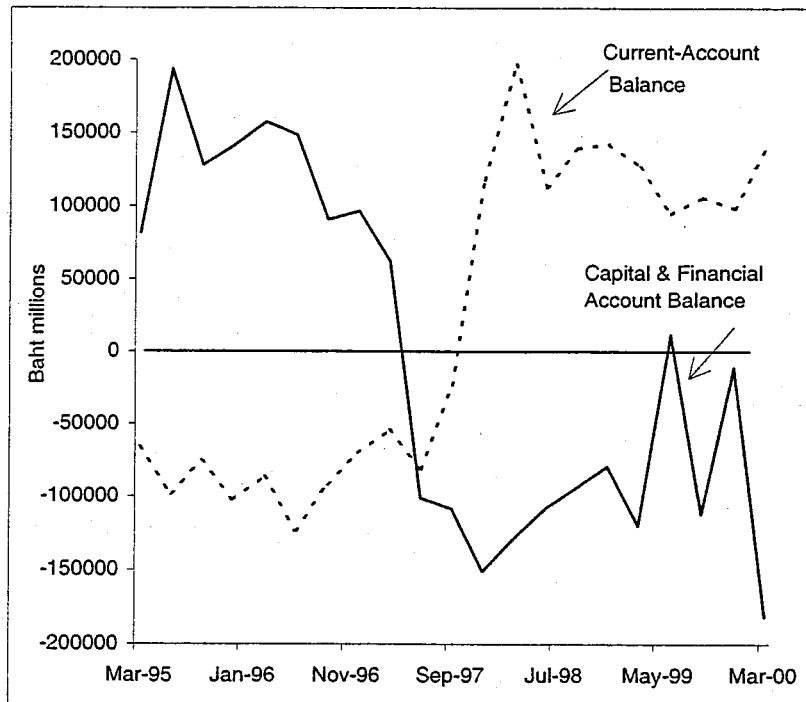
TABLE 19
COMPOSITION OF NET PRIVATE-CAPITAL INFLOWS TO THAILAND, 1997-1999
(US\$ billions)

	1997		1998				1999			
	Year	Year	Q1	Q2	Q3	Q4	Q1	April ^a	May ^a	
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	
Recapitalization	0	1,986	952	1,172	0	0	21	0	974	
Bangkok International Banking Facility	-1,913	-9,634	-2,125	-2,118	-1,924	-3,479	-2,123	-1,111	-525	
Nonbanks	-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	

^a Excluding \$2.1 billion in bank recapitalization.

SOURCES: Bank of Thailand; CEIC database.

FIGURE 17
BALANCE OF PAYMENTS IN THAILAND, 1995–2000



SOURCES: Bank of Thailand; CEIC database.

Illiquidity or Insolvency?

Although most observers agree that weaknesses in the financial system played a key role in the East Asian crisis, there has been limited agreement about whether the difficulties were attributable to the insolvency of financial institutions or to their illiquidity. The consequences for economic policy will vary greatly, depending on what the problem is perceived to be.³ The Thai data suggest that 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

³ For instance, as noted by an anonymous referee, "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." When banks are insolvent, however, allowing them to continue operating without restructuring will magnify market distortions and the concomitant fiscal costs of bailout and rehabilitation.

the Bangkok Bank of Commerce, led to the currency crisis by way of a monetary disequilibrium caused by an FIDF-induced bailout. Reflecting this pattern, finance-company borrowing rose with respect to commercial-bank deposits of similar maturity between early 1996 and mid-1997. Since the devaluation, however, the premium has been declining (IMF, 2000b), suggesting a general worsening in the condition of the overall financial system brought about by the illiquidity caused by an international bank panic. The Bank of Thailand (1999, p. 6) notes that “in 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” (emphasis added).⁴ This distinction between the predevaluation insolvency of a group of finance companies and a postdevaluation systemic liquidity crisis culminating in financial and economic collapse is further confirmed by the time line of the problems faced by the Thai finance companies and commercial banks.

Prior to the IMF stand-by arrangement in August 1997, the Bank of Thailand recognized the need to segregate solvent or viable financial institutions from nonviable ones. Thus, the Bank of Thailand and the Ministry of Finance (MOF) announced that ten (unnamed) finance companies would need to raise capital by March 1997 in order to avoid ceding company control to the FIDF. Public confidence in finance companies eroded between March and June 1997 amid deposit withdrawals by the public (but not an outright panic of the entire financial system). The FIDF provided liquidity support to sixty-six of a total of ninety-one finance companies. The Bank of Thailand suspended sixteen finance companies in June (seven of which were from the March list). It is notable that 43 percent of the loans extended by these suspended companies were to the real-estate sector (IMF, 2000b).

⁴ The distinction between *solvency* and *liquidity* is very fine. As Lindgren et al. (1999, p. 34) note with regard to the Thai debacle, “the 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.”

As the economic recession intensified, the FIDF provided blanket guarantees to banks and the remaining finance companies in an effort to maintain public confidence in the financial system. The Ministry of Finance and Bank of Thailand also issued a joint statement specifying measures to strengthen the financial system and announced that no additional finance companies would be suspended beyond the initial sixteen. Such blanket guarantees clearly entailed very large sovereign contingent liabilities. All of 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 fifty-eight suspended finance companies and to oversee their liquidation (all but two were shut down). An asset-management company (AMC) was also established and entrusted with the responsibility of bidding for the lowest-quality assets as a buyer, or bidder, of last resort; this arrangement was meant to prevent a fire sale of the finance companies' assets, which, in turn, could undermine the intrinsic collateral values of the entire financial system. As capital outflows accelerated, some weaker banks—the Bangkok Metropolitan Bank, First Bangkok City Bank, and Siam City Bank—were intervened in December 1997 and January 1998. These three banks were collectively responsible for 10 percent of banking-system deposits. Other banks (Thai Danu and Bank Asia) were acquired later in the year. Seven more finance companies were intervened in May 1998 and merged with a state-owned finance company, and two other banks (Union Bank of Bangkok and Laem Thong Bank) were intervened in August 1998. These suspensions, mergers, and interventions continued into 1999. The existing financial institutions were encouraged to restructure their holdings of corporate debt. Table 20 documents the extent of domestic financial-system consolidation. The government also introduced measures to recapitalize banks, privatize intervened banks, improve prudential regulations and supervision, and formulate bankruptcy and foreclosure laws (see Moretti, 1998, Lindgren et al., 1999, and IMF, 2000b, for detailed discussions of the East Asian financial-restructuring programs). Unlike finance companies, which were directed by the single public asset-management company, banks were individually responsible for establishing their own asset-managing institutions to remove nonperforming loans from the bank balance sheets. The FRA auctioned most of the assets of the closed institutions and recovered nearly 180 billion baht by mid-1999 (MOF, 1999).

TABLE 20
CONSOLIDATION OF THE FINANCIAL SYSTEM IN THAILAND, JUNE 1997 AND DECEMBER 1999

	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
Bank of Thailand 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	

^a Dollar figures are at a constant exchange rate of 37 baht to the dollar. Other financial institutions (foreign bank branches and Bangkok international banking facilities) account for the residual 22 to 25 percent of total assets.

^b Figures on assets are for end of September 1999.

^c This figure 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: International Monetary Fund (2000b).

Consequences of the Systemic Liquidity Crisis Following the Devaluation

Equity markets are often seen as leading barometers of economic activity.⁵ Stock-market data reveal that the overall market index, which had been on a downward trend since early 1996, reached a trough in mid-1998 before rebounding. Banking stocks, although also at lows in mid-1998, declined much more steeply, indicating continued investor pessimism about the prospects of the financial institutions (Figure 10). The stocks related to real estate (property development), which had started falling much earlier, during the third quarter of 1994, remained sluggish even into mid-1999. As would be expected, given the considerable real-estate exposure of the finance companies, these trends were broadly replicated by the finance-company stocks. More direct evidence of the magnitude of the problems in the financial sector is proxied by the fiscal costs of restructuring (Table 21). Such estimations of fiscal

TABLE 21
FISCAL COSTS OF RESTRUCTURING AND OF NONPERFORMING
LOANS IN THAILAND, 1997–1999
(Percent of 1998 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
Memorandum items:	
Fiscal deficit	5.0
Interest rate used (%)	3.0
Revenue	18.4
Nonperforming loans (NPLs): ^a	
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

^a Nonperforming loans are measured on a three-month basis; official estimates include assets carved out for sale by the asset-management companies.

SOURCES: Asian Development Bank (2000); Claessens, Djankov, and Klingebiel (1999).

⁵ This section draws on reports by the Asian Development Bank (2000) and the International Monetary Fund (2000b).

costs are undoubtedly fraught with difficulties, because 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 about 30 percent of GDP.⁶ This figure is much lower than the estimated costs in Indonesia, at 58 percent of GDP, but much higher than those in Malaysia and South Korea, at 10 and 16 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. The debate about what constitutes a “credit crunch” and how it should be measured is controversial (see Stiglitz and Furman, 1998; Lane et al., 1999; Lindgren et al., 1999; IMF, 2000b). This study does not address those issues, recognizing only that credit growth reflects both the demand for and supply of credit. Available evidence, however, points to a high and growing risk aversion on the part of Thai financial institutions toward lending, because they have been burdened by large NPLs and remain undercapitalized (IMF, 2000b). This burden 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 being left with the private banks themselves (Table 22).

The adoption of international banking standards and the tightening of regulatory requirements in the midst of the crisis (aimed at reducing the vulnerability to future crises), along with the consolidation or contraction of the domestic financial system, seems to have added to the inability or unwillingness of financial institutions to return to “normal” lending operations. The financial institutions in Thailand have seemed keener on trying to recover as much of their outstanding loans as possible (through foreclosing on assets that creditors had pledged as collateral), 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 after January 1998 (Figure 13). Financial institutions have also been reluctant to engage in the work-outs of weak but potentially viable corporations, because this activity would inevitably increase balance-sheet holdings of NPLs. A simultaneous tightening of regulatory

⁶ Asher (2000) discusses the fiscal implications of the regional crisis and of the fiscal reforms needed for sustained growth in the crisis-hit economies.

TABLE 22

SUMMARY OF MEASURES TO ADDRESS THE FINANCIAL CRISIS IN INDONESIA, MALAYSIA,
THE PHILIPPINES, SOUTH KOREA, AND THAILAND

Measures	Indonesia	Korea	Malaysia	Philippines	Thailand
Emergency					
Liquidity support	Yes	Yes	Yes	Yes	Yes
Introduction of a blanket guarantee	Yes	Yes	Yes	Yes	Yes
Institutional					
Establishment of an overarching 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 framework to restructure corporate debt	Yes	Yes	Yes	No	Yes
Operational autonomy of restructuring agencies	Limited	Yes	Yes	n.a.	n.a.
Restructuring					
Interventions in weak or insolvent financial institutions, including:	Yes	Yes	Yes	Yes	Yes
Mergers of weak institutions	Yes ^d	Yes	Yes	Yes	Yes ^d
Closures 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 to encourage corporate restructuring	Yes	Yes	Yes	Yes	Yes
Steps to improve prudential supervision and regulation	Yes	Yes	Yes	Yes	Yes

^a By means of a steering committee chaired by the central banks.

^b The powers of preexisting asset-management companies (AMCs) were substantially increased.

^c The FRA was established to illiquidate fifty-six closed finance companies; the AMC was meant to address residual FRA assets.

^d Mergers of government-owned intervened institutions.

^e Foreign banks may purchase up to a 30 percent stake.

SOURCE: Lindgren et al. (1999).

changes in equity markets exacerbated the credit situation. Most of these involved stringent requirements for new entrants. These requirements have had a particularly detrimental impact on the small and medium-sized enterprises that dominate economic activity in Thailand.

There was, not surprisingly, a severe decline in investment and output in 1997–98. Domestic demand overall experienced an even sharper decline, owing 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 a general heightened economic insecurity of households. Specifically, the Bank of Thailand's composite consumption index fell sharply in mid-1997, with consumer durables being especially hard hit. Although investment demand fell across the board, construction was worst affected, its share falling from 50 percent of total investment before the crisis to just 35 percent by 1999. Of course, there was an added dimension in Thailand, namely, the unhedged nature of the external liabilities of corporations. Thus, the rise in the baht value of external debts following the initial devaluation substantially worsened the balance-sheet positions of domestic corporations and banks. Indeed, Calvo (1998) and Calvo and Reinhart (1999) remind us that the central difference between financial crises in emerging and industrial markets is that output did not collapse in the latter.⁷

Although detailed discussions of the macroeconomic trends in Thailand during 1999 and 2000 are well beyond the scope of this study, it should be noted that the stabilization of exchange rates following a gradual return in investor confidence (or at least an abatement of the acute pessimism) allowed for a reduction in interest rates (see the Bank of Thailand's *Quarterly Bulletin* and the World Bank's quarterly *Thailand Economic Monitor*). The Thai fiscal-policy stance, too, has been highly supportive of economic recovery, although this stance has resulted in a sustained fiscal deficit since 1996 and implications for the

⁷ The contractionary impact of a devaluation is 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 relation between real-exchange-rate depreciations and economic activity in East Asia even before the crisis. Bird and Rajan (2000) discuss the issue of contractionary devaluation in the context of the Thai crisis, and Krugman (1999b) revisits the issue and discusses policy options in light of the East Asian crisis.

sustainability of public debt (IMF, 2000b). Increased consumer confidence and a reduction in the value-added tax rate helped boost consumption demand. Export demand was buoyed by a depreciated currency, strong growth in the United States and Europe, and the economic recovery of regional trading partners. Investment demand remained depressed, however, until late 1999 (Table 23 and Figure 7), owing to the existence of excess capacity (in particular, in the construction sector) and to corporate-debt overhang.

TABLE 23
COMPONENTS OF GDP GROWTH IN THAILAND, 1991–1999
(Percent)

	1991–1994 ^a	1994	1995	1996	1997	1998	1999
Real GDP growth	8.5	9.0	8.9	5.9	-1.8	-10.0	4.0
Domestic demand	8.2	9.1	9.1	7.2	-9.5	-24.2	7.9
Consumption	7.5	7.9	7.3	7.5	-1.2	-12.0	5.5
Private	7.6	7.9	7.6	6.8	-0.8	-14.0	5.0
Public	6.5	8.2	5.4	11.9	-3.6	1.2	8.7
Gross investment	9.5	10.9	11.8	6.8	-21.7	-46.7	15.0
Fixed investment	10.0	11.4	11.0	7.4	-20.3	-38.1	3.0
Private	8.0	8.8	10.5	3.4	-29.7	-44.3	-1.2
Public	20.1	22.5	12.6	21.9	9.2	-25.7	9.3
Exports of goods and services	14.0	14.2	15.5	-5.5	8.3	7.9	9.6
Imports of goods and services	12.4	15.7	19.9	-0.5	-11.7	-24.9	22.3
Contributions to growth, of which:							
Consumption	4.8	5.1	4.6	4.7	-0.7	-7.7	3.5
Private	4.3	4.4	4.2	3.7	-0.4	-7.8	2.7
Public	0.6	0.7	0.4	0.9	-0.3	0.1	0.8
Fixed investment	4.0	4.6	4.5	3.1	-8.6	-13.2	0.7
Private	2.6	2.9	3.4	1.1	-9.6	-10.2	-0.2
Public	1.4	1.7	1.1	2.0	0.9	-3.0	0.9
Change in stocks ^b	-0.5	0.3	2.4	0.5	-1.6	-3.8	2.7
Net exports	0.2	-1.0	-2.6	-2.3	9.2	14.7	-2.9

^a Average.

^b Including statistical discrepancy.

SOURCE: International Monetary Fund (2000b).

6 CONCLUDING REMARKS

Thailand has developed a notoriety of sorts as the epicenter of the 1997–98 East Asian crisis, with the devaluation of the Thai baht in July 1997 marking the beginning of the regional financial and economic collapse. This study has concentrated on determining the extent to which the existing currency-crisis literature might be useful in explaining the Thai crisis of 1997–98. The evidence suggests that the Thai collapse is most appropriately seen as consisting of two distinct but related components. First, a fundamentals-based crisis arose 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 2, 1997, led to an outright currency and economic collapse by the end of 1997 and into 1998. Using the terminology of Flood and Marion (1998), Thailand was originally “pushed” into devaluation by secularly deteriorating fundamentals, but it was then “pulled” into an outright economic collapse by an international bank panic.¹

Informed observers have recognized that realistically (if not theoretically), the bank-panic model cannot stand on its own but, rather, requires the existence of “bad” fundamentals (Corsetti et al., 2001).² The argument in the present study is that the initial crisis was the trigger that led to an outright collapse. To be more specific, although the size of Thailand’s current-account sustainability, real-exchange-rate overvaluation, and export and growth prospects all showed signs of weakness, the initial devaluation was a direct result of the underlying monetary and financial imbalances in Thailand. Thailand’s heavy reliance on a bank-based financial system and the high leverage of corporations made its economic distress particularly acute.

¹ Alternatively, as Dollar and Hallward-Driemeir (2000) note, Thailand initially suffered a devaluation because of “bad policy,” but it was then led into an outright collapse because of “bad luck” (caused by a confidence crisis). This bad luck, however, was not independent of the domestic policy regime, because premature financial liberalization in the absence of prudential regulation and a soft dollar peg were a significant part of the reason, precrisis, for the rapid buildup of large-scale, short-term uncovered external debt in Thailand, making the country susceptible to a postcrisis financial panic.

² Indeed, Chang and Velasco (1998) attempted to couch the bank-panic model within a second-generation genre of models in which “bad” fundamentals are necessary but not sufficient to cause a crisis.

Although the important distinction between the initial devaluation and the ensuing financial and economic collapse appears to be missing from the debate about the causes and consequences of the East Asian crisis, both Calvo and Mendoza (1996) and Sachs, Tornell, and Velasco (1996c) conclude that the 1994–95 Mexican crisis should be seen in terms of these two distinct stages.³ It is important to emphasize, however, that the findings of the present study pertain solely to Thailand; the crises situations of the other East Asian economies have yet to be carefully examined. The conclusion drawn by Krugman (1999a, pp. 8–9), therefore, may well be right, 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.” But this conclusion remains to be proven, and that can best be done by detailed and data-intensive country studies of the kind undertaken in this study.

³ In the case of Mexico, though, the emphasis is more on equity flows than on bank lending. There also remains some disagreement as to whether the initial devaluation of the peso was self-validating (Sachs, Tornell, and Velasco, 1996c) or fundamentals-based as in Krugman, Flood, and Garber (Calvo, 1996a; 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, might precipitate a full-blown liquidity crisis.

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The work of the International Economics Section is supported in part by the income of the Walker Foundation, established in memory of James Theodore Walker, Class of 1927. The offices of the Section, in Fisher Hall, were provided by a generous grant from Merrill Lynch & Company.

ISBN 0-88165-260-1

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