

The Asian Financial Crisis

Causes, Contagion and Consequences

edited by

Pierre-Richard Agénor, Marcus Miller
David Vines and Axel Weber



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1 The role of macroeconomic and financial sector linkages in East Asia's financial crisis

PEDRO ALBA, AMAR BHATTACHARYA, STIJN CLAESSENS,
SWATI GHOSH AND LEONARDO HERNANDEZ

1 Introduction

Private capital flows to developing countries increased sixfold over the years 1990 to 1996. These large inflows were not simply an independent and isolated macroeconomic shock but rather the manifestation of structural changes in the world economic environment and in developing countries themselves. The structural changes resulted in the transition by many countries from near financial autarky to fairly close integration with world capital markets. The capital inflow phenomenon, and the associated need to intermediate efficiently large amounts of foreign capital and address potential macroeconomic overheating, were the direct products of the transition between these polar financial integration regimes.

Countries in East Asia were at the forefront of the worldwide movement toward increased financial integration (see World Bank, 1997) and are good examples of both the benefits, and the risks, of integration. East Asian countries fared quite well during the initial stages of this integration process, especially in comparison with many developing countries outside the region. Indeed, in many ways lessons to be applied elsewhere regarding the appropriate adjustment to large capital inflows have been drawn from the experiences of East Asia (for example, Corbo and Hernandez, 1996). Countries in the region also weathered the storm associated with the Mexican currency crisis of December 1994 in relatively good form, suggesting that the policies they adopted to manage inflows also proved effective in rendering them relatively less vulnerable to a financial shock that created serious disruptions elsewhere. Nonetheless, the summer of 1997 and events since have made clear that this view could no longer be sustained. The crisis that struck Thailand, and the rapidity with which it spread to other countries in East Asia, made clear that all was not well and that the management of capital flows had not been without risks. In the new, more integrated environment, private capital could potentially flow

out as well as in, with asymmetric effects on the domestic economy of the recipient countries.

There are many explanations and typologies that have been put forward to explain the onset of this financial crisis (Corsetti, Pesenti and Roubini, 1998; Feldstein, 1998; IMF, 1997; Krugman, 1998, Radelet and Sachs, 1998a, 1998b; Sachs, Tornell and Velasco, 1996; and chapters 2–4 in this volume, among others). These papers provide typologies of different types of financial crises that may be applicable to East Asia, and try to differentiate between them. In this chapter, we take a different focus, and analyse the vulnerability of the countries most affected by the crisis, and the proximate causes of the build-up of these vulnerabilities during the 1990s. Hence, we do not try to differentiate between the various types of financial crises, to identify the triggers of the crisis, or to explain its subsequent evolution. We also do not discuss the international aspects of the crisis, in particular the role played by the lack of due diligence by foreign borrowers and investor herding, but rather focus on the domestic aspects.¹ Finally, we also do not address whether the macroeconomic policies pursued and other weaknesses represented fundamental flaws and made a financial crisis inevitable, or whether there was a financial panic in all or any particular country. While we believe that panic played a role, we also believe that the build-up of vulnerability was very large and allowed the crisis to take hold.

Our basic assertion is that the build-up of financial vulnerabilities in East Asia was associated with reinforcing dynamics between capital flows, macro policies and weak financial and corporate sector institutions. In its basic element, similar to the Chilean crisis of the early 1980s, the growing vulnerability can be attributed to the private investment boom and surge in capital inflows, in turn based on the region's success – particularly its strong economic fundamentals and structural reforms of the 1980s. But the pace and pattern of investment in the mid-1990s, and the way in which it was financed, made some countries vulnerable to a loss of investor confidence and a reversal in capital flows. This growing vulnerability was the result of private sector decisions rather than public sector deficits. These private sector activities took place, however, in the context of government policies that did not do enough to discourage excessive risk-taking, while providing too little regulatory control and insufficient transparency to allow markets to recognise and correct these problems. At the root of the problem were weak and poorly supervised financial sectors against the backdrop of large capital inflows. Equally, inadequate corporate governance and lack of transparency masked the poor quality and riskiness of investments. In addition, although macroeconomic policies were generally sound, pegged exchange rate regimes and implicit guarantees tilted incentives toward excessive short-term borrowing and capital inflows.

Table 1.1 *Magnitude and composition of capital inflows, 1985–1996 (per cent of GDP)*

	LAC ^a			ASEAN-4 ^b		
	1985–8	1989–92	1993–6	1985–8	1989–92	1993–6
Net long-term capital flows	1.3	1.7	4.3	2.0	4.8	6.9
– Net official flows	0.5	0.3	0.0	1.2	1.3	0.4
– Net private flows	0.8	1.4	4.4	0.8	3.5	6.6
Bank/trade lending	0.3	0.0	0.5	–0.3	0.9	0.8
Portfolio bond	–0.2	0.2	1.2	0.2	–0.1	1.4
FDI	0.7	0.9	1.6	0.9	2.3	2.4
Portfolio equity	0.0	0.3	1.1	–0.1	0.4	2.0
IMF credit	0.0	0.0	0.1	0.1	–0.1	0.0
Other private flows	–0.7	0.7	–1.0	0.3	2.0	–0.1
of which: short-term debt	–0.1	0.7	0.6	0.1	2.0	2.3

Notes: ^aLAC = Latin American countries.

^bASEAN 4 = Indonesia, Malaysia, Philippines and Thailand.

Source: World Bank data.

The chapter starts in section 2 with a short overview of capital flows and macroeconomic developments in the region prior to the crisis. Section 3 explains a simple analytical framework of the macro-financial linkages and how they can exacerbate vulnerabilities, then goes on to describe the manifestations of vulnerability in East Asia, those that concern the economy as a whole and the financial sector in particular. These two sections set the stage for a more detailed discussion in the remainder of the chapter on the macroeconomic policies and financial and corporate factors that led to the build-up of the vulnerabilities. Sections 4 and 5 review in detail the macroeconomic policies and financial and corporate policies and institutional weaknesses, respectively.

2 Overview of capital flows and economic developments in East Asia

East Asia led the developing world in the resurgence of private capital flows in the late 1980s. It quickly emerged as the most important destination for private capital flows as its share of total capital flows to developing countries increased from 12 per cent in the early 1980s to 43 per cent during the 1990s. During this period, the composition of flows to East Asian countries also changed (table 1.1). In the second half of the 1980s, commercial bank

Table 1.2 *Investment, savings and capital flows, 1985–1996 (per cent of GDP)*

	LAC ^a			ASEAN-4 ^b		
	1985–8	1989–92	1993–6	1985–8	1989–92	1993–6
Investment	20.5	20.6	20.1	25.7	32.6	35.0
National savings	20.6	19.6	17.6	23.9	28.6	30.3
– Private	16.5	16.2	15.1	13.2	20.0	20.4
– Public	4.1	3.3	2.5			
Current account deficit	1.0	1.1	2.4	1.1	3.8	4.6
Total capital inflows	0.7	2.4	3.5	2.2	6.7	6.8
Reserve accumulation	–0.3	1.3	1.0	1.0	2.9	2.2

Notes: ^a LAC = Latin American countries.

^b ASEAN 4 = Indonesia, Malaysia, Philippines and Thailand.

Source: World Bank data.

lending was replaced by FDI. In the 1990s, portfolio flows (both bond and equity) expanded rapidly as did short-term borrowing – portfolio flows amounted to 3.4 per cent of GDP during 1993–6, while short-term borrowing an additional 2.3 per cent of GDP. Whereas the dominant role of FDI distinguished East Asia from Latin America in the late 1980s and early 1990s, in the more recent period borrowing was skewed more towards short-term flows than was the case for Latin America.

Another important characteristic of private capital flows to East Asia was that, unlike Latin America, it was preceded rather than followed by a surge in investment (table 1.2). In the second half of the 1980s and the early 1990s, the bulk of the increase in investment was financed by a corresponding increase in national savings. During the more recent period, however, a higher fraction of the increase in investment was financed abroad. Nevertheless, the magnitude of private capital flows was much higher than the amount of foreign savings absorbed, leading to substantial reserve accumulation. There was considerable variation, however, at the individual country level: Malaysia and Thailand received the largest magnitude of capital inflows, cumulative in excess of 30 per cent of GDP; the Philippines also received substantial inflows during 1993–6; but Korea did not receive more than 15 per cent of GDP. In contrast, in Latin America there has not been an investment boom – the investment ratio has remained constant since the mid-1980s – but a decrease in savings, although again important differences among countries exists.

During the inflow periods, macroeconomic policies in most East Asian countries shared three broad elements in common:

- First, many adopted an exchange rate regime oriented toward enhanced competitiveness – i.e. the achievement of a real exchange rate target to complement the outward orientation embodied in structural policies. This policy was implemented through step devaluations in several countries in the region during the mid-1980s, followed in some countries by continuous depreciation, in some cases more than offsetting the differential between domestic and foreign inflation. In East Asia, therefore, unlike in many countries of Latin America, nominal exchange rate management during the capital inflow episode was not primarily devoted to the establishment of a nominal anchor. This exchange rate policy indeed seems to have been relatively successful in avoiding currency overvaluation from the mid-1980s to the mid-1990s.
- Second was the adoption of a tight medium-term stance for fiscal policy. Overall public sector budgets in the region, which had exhibited deficits not out of line with those of other middle-income developing countries at that time, moved steadily into surplus after the mid-1980s. By the late 1980s, several countries in the region had achieved sizable fiscal surpluses.² As the economies of these countries grew and the tight fiscal stance restrained (and at times reversed) the growth of public sector debt, public sector debt/GDP ratios fell throughout the region. As a result, by the mid-1990s several countries in East Asia had achieved ratios of debt/GDP substantially below those of many industrial countries. This fiscal stance also promoted the depreciation of the real exchange rate, and helped prevent the emergence of exchange rate misalignment.
- Third, especially once the sizable fiscal surpluses were achieved in the early 1990s, countries began to rely more on monetary policy to prevent over-heating. Countries placed heavy reliance on monetary policy as a short-run stabilisation instrument, varying the intensity of sterilised intervention in the foreign exchange market in accordance with domestic macroeconomic needs. On the structural side, the economies of East Asia continued in the 1990s the process of liberalisation that had begun in the mid-1980s. Trade liberalisation, capital account liberalisation and especially financial sector liberalisation all proceeded during the inflow period.

This mix of structural and macroeconomic policies proved attractive to foreign capital and, in combination with tight fiscal policy, was largely successful in preventing macroeconomic over-heating, at least early in the inflow period. The World Bank (1997) found that countries that relied more on fiscal policy to prevent over-heating during the capital-inflow period were also more successful in avoiding excessive real exchange rate appreciation and achieved a mix of aggregate demand oriented toward investment

rather than consumption. This link can be interpreted naturally as the outcome of the policy mix undertaken. Since the effects of tight money tend to fall disproportionately on investment, an outward-oriented strategy in which tight fiscal policy supports a depreciated real exchange rate exerts a systematic effect on the composition of aggregate demand favouring investment over consumption. During this period, East Asian countries saw sharp increases in their investment rates (figure 1.1). For example, in Indonesia investment/GDP rose from an average 25 per cent during 1985–9, to 32 per cent during 1990–6, while in Korea the investment rates rose from an average of 30 per cent to 37 per cent during the same period. Malaysia and Thailand saw even larger increases – from 26 per cent to 40 per cent, and from 30 per cent to 42 per cent of GDP, respectively.

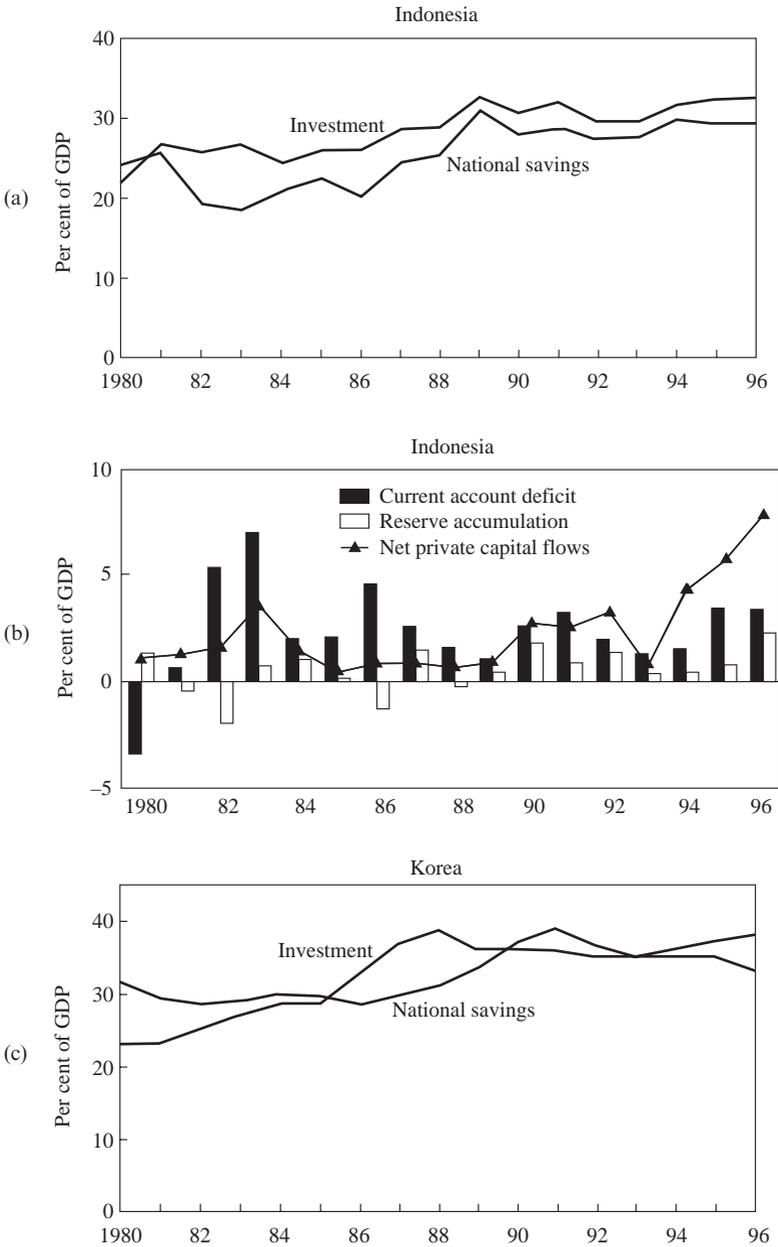
By 1994–6, however, the acceleration in the growth of domestic demand, that was accompanied by an increase in net capital inflows, led to the emergence of demand pressures in all the four countries that were hardest hit by the crisis – Indonesia, Korea, Malaysia and Thailand. In all four countries the acceleration in the growth of domestic demand reflected both the pick-up in the growth of investment and to a lesser degree in consumption, although the relative mix differed across countries. But, in all four countries, with the sharp pick-up in the contribution of domestic demand, the contribution of the external sector to GDP growth turned negative during the period.

3 The build-up in vulnerability: a simple analytical framework

The growing vulnerability of East Asia was rooted in the private investment boom beginning in the late 1980s just described, but two factors amplified these trends and the build-up of demand pressures:

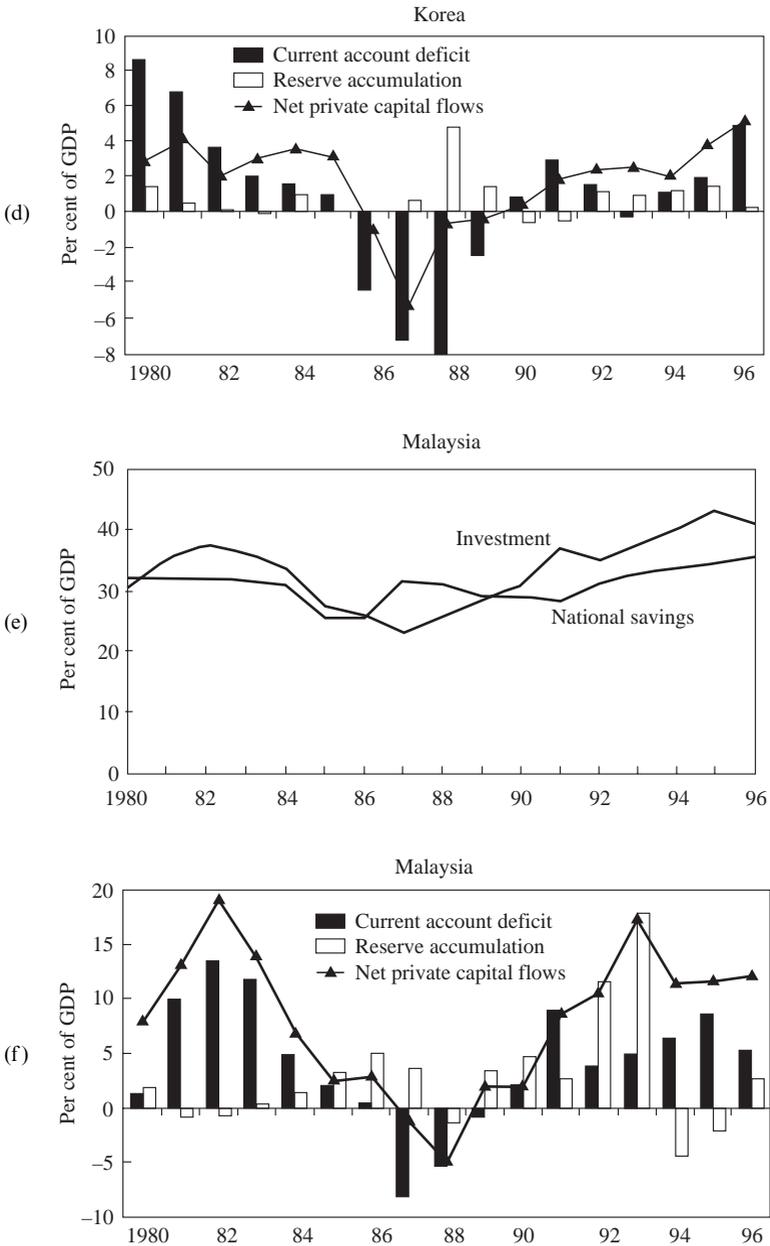
- First, the process of external financial integration, and the surge in private capital inflows that accompanied it, worked as an additional force to reinforce the upswing in the domestic business cycle. The increase in private capital inflows, which in the case of East Asian countries was motivated mainly for investment purposes, provided the additional liquidity that allowed banks and non-bank financial intermediaries to increase lending, despite efforts to sterilise inflows. Capital flows also contributed to increases in asset prices. Furthermore, the policy response to the surge in inflows, which increasingly relied on tight monetary policy and heavy sterilisation, provided further impetus to these flows, added to the process and aggravated the fragility in the corporate (and therefore) banking sector through sustained high interest rates.

Figure 1.1 *Macroeconomic developments in Asia, 1980–1996*



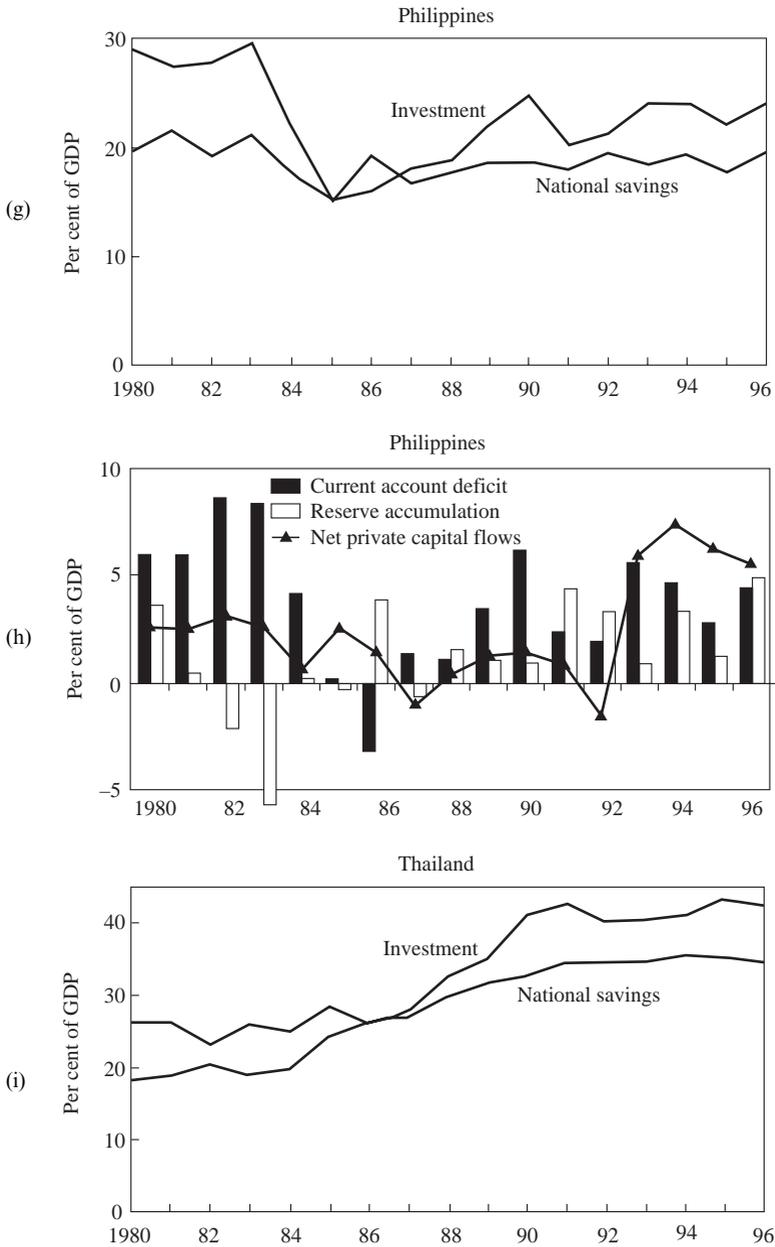
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Figure 1.1 (cont.)



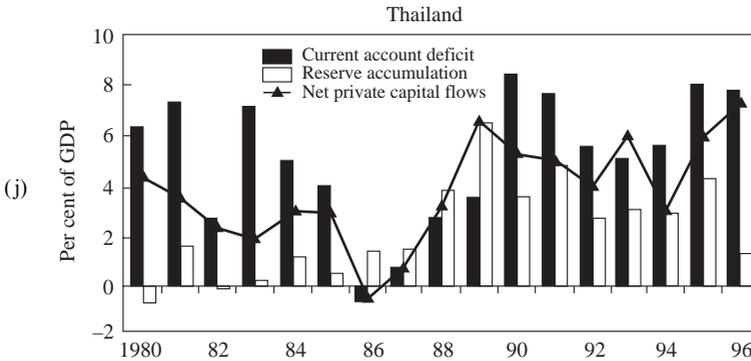
Source: World Bank data.

Figure 1.1 (cont.)



Source: World Bank data.

Figure 1.1 (cont.)



Source: World Bank data.

- Second, the high degree of segmentation of financial markets, and the growing importance of banks and non-bank financial intermediaries, allowed agents who could not directly borrow abroad to finance investments and increased expenditures through domestic borrowing. Indeed, banks dominate the financial systems in East Asia and credit plays an important role as the transmission channel of monetary policy. Except in Malaysia, equity and bond markets play a minor role in financing new investment and firms depend heavily on bank credit. Securities outstanding represent a much smaller share of financial intermediation than in the USA and other industrial countries (World Bank, 1997). In Malaysia, the capitalisation of the equity market is very large, but accounting conventions account for some of the market size. Table 1.3 illustrates the importance of the credit channel in East Asia through correlation coefficients between changes in economic activity and changes in credit and money during 1990–6. In all four Asian countries (except, perhaps, Korea) the correlation coefficients suggest that credit plays a more important role than money, although the lag structure varies between countries. Credit also seems to play a more important role in East Asian than in industrial countries in the sense in the latter that credit and money are broadly of equal importance. The credit channel thus played an important role in exacerbating the booms in asset prices, consumption and investment in East Asia.

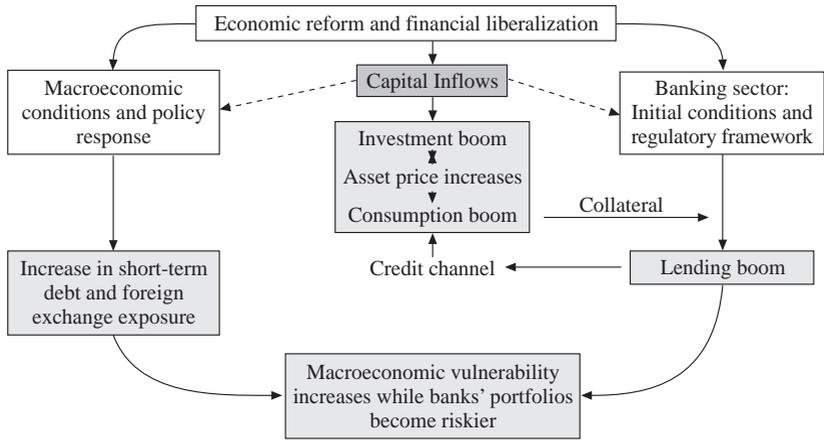
Figure 1.2 illustrates the several self-reinforcing channels at work, and how the combination of weak initial conditions – in particular, concerning the quality of the intermediation process in the recipient countries – and macro policies can lead to a rapid build-up of macro financial fragility. For instance, the inflows that initially occur because of the economic reforms – and improved prospects – can lead to a lending boom which, in turn, can

Table 1.3 *The credit channel in East Asia: correlation^a between output and money, and output and credit^b*

	Money ^c		Credit ^c	
	Contemporaneous	Lagged One Quarter	Contemporaneous	Lagged One Quarter
Canada	-0.075	0.222	0.359	0.248
Germany	-0.012	0.360	0.159	0.333
USA	-0.036	0.205	-0.107	0.206
Indonesia ^d	0.156	0.054	0.400	0.168
Korea	-0.117	0.143	0.12	0.088
Malaysia	-0.039	-0.130	0.277	0.011
Thailand ^d	0.112	0.356	0.374	0.455

Notes: ^a Simple correlation coefficients of quarterly first differences during 1990–6.
^b Variables are in real terms and have been seasonally adjusted.
^c Credit includes both banks and non-bank financial institutions, except for Indonesia where it only comprises banks; money is M1.
^d The output variable is industrial production, except for Indonesia which refers to GDP, and Thailand which refers to electricity consumption (a proxy for output).
Source: Data are from IMF: International Financial Statistics, and country sources.

Figure 1.2 *Self-reinforcing dynamics resulting in increased vulnerability*



finance a real-estate boom and asset prices increases. If these assets are used as collateral for additional loans, then this will reinforce the increase in asset prices. The greater availability of credit will also accelerate economic activity, validating and reinforcing the expectations about the recipient country. The latter can lead to a surge in consumption, as agents believe

that their permanent income and wealth has increased. In sum, the initial surge in inflows can put in motion a process in which the economy starts growing faster while economic agents – firms and households – increase their leverage. However, if the investment that is being financed is *ex post* of poor quality, then the process will prove to be unsustainable and a downward correction in asset prices will occur. The latter depends on the quality of the banking system – which depends in part on the supervisory and regulatory framework – and management in the corporate sector.

3.1 Dimensions of vulnerability

These self-reinforcing dynamics led to three key weaknesses in East Asia:

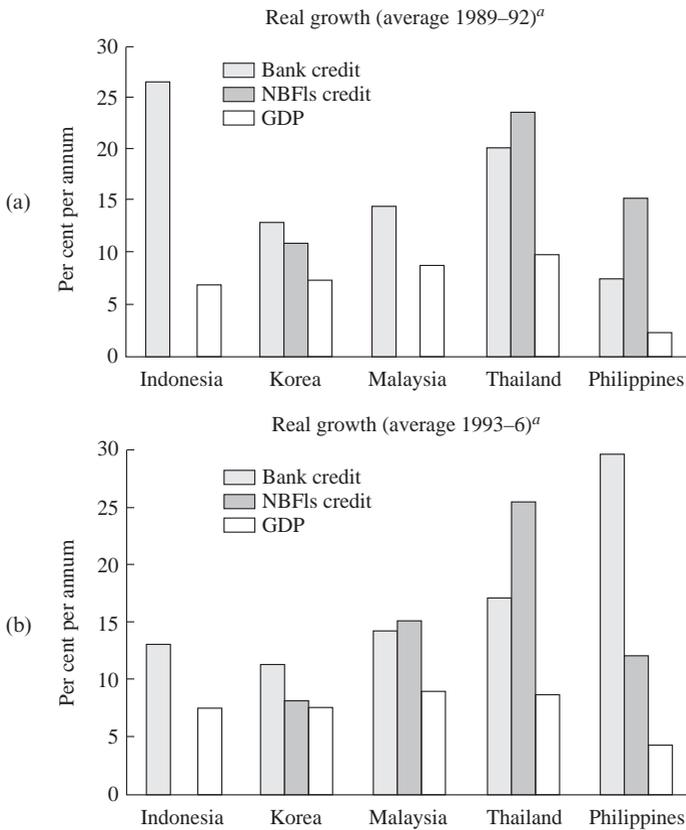
- (1) increased banking sector fragility associated with lending and asset booms and rising exposure to risky sectors
- (2) high leverage both economywide and in many individual firms
- (3) currency and maturity mismatches that left some economies highly vulnerable to reversals in capital flows.

There were, therefore, two dimensions to this growing vulnerability. First, growing contingent liabilities that were not adequately recognised before the crisis. Second, increased risks of an external liquidity crunch primarily because a large build-up of external short-term debt, much of which was unhedged. In addition, there was some deterioration in economic fundamentals during 1995–6, in particular, widening current account deficits and slowdowns in productivity and export growth, although this started from strong initial conditions. Nonetheless, these trends may have led to growing perceptions among investors about a misalignment of exchange rates, in particular in Thailand, where the export slowdown in 1996 was very sharp and protracted.

3.2 Increasing banking fragility

Financial liberalisation, through decreasing reserve requirements, resulting increases in financial savings and surges in foreign capital inflows, led throughout East Asia to increases in monetary aggregates. In turn increased liquidity and monetisation resulted in a generalised surge in bank and non-bank financial institution (NBFI) lending, although the amplitude and duration of these cycles, as well as their apparent relationship with

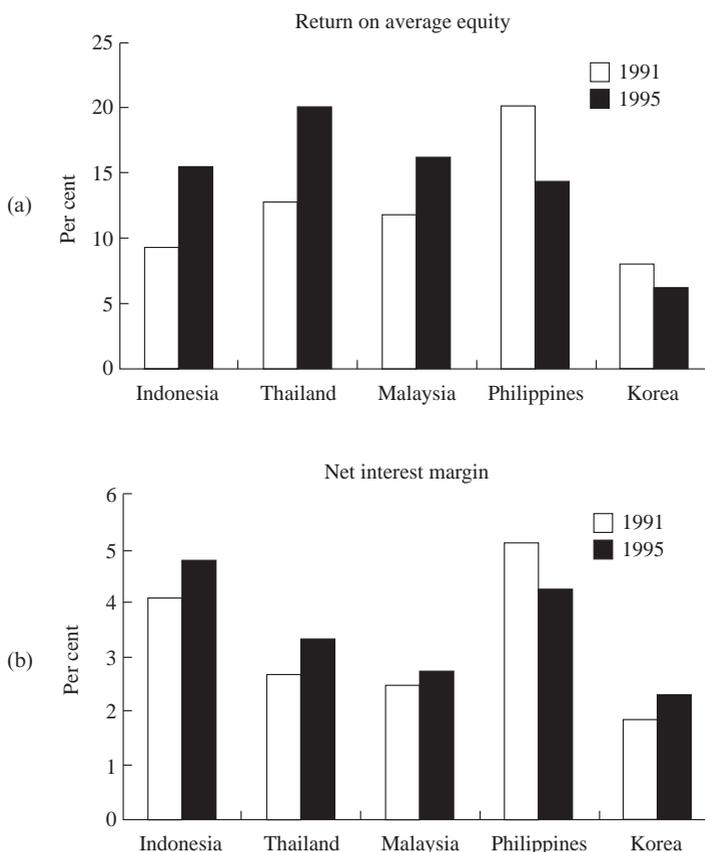
Figure 1.3 *Lending booms in East Asia, 1989–1996*



Note: ^aRates of growth are calculated on an annual basis and in real terms.

Source: IMF, *International Financial Statistics*.

financial liberalisation and the surge in capital inflows, varied from country to country. For example, in Malaysia, the Philippines and Thailand, bank and non-bank credit to the private sector began growing at higher rates and on a sustained basis following the surge in capital inflows. In Korea and Indonesia, in contrast, the growth in bank and non-bank credit to the private sector was lower during the inflow period than in the years prior to the surge in foreign capital. Most important, however, is that the high growth in credit – in many cases several times the growth in GDP – strained banks in their capacity to properly screen and assess risk of borrowers and projects (figure 1.3).

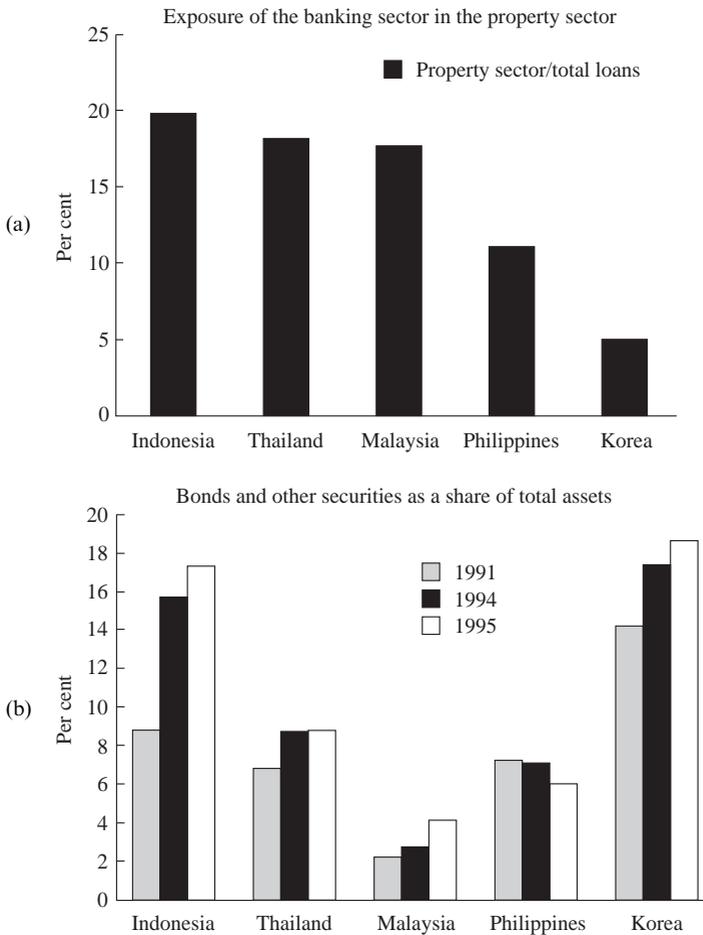
Figure 1.4 *Profitability and efficiency in East Asian banking, 1991 and 1995*

Source: Goldman-Sachs, *Banking Research* (September 1997).

However, the rising fragility was not detected during the lending booms as the growth in banks' loan portfolios was accompanied by rising measured profits. Figure 1.4 shows that in countries in which credit growth was high – except the Philippines – there was an increase in the profitability of the banking sector, consistently across all indicators. Conversely, in countries where the lending boom was smaller – in absolute terms or proportional to GDP – profitability tended to show a small increase, or even a decrease depending on the profitability indicator used.

As a result of the lending booms, banks and NBFIs became more vulnerable to economic shocks over this period. This occurred for two main reasons: by lending excessively to sectors or firms whose debt service

Figure 1.5 *Banks' exposure to risky assets, 1991–1995*



Source: Goldman-Sachs, *Banking Research* (September 1997).

capacity was particularly susceptible to shocks; and by reducing their own capacity to absorb negative shocks, especially by exacerbating currency and maturity mismatches and by under-provisioning for future potential losses.

3.2.1 Increased exposure to risky sectors

Real-estate lending was high and the banking sector exposure to real-estate was greater in countries where the growth of credit was larger than

proportional to GDP growth (figure 1.5). It should be noted that data on real-estate lending are not comparable across countries and in several countries probably under-estimate the exposure of the banking system to the real-estate sector (as loans to developers are not classified as lending for real-estate). But, there were significant differences among countries. Korean banks did not have large property exposure; Korean banks did, however, increase the share of bonds and other securities in their portfolios to almost 20 per cent (in addition, Korean banks extended large amounts of guarantees on securities issued by corporates). Except for the Philippines, countries increased their exposure to bonds and other securities (see figure 1.5).

Both real-estate market and securities markets have been very volatile in East Asia. real-estate price fluctuations during the 1990s were the highest in Philippines and Malaysia, with ratio of highest to lowest prices since inflows started of 3 and 2, respectively. Still, in both countries, vacancy rates in 1996 were relatively low at around 2 per cent (and the banking sector exposure to real estate appeared to be low in the Philippines). In Thailand and Indonesia, the variability of real-estate prices was lower, with high to low ratios of 1.25 and 1.32, respectively. In both countries, vacancy rates in 1996 were relatively high at around 14 per cent and increasing. The space under construction in Southeast Asia at the end of 1996 already suggested a significant oversupply of real-estate during 1997–9, especially in Thailand (figure 1.6).

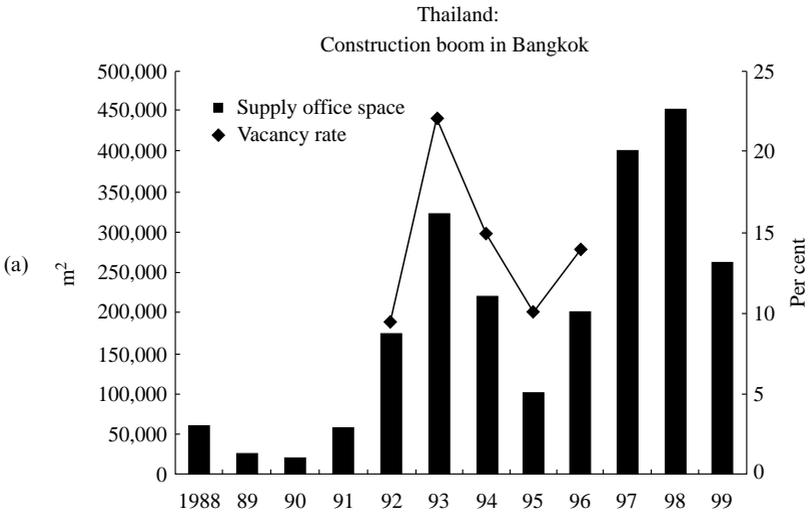
3.2.2 Increased foreign exchange exposure

Especially in Thailand, Malaysia and the Philippines, there was a significant increase in foreign exchange exposures of banks since the late 1980s (figure 1.7). Also, for Korea, Thailand and the Philippines, there was a very rapid increase in the stock of foreign liabilities of NBFIs. In Indonesia, the increase of foreign exchange exposure of banks was significant up to 1994, and was followed by a small decrease, but the overall exposure was small. Commercial banks in Korea did not show any increase in foreign exchange exposure during this period, but merchant banks in Korea did increase their foreign exchange exposures significantly.

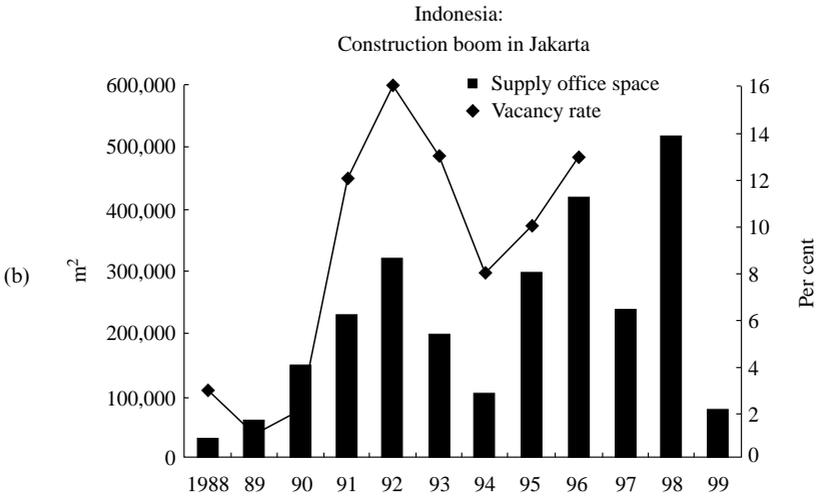
3.3 *Corporate sector vulnerabilities*

Despite differences between countries, the financial structures of many firms in the four countries most affected by the crisis were very fragile by end-1996. Corporates in these four countries grew very rapidly during the

Figure 1.6 Real estate office supply and vacancy rates, 1988–1999



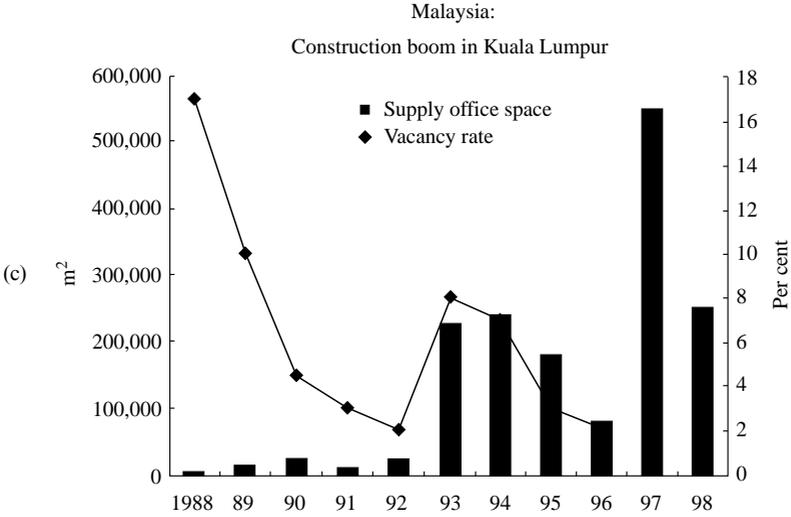
Note: 1997–9 comprises office space under construction.



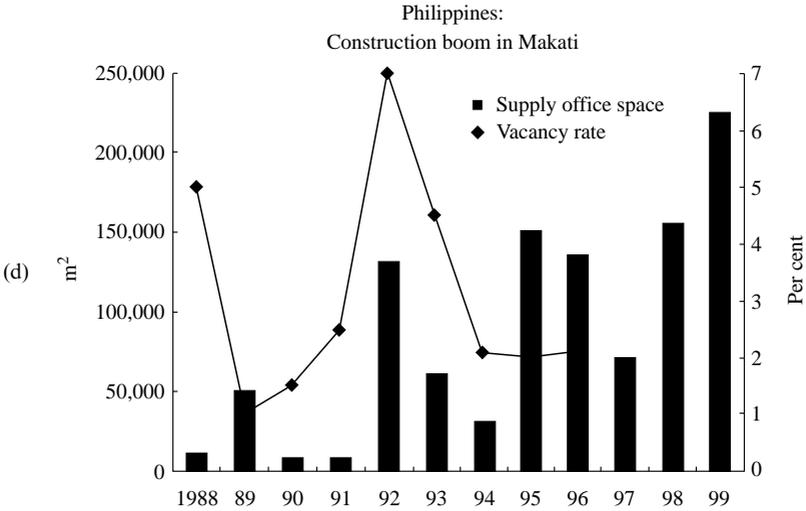
Note: 1997–9 comprises office space under construction.

1990s which, combined with declining profitability, led to a very large increase in external financing needs. Since firms in all four countries are very dependent on banks for external financing and equity markets are relatively under-developed, the asset expansion resulted in severely unbalanced liability structures. The vulnerabilities in corporate financial

Figure 1.6 (cont.)



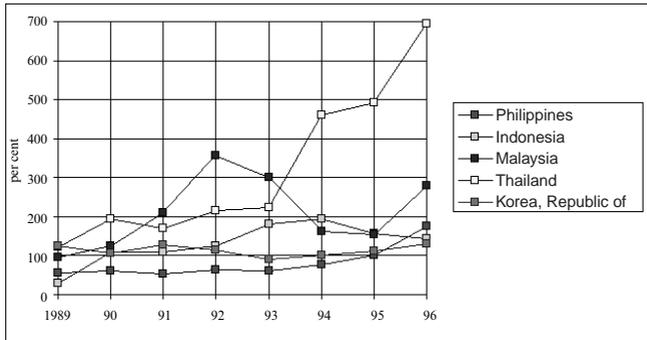
Note: 1997–8 comprises office space under construction.



Note: 1997–9 comprises office space under construction.

Source: Jones Lang Wootton, *Asia Pacific Property Digest* (January 1997).

Figure 1.7 *Foreign exchange exposures in the banking system, 1986–1996 (Ratio, per cent, of foreign exchange liabilities to foreign exchange assets)*



structures in the region built up quickly during the 1990s, and were evident before the onset of the crisis in mid-1997. Four key variables (table 1.4) illustrate this build-up of vulnerabilities:

- Rapid increase in fixed assets* Firms expanded at an unprecedented rate in these countries during the years preceding the crisis. Fixed assets measured in US dollars expanded on average during 1994–6 at 36 per cent in Indonesia, 30 per cent in Thailand, 22 per cent in Malaysia; and 20 per cent in Korea (1994–5), compared to 1 per cent–5 per cent in industrial countries (Pomerleano, 1998).
- Increasing leverage* Much of these new assets were financed through bank debt and East Asian firms tend to have high debt/equity ratios, while in Malaysia and Thailand, leverage increased during this period. Except in Malaysia, new equity was not widely used since stock markets are relatively underdeveloped and/or owners did not wish to dilute their control. In addition, internal financing was constrained by weakening corporate performance. According to Claessens, Djankov and Lang (1998), while generally higher than in industrial countries, real returns on total assets in local currency terms declined in Indonesia, Korea, Malaysia and Thailand between 1991–3 and 1996.
- Declining interest coverage* As a result of declining performance and rising debt, the ability of firms to meet debt service payments deteriorated substantially during the period. By end-1996, the median firm's interest coverage in Thailand and Korea was below investment-grade standards – that is, below that of the median Standard and Poors (S&P) single B firm in the USA during 1994–6 (figure 1.8).

Table 1.4 *Increasing corporate vulnerability in East Asia, 1991–1996*

		1991–3 ^a	1994	1995	1996
Indonesia	Growth in fixed assets (%)	22	37	36	35
	Debt/Equity ratio	1.8	1.8	1.8	1.8
	Short-term/Total debt (%)	56	58	58	57
	Interest coverage	Na	2.2	3.1	2.4
Korea	Growth in fixed assets (%)	11	15	24	—
	Debt/Equity ratio	3.2	3.3	3.4	3.2
	Short-term/Total debt (%)	54	59	60	59
	Interest coverage	1.4	1.9	1.8	1.1
Malaysia	Growth in fixed assets (%)	15	21	18	26
	Debt/Equity ratio	0.6	0.7	0.8	0.9
	Short-term/Total debt (%)	73	73	72	70
	Interest coverage	9.4	11.7	9.6	6.7
Thailand	Growth in fixed assets (%)	25	47	27	17
	Debt/Equity ratio	1.5	1.6	1.7	1.9
	Short-term/Total debt (%)	71	72	67	67
	Interest coverage	4.4	3.8	2.5	1.9

Note: ^aThe 1991–3 data for fixed assets refers to 1993.

Sources: Data on growth of fixed assets and interest coverage (EBITDA/interest payments) are from Pomerleano (1998). Data on leverage and composition of debt are from Claessens, Djankov and Lang (1998).

- *Large share of short-term debt* Short-term debt represented a large share of total debt of East Asian firms relative to industrial country standards.

Thus, by end-1996, East Asian firms were highly susceptible to liquidity and interest rate shocks. As a result of high leverage, small shocks to interest rates or operational cash flow greatly affected the ability of these corporations to service their debts. In Thailand, for example, as a result of the crisis 114 firms out of a sample of 300 listed on the Stock Exchange of Thailand (SET), could not service interest from their earnings before interest and taxes at end-1997, up from 18 in 1994. Interest expenses could thus not be fully covered in 1997 from operating income and had to be rolled-over and financed from new loans, non-operating income or asset sales. The need to roll over interest obligations would exacerbate the already high liquidity risk implied by the high share of short-term debt. With high leverage, the increase in interest rates and decline in profitability led to a large number of firms running into debt servicing and liquidity problems, which in turn negatively affected output.

The combination of rapid fixed asset growth and declining real profitability is a micro manifestation of the parallel investment boom and slowdowns in productivity growth. The resulting widening of the current account