

Proceedings of a Conference

**CAPITAL FLOWS  
AND THE  
INTERNATIONAL  
FINANCIAL  
SYSTEM**



Economic Group  
Reserve Bank of Australia

# Proceedings of a Conference

held at the H.C. Coombs Centre  
for Financial Studies, Kirribilli  
on 9–10 August 1999

## CAPITAL FLOWS AND THE INTERNATIONAL FINANCIAL SYSTEM

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Economic Group  
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Web site: <http://www.rba.gov.au>

ISBN 0 642 70465 1

Printed in Australia by J.S. McMillan Printing Group

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# Introduction

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David Gruen

It has become easier, with the passage of time, to forget what an extraordinary event the Asian financial crisis was. Before the crisis, the countries of east Asia had grown faster, for longer, than any other countries in recorded history. They had transformed their economies and the standard of living of their people in the course of a single generation. In 1960, some of the east Asian countries had standards of living similar to those in Africa; by the mid 1990s, the contrast between economic conditions in the two regions was very stark indeed. The miracle of east Asian economic growth was something to be admired, studied, and emulated.

Two years after the onset of the crisis, however, the east Asian economies are viewed in a rather different light. Admiring analysis of the ‘Asian model’ – complete with suggestions that Asian-style capitalism might be more robust, and ultimately more successful, than the Anglo-American version – has given way to disparaging discussion of ‘crony capitalism’, ‘connected lending’ and bankrupt financial systems in Asia, and to a sense of triumphalism about Anglo-American capitalism. The atmospherics have evolved almost as quickly as the financial crisis itself.

But the success, or otherwise, of the Asian economic model is not the only thing at stake in the aftermath of the Asian crisis. There are also wider issues about the stability of the international financial system.

The transfer of capital from the industrial world to the developing world – intermediated through the international financial system – should be of benefit to all. Capital flows, and the technology that goes with them, should be a powerful force for enriching the developing world. Moreover, the higher returns available to savers in the industrial countries from investing in the developing world should ease the demographic transitions in the industrial countries as their populations age.

The problem, brought to the fore by the string of financial crises in the 1990s, is that the threat of sudden, unpredictable reversals of capital flows to developing countries may be a force for instability on a scale that could swamp these longer-term benefits.

The papers in this volume were commissioned by the Reserve Bank to improve our understanding of capital flows and the international financial system. They aim to contribute to our understanding of the causes of financial crises and the best ways to reduce their frequency and severity, to analyse ways in which developing countries can best reduce their vulnerability to capital-flow reversals, and to examine suggestions for reforming the international financial system.

## **Understanding Financial Crises and the Role of Capital Flows**

Financial crises have occurred intermittently for at least the past two hundred years, as Bordo and Eichengreen remind us in their contribution to this volume. The

importance of financial crises precipitated by sudden reversals of international capital flows, as well as the economic devastation wrought by them, have generated much intellectual effort devoted to understanding them. The early contributions focused on currency crises, but more recent explanations have broadened to include the more virulent strains that involve both the currency and the domestic financial system, which are clearly of more relevance to the Asian financial crisis.

Several explanations of financial crises have been offered, as Dooley and Walsh explain in their paper. One set of explanations relies on some fundamental incompatibility in domestic economic policies that leads inexorably to a financial crisis in the country. An alternative set of explanations relies on the idea that, in certain circumstances, there may be more than one possible equilibrium for the economy. Nations can then be subject to ‘self-fulfilling crises’ in which a loss of confidence creates an economic, and perhaps political, collapse that validates investors’ pessimism.

Such self-fulfilling crises can occur when international investors are behaving rationally, in their own private interests, and fully understand the economic environments in which they invest. Nevertheless, a change of heart on their part – one that is ultimately validated by economic outcomes – generates the crisis.

A further alternative, however, is that investors may lack such understanding. Some explanations of financial crises focus on the idea that investors can be subject to herding and have a preoccupation with the short term that may occasionally lead to market panic. One version of this idea is presented by Brock in his paper. His argument is that investors are not in a position to fully understand their evolving economic environment, and may alter their views about how the world works when new information arrives. Some new information will be particularly influential, leading to collective changes of view. Some investors will change their view because others, who they think are well-informed, have done so – that is, they will herd.

It is of course possible that more than one of these explanations is relevant to any particular financial crisis. Before discussing the possible links between them, however, it is worth examining each of the explanations in more detail.

## **Inappropriate government guarantees**

How can incompatibilities in domestic economic policies lead to a financial crisis? The argument, as applied to east Asia, is that governments provided a range of inappropriate guarantees to their private sectors. For example, banks lent to favoured individuals, corporations or sectors of the economy, on the understanding, implicit or explicit, that the government would provide financial support to them in the event that their loans could not be repaid. Similar logic could explain foreign investors’ willingness to lend large quantities of funds to domestic banks and favoured corporations in the aftermath of financial deregulation. By this argument, these loans were not advanced on the basis of commercial judgments about the likely soundness of these domestic institutions, but because foreign investors assessed that east Asian governments, or IMF-sponsored international rescue packages, would likely repay the foreign loans if the domestic institutions could not do so.

A similar argument can also be advanced to explain the extensive unhedged borrowing in foreign currency by east Asian corporations and financial institutions. According to this argument, the private sector in the east Asian countries was encouraged to borrow in this manner by the exchange rate stability provided by the quasi-fixed currency pegs to the US dollar that operated in the region.

When the countries suffered an adverse external shock, the implicit liabilities of the government rose enormously as the possibility loomed large that many private-sector loans could not be repaid. Furthermore, as it became more likely that the currency pegs could not be sustained, the large stock of unhedged foreign loans in the economy further raised financial fragility and the implicit liabilities of the government. By this argument, foreign investors eventually became sufficiently concerned about the government's capacity or willingness to pay out on its rapidly rising contingent liabilities, that they withdrew their funds, thereby precipitating the crisis.

There is not necessarily any suggestion here that investors have had a 'change of heart' about the country. Rather, the idea is that they have simply responded to changed economic fundamentals in a quite consistent way.

### **Self-fulfilling crises**

The second set of explanations for financial crises involves the idea that an economy can switch from a good to a bad equilibrium, driven solely or predominantly by a change of heart by investors without any change in economic fundamentals. This is then a self-fulfilling crisis, which can be understood by analogy with a bank-run. Banks stand ready to redeem the full value of savers' deposits at short notice, despite having most of their funds on loan for longer-term investment projects. If a small number of savers avail themselves of this option, banks have sufficient liquid funds to honour these claims. But if investors come to the view – for whatever reason – that a bank may not have sufficient liquid funds, then a bank-run can result, which validates investors' new-found pessimism. A financially solvent bank has become illiquid, unable to satisfy the legitimate claims of its depositors.

For many analysts, the analogy with the Asian crisis is a close one. Many of the elements of the good and bad equilibria have already been discussed. The good equilibrium is characterised by strong growth, strong investment and ample capital inflow. The bad equilibrium occurs if international investors become pessimistic, withdrawing their financial capital from the country. This, in turn, leads to a collapse of both domestic investment and the currency peg. Parts of the financial and corporate sectors are bankrupted, by both the collapsing domestic investment in a previously rapidly growing economy, and the sharp rise in the domestic-currency value of unhedged foreign borrowings. The economy sinks into a deep recession, validating investors' change of heart about the country's prospects.

The extent of global contagion in the 1997–99 financial crisis provides support for this 'self-fulfilling' explanation. Granted, there were domestic economic problems in each crisis country. But the idea that these could, by themselves, lead to a rapid succession of deep crises in such a wide array of countries (in some cases,



geographically quite separated) seems far-fetched. The common thread instead seems to be a collective change of view by international investors about emerging markets, generated by the gathering storm of crises.

Corbett, Irwin and Vines, in their paper in the volume, also argue that the Asian financial crises were self-fulfilling ones. In their view, inappropriate government guarantees were also implicated because they heightened each country's vulnerability to crisis, and made the 'bad' equilibrium much worse than it would otherwise have been.

### **From euphoria to panic without missing a beat**

The third set of explanations for financial crises, and sudden reversals in capital flows, relies on the argument that the standard textbook view of capital flows – that they are driven predominantly by rational, patient investors with a good understanding of the economic environments in which they invest – is a poor representation of reality. Instead, the argument is that investors are sometimes subject to herding, and to swings of sentiment that are not well grounded in the economic fundamentals.

On this view, as applied to the east Asian economies, capital inflow in the years before the crisis was driven, largely, by investors' optimism about the prospects for earning high risk-adjusted returns in these economies, rather than implicit government guarantees. This explanation for the reversal of capital flows need not be inconsistent with the idea that the resulting crisis was, in large part, self-fulfilling. The explanation would, however, highlight the extent to which the earlier market expectations were unrealistically optimistic, and the aspects of market panic that resulted when these expectations were disappointed. According to this view, the crisis came when 'euphoria turned to panic without missing a beat'. Sakakibara (among others) subscribes to this interpretation of the Asian crisis, and financial crises in general, in his comments in the volume.

Two years after the onset of the Asian crisis, it is perhaps easy to forget why investors might have held such optimistic expectations in earlier years. But an examination, for example, of the World Bank's 1993 report on east Asia, gives a flavour of the widespread views about the region at that time. That report – revealingly titled *The East Asian Miracle: Economic Growth and Public Policy* – argued that the strong growth that had been experienced for so long was based on strong fundamentals, at both the macro and microeconomic levels, and sound public policies. On that basis, it was not so unreasonable for investors to expect a continuation of strong growth, and associated high investment returns, in the region.

In support of this argument that inflows were driven primarily by a search for high returns, rather than implicit government guarantees, it should be noted that much of the inflow was in forms for which there was no conceivable government guarantee, such as portfolio investments in the stockmarkets of the region. Hausmann, in his comments in the volume, argues that there is little evidence that inflows were disproportionately in those forms – like lending to banks – that would likely benefit from government guarantees.

On this view of events, a long period of rapid growth and high returns led to general market euphoria about the region, which attracted new investors and more capital inflow. Financial deregulation in these economies facilitated the inflow, as did developments on the supply-side, such as the growth of mutual funds and the decline in interest rates in the developed world.

There were emerging signs of over-investment and the formation and growth of asset-price bubbles in several markets in the region in the years leading up to 1997. But while these developments may have been noted, they did little to deflate the general feeling of optimism about the region.

Over the period 1995–97, however, there was a series of adverse external shocks – particularly a trade-weighted appreciation of the region’s currencies as the US dollar, to which they were pegged, rose against the European currencies and the yen, and a fall in the terms of trade for electronic-goods exporters. These shocks brought into question the sustainability of the currency pegs to the US dollar, undermining the confidence of international investors in the region’s prospects, and leading to a sudden withdrawal of their funds. As the currency pegs collapsed, the elements already discussed, particularly the large stock of unhedged foreign-denominated borrowings, undoubtedly fuelled investors’ new-found pessimism and the sense of market panic, making the crisis much more severe than it would otherwise have been.

## **Reducing Developing Countries’ Vulnerability to Capital-flow Reversals**

The alternative explanations for financial crises canvassed above have significantly different implications for which policy prescriptions are likely to be most helpful in reducing the frequency and severity of such crises.

For some domestic economic problems, the policy implications seem apparent. As has been said, one of the lessons from the Asian crisis is that exposing badly regulated banks to an open capital account is like offering a recovering alcoholic a drink. The implication is that financial regulation needs improving, but also that the capital account should be opened slowly.

To the extent that implicit government guarantees played a significant role in generating economically wasteful excess capital inflow in the pre-crisis years, as well as the sudden reversal of these flows, the appropriate policy response is to limit these implicit guarantees as much as possible. Such guarantees, to favoured individuals, corporations, or sectors of the economy, were undoubtedly important in several east Asian countries. But, of course, the economic waste associated with inappropriate government guarantees in the financial sector is not a problem unique to that region. As Volcker reminds us in his paper in the volume, the losses in the United States Savings and Loans industry in the 1980s are but one prominent recent example of the same phenomenon in an advanced developed country.

It is also worth noting that governments in almost all countries provide substantial guarantees to the financial system. Governments do not stand by passively in the event of a crisis that threatens the integrity of the domestic financial system (and nor

should they). If a systemic financial crisis were to arise in almost any country, the contingent liabilities of the government would rise enormously, as they did in the east Asian crisis countries.

This problem may be particularly serious for developing economies. The financial systems in many such countries are small, domestically owned and disproportionately exposed to the relatively undiversified local economy. As previously noted, they also tend to be poorly supervised. As a consequence, adverse domestic shocks can threaten the integrity of the domestic financial system, undermine international confidence and set in train some of the destructive forces seen in the Asian crisis. A possible alternative for these countries is to follow New Zealand's lead, and allow the domestic financial system to become largely foreign-owned. A foreign-owned financial system is likely to be much more diversified across economies, and thus less susceptible to country-specific shocks. Furthermore, foreign-owned financial institutions may need neither to be guaranteed nor supervised by the government of the developing country in which they operate.

As previously mentioned, the extensive unhedged foreign borrowing undertaken by east Asian corporations and financial institutions contributed to the severity of the domestic recessions that followed hard on the heels of the currency collapses. It has been widely argued that this unhedged borrowing was encouraged by the exchange rate stability provided by the quasi-fixed currency pegs to the US dollar operating in the region. The obvious implication, drawn by many analysts, is that more exchange rate flexibility would reduce the extent of unhedged foreign borrowing, thereby reducing the financial fragility of these economies.

This argument may well be right. It certainly makes sense for unhedged foreign borrowing to be undertaken by those in the economy, like exporters, who have an alternative natural hedge against exchange rate movements. It also seems likely that if the currency is allowed to fluctuate on a day-to-day basis, banks and firms will learn the value of using derivatives markets to insure against currency swings.

But the logic is not as compelling as it first appears. While hedge markets exist in which individuals can trade foreign-exchange risk, this may not be true for the country as a whole. For the whole country to hedge the foreign-currency exposure of its international loans requires foreigners to be willing to hold a significant exposure to the country's domestic currency. (Hedging the foreign-currency exposure of international loans is largely equivalent to borrowing internationally in your own currency.) For industrial countries, like Australia, a substantial proportion of foreign borrowings is indeed denominated in domestic currency. Almost without exception, however, non-OECD countries have almost no external debt denominated in their own currencies, as Hausmann points out in his comments in the volume. For reasons that remain unclear, markets in which developing countries can undertake such borrowing are thin or non-existent.

This incompleteness of financial markets may be an important reason why there is so much unhedged foreign borrowing by developing countries. Missing financial markets may therefore be an important source of developing countries' financial fragility, rather than their choice of exchange rate regime.

As well as contributing to a severe recession in the aftermath of a currency collapse, unhedged foreign borrowing – specifically short-term borrowing, and especially when it is borrowed by the banking system – also substantially raises the likelihood of a currency and financial crisis in the first place. This has led to a growing chorus of calls for developing countries to adopt Chilean-style holding-period taxes on capital inflow, which seem to have been successful in lengthening the maturity of Chilean foreign debt, without materially affecting the quantity of capital inflow.

A further suggestion is that the public sector should hold substantial foreign exchange reserves to offset, for the country as a whole, the currency mismatch associated with unhedged foreign borrowing by the private sector. There may be merit in this suggestion, but it is not without costs. If private-sector unhedged foreign borrowing is (partly) matched by higher public-sector foreign reserve holdings which would not otherwise have been accumulated, then the private sector does not face the true cost of its borrowing. If the private sector had to accumulate the foreign reserves itself, it would not have undertaken the foreign borrowing in the first place, as Corden points out. Moreover, the private-sector borrowing and public-sector reserve accumulation are likely to be costly for the economy as a whole, because the interest rate earned on foreign reserves is likely to be lower than the borrowing rate paid on private-sector foreign loans.

On the issue of which exchange rate regime best equips developing countries to cope with volatile capital flows, there remains considerable disagreement. One view is that they must choose between the extremes of a currency board (or a common currency) on one hand, and a freely floating exchange rate on the other. Yet, as argued by Grenville and Gruen and by Volcker in their papers in the volume, both these extremes have their disadvantages. Fixed exchange rates deprive an economy of a valuable price mechanism for adjusting to shocks and create an exit problem when they fail. But freely floating rates have not always delivered the benefits expected of them. Instead, they have often been excessively volatile, sometimes subject to prolonged misalignments and overshooting. These attributes are likely to be particularly disruptive for developing economies, which tend to be very open, with undiversified exports, yet with poorly developed markets for the management of exchange rate risk.

It therefore remains unclear what exchange rate arrangements these countries should choose. Different regimes undoubtedly suit different countries. Singapore provides one possible model, with a flexible exchange rate, but one that exhibits much less volatility than the floating rates of the major industrial countries. This lower volatility appears to be achieved by a combination of restrictions on foreigners' capacity to borrow domestic currency, and an active commitment to use monetary policy and foreign-exchange intervention to help limit, though not eliminate, short-term movements in the trade-weighted value of the Singapore dollar.

## Reforming the International Financial System

How one approaches reform of the international financial system depends, not surprisingly, on what one regards as the underlying source of its shortcomings. This depends, in large part, on one's view of the important causes of sudden reversals of capital flows, and the associated financial crises.

As previously discussed, some analysts regard the critical distortion facing the international financial system as the implicit guarantees provided to international investors by the prospect that they will be bailed out by an IMF-sponsored rescue package in the event of a crisis. (These analysts also point to inappropriate government guarantees – but these can be eliminated by the governments themselves without requiring reform of the international financial system.) The appropriate response is then to severely limit the size and frequency of these rescue packages. In this way, the moral-hazard problems associated with the implicit guarantees become much less serious, and international investors become more attuned to the actual risks involved in investing in developing countries.

The possibility of receiving a rescue package if there is a crisis in future clearly does provide (limited) insurance to those developing countries which may at some time receive such a package, as well as to international investors who invest in those countries. But, as Mussa argues in his paper, the existence of moral hazard does not necessarily imply that the rescue packages are too generous or too frequent. This can most clearly be seen by analogy with the insurance industry.

The insurance industry provides economically valuable services, despite having to deal with endemic moral-hazard problems. In general, risk-averse individuals or firms take too few socially diversifiable risks in the absence of insurance. An insurance firm can diversify its own risks by providing insurance to many such individuals, who in turn will take more risks than they otherwise would. Up to some level, this extra risk-taking is socially and economically desirable, even if some moral hazard is generated as a consequence.

Returning to our explanations for developing country financial crises, the idea that a change of heart by international investors can generate a self-fulfilling crisis (at least in economies which are, in some sense, vulnerable) means that private capital flows can be inherently unstable. If this is so, then developing countries face real hazards associated with the possibility of capital-flow reversals on a large scale. A developing country faced with such a reversal is in a similar predicament to a bank that has suffered a run on its deposits. Like a bank, a country can become illiquid, even though it remains solvent.

In this world, rescue packages play the economically desirable role of providing internationally diversifiable insurance. Indeed, from this perspective, the insurance provided is extremely limited. Even after receiving international rescue packages, countries still suffered massive losses – estimated by Mussa, for the Asian crisis countries, to range from 24 per cent of annual GDP for Korea to 83 per cent for Indonesia.

For many observers, the crucial underlying problems with the international financial system arise because there are only poor international substitutes for important domestic institutions and laws that contribute to the efficient functioning of modern economies. Perhaps the two most important of these institutions are the lender of last resort, and bankruptcy laws and procedures. The aim of many international reform proposals is to mimic these institutions more closely at an international level.

When faced with an illiquid financial institution, a domestic lender of last resort must decide whether that institution is solvent or not. If solvent, loans are advanced to enable the institution to survive. If not, the institution is taken over or closed down. Ideally, the lender of last resort has deep pockets (it may be the central bank, with the capacity to print money) and can act quickly to stem a bank-run and arrest contagion to other institutions. Ideally, it is also in a position to make delicate decisions about whether or not to close down financial institutions, (relatively) free from political interference.

The closest international equivalent to a domestic lender of last resort is the IMF, although it is hardly equivalent. Many reform proposals involve trying to make it more so. Many observers argue that the IMF needs substantially more resources, in order to provide deeper financial cushions to countries in crisis, and to deal more effectively with contagion to other countries. There are also proposals to reduce crisis-response times, with the same aims in mind.

Furthermore, by its nature, the IMF is subject to political pressure, especially from those countries from which it gets the largest share of its financial resources. One implication of this political pressure is that the Fund's rescue packages tend to provide financial assistance that allows foreign investors from creditor countries to be repaid at the expense of taxpayers in the crisis countries. Another, specifically applying to the conditionality the Fund attached to its Asian packages, was the requirement that crisis countries open their financial markets and distribution systems to foreign competition – arguably serving the interests of industrial countries seeking market access more than the crisis countries themselves.

The lack of international bankruptcy rules also hampers the efficient functioning of the international financial system. The existing arrangements for resolving international crises operate in a much more cumbersome manner than do industrial-country domestic bankruptcy procedures. Many reform proposals focus on ways to speed this resolution, as well as to 'bail-in' private-sector creditors so that the financial burden of the crisis is shared more equitably.

Many international bonds, for example, require the unanimous consent of bondholders if there is to be a restructuring of the debt contract. But unanimous consent is unwieldy and time-consuming, not to mention providing the incentive for some bondholders to hold the process to ransom by threatening legal action. The alternative is to require international bond contracts to include provisions for an orderly workout (for example, by specifying majority voting, or making provision for a bondholders meeting) if that becomes necessary. Such clauses are unlikely to

occur at the behest of developing countries, which would rightly fear that requiring them would signal that the country saw itself as likely to suffer a crisis. They would therefore have to be introduced by creditor countries, perhaps at the instigation of the IMF. In some cases, like Korea late in 1997, it has proved possible to get voluntary agreement from creditor-country banks to roll-over their credits, undoubtedly assisting Korea's rapid recovery from crisis.

Another relevant issue for reform, distinct from those already discussed, concerns the extent to which hedge funds have a destabilising impact on international financial markets. This issue is taken up in the papers by Rankin and Yam.

Hedge funds are usually structured to avoid regulation and reporting requirements. They also typically engage in a high degree of leverage, particularly off-balance sheet. Their trading strategies often involve rapidly generating, or unwinding, sizable open positions in financial markets.

Data on the trading activities of hedge funds are virtually non-existent. It is nevertheless possible to learn about their activities from market intelligence. In the case of Hong Kong, hedge funds borrowed large quantities of Hong Kong dollars in the several months before August 1998 and built up significant short positions in the Hong Kong stockmarket. In August, they sold Hong Kong dollars, in the expectation that the Monetary Authority's defence of the currency would drive up interest rates and lead to a fall in stock prices, from which they would profit. This attack on Hong Kong's financial markets was very disruptive for a time but ultimately proved unsuccessful because, as well as defending the currency, the authorities also bought stocks, driving up stock prices and eventually inflicting heavy losses on the hedge funds.

Hedge funds also built up large open positions in the Australian dollar in the first half of 1998, with the aim of inducing other market players to follow their lead and thereby profiting from a fall in the currency. The size of the positions taken, and the aggressiveness of the trading strategies pursued by these funds caused a good deal of instability in Australian markets. This experience suggests that floating currencies can also be destabilised by the activities of hedge funds, even in markets as deep and liquid as that for the Australian dollar.

There have been several suggested policy responses. One possibility is to set up a disclosure or reporting framework to provide information necessary for proper risk assessment by counterparties, creditors and investors. Another involves 'indirect regulation' of hedge funds by requiring the banks with which they deal to adopt more prudent policies on the management of their exposure to hedge funds. Further suggestions involve the direct regulation of hedge funds, or if that proves impractical, the introduction of a code of best practice for hedge funds, with pressure brought to bear on them to comply.

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# Problems and Challenges of International Capital Flows

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Paul A Volcker

Many months have passed since Ian Macfarlane approached me about the idea of a conference on international monetary reform in Sydney. It was a good idea then – and I think it is now. But except for the locale, it is hardly unique.

I do not know how many conferences the Asian financial crisis has spawned. I do know it has been a time of full employment for economists with any pretension to competence in the area – and even for those who don't. I also know that, for the moment at least, the sense of crisis has died down.

It is also my sense that there is little or no connection between those two observations.

The conferences have provided, as nearly as I can detect, little by way of consensus on the really critical issues – the issues of truly systemic importance. Given that lack of intellectual conviction, and the limitations of time, little has been done to achieve concrete reforms.

The sense of receding financial crisis is more analogous to the passage of a forest fire than to successful fire precautions: the flames die down and the embers cool, but there remains a lot of devastation and the prospect of a long period of regrowth.

What will be critically important in the end is whether that regrowth will be healthy and sustained. It will at any rate, be quite a challenge, to return to anything like the growth paths that prevailed in most of Asia before the crisis. The specific arithmetic varies among countries. But it is obvious that countries that had been enjoying growth trends of six or seven or eight per cent a year are now producing far below their potential, even if some of them have now turned the corner from deep recession.

Maybe restoration of the earlier rate of growth is too tough, too unrealistic, a test. A strong argument can be made that the extraordinary growth rates in Thailand, in Indonesia, in Malaysia and elsewhere had to taper off to a more sustainable pattern. But whatever the precise number, the issue with which we are all grappling is whether the emerging nations of Asia, of Latin America, and of Eastern Europe can in fact restore a strong and sustainable growth path in the context of open international markets for money and capital.

That, it seems to me, is the basic issue before this conference. It is quite obviously a terribly important issue, an issue bearing upon all our thinking about the benefits of an open globalised economy.

The papers before this conference help put it in proper perspective. The current crisis is not the first, nor will it be the last, in international finance. But there are factors vastly complicating the situation.



We all know how modern technology – the information society and all – has broken down natural barriers to the free movement of money. It can flow faster and faster in larger amounts, with the number of participants rising exponentially. But it is not just technology that rules the economic world. Within a single decade following the fall of the USSR, the ideology of open markets for money has swept the emerging world, with all the bright promise of enhancing efficiency and growth.

Is that all more chimera than reality? Or, more appropriately, what do nations, individually and collectively, need to do to better assure that the vision will become reality? I'd like to think we could reach really solid conclusions in the next 36 hours. I realise the precedents are against that. But I am an ardent fisherman – an avocation in which hope springs eternal, and which occasionally is rewarded by success!

In fact, a fisherman often needs to be satisfied and rewarded by the experience rather than by the size of his catch, and the papers before us have already helped our thinking. Perhaps my own view of the source of the difficulties is a bit idiosyncratic. I can only plead the fact that I was directly engaged in these matters from both public and private perspectives for about 40 years, and that provides a certain perspective. And just possibly, the fact that I am, at this advanced state of life, somewhat removed from the operational fray, permits me to be more pointed.

Of one thing, I feel quite confident. The points about which the greatest degree of consensus has emerged – the reforms that have received the most emphasis in official circles – provide little basis for expecting future crises can be avoided or even greatly ameliorated.

These reforms take as their point of departure that the Asian crisis, and presumably the earlier Latin American crises, primarily grew out of deficiencies in the emerging countries – and most particularly institutional deficiencies. The emphasis has been placed on stronger national banking regulation, better auditing standards, American-style accounting practices, transparency in all things (including, I should note, central bank disclosures and decision-making). Now those happen to be things with which I have been concerned my entire professional life. I don't want to minimise their importance. Intelligent supervision and regulation, more accurate information, more widely available, and disciplined professional behaviour, free of corruption and cronyism should, in principle, improve the efficiency of markets. There will be broader participation, possibly enhanced savings, and improved allocation of capital – all of which is worthwhile and desirable.

What I question is whether it is at all an adequate response to the seemingly repetitive, and perhaps increasingly severe, pattern of international financial crises.

I remind you of the plain fact that US-style supervision and regulation did not prevent a massive savings and loan crisis in the United States, nor a substantial threat to some of our major commercial banks at the start of this decade. In well-developed and traditionally prudent Scandinavia, entire banking systems collapsed, saved only by direct government intervention. I well remember the collective failure of the large Texas banks (mostly supervised by the Federal Reserve) in the mid 1980s only a few years after they were considered among the very strongest of all American banks.

How many occasions can you cite, I might ask, when auditors of banks, applying GAAP standards, have given timely advance warning of the potential failure of a major financial institution? Perhaps there are such instances, but they haven't come to my attention.

The hard fact of the matter is banking supervision is at best a difficult and uncertain process. Inevitably, it lags the actual development of markets and institutions responding to the drive and impetus of imaginative risk-takers. The fact those risk-takers now operate with all the paraphernalia of the electronic age, reinforcing highly sophisticated financial engineering blessed by Nobel Prize winners, only makes it more difficult.

It is also a fact that tough financial supervision is politically popular only in the aftermath of crisis, when it is least needed to restrain animal spirits. When markets seem to be working well and large profits are being generated, as in South-East Asia not so long ago, all the practical and political pressures are the other way – typically supported by substantial academic opinion emphasising the merits of free markets and the arbitrariness of regulators and regulations.

Most significantly, the market is adept at finding ways around tough (and inevitably arbitrary!) regulations. If banking regulations are confining, then other ways will be found to do business. We need no more recent and dramatic example than that of the now notorious LTCM – an institution operating with great secrecy and without supervision right within the United States – the threatened collapse of which purportedly would have torn apart the world's largest and most fluid and efficient capital market.

A generation ago, the rapid growth, and officially tolerated lack of regulation, of American savings and loans was a market and political response to the 'tough and arbitrary' regulation of banks. Today it is competition from investment banks and hedge funds. In Thailand just a couple of years ago, it was more highly regulated finance companies that were the weakest link. And so it goes.

By all means, let's work on improving financial supervision and regulations. But let's recognise that it is unrealistic to assume that that is adequate to deal with the truly systemic problem before us.

Well, what about controls? Here is another area of emerging consensus.

The general agreement is all the more surprising in the light of common opinion a few years ago. It was at the Hong Kong annual meeting only two years ago that the IMF came close to promulgating a new Article elevating open money and capital markets to the same status as freedom of current account transactions from controls. Now, there seems to be a general willingness to accept at least limited restraints on short-term capital inflows as a self-protective measure, so long as those controls are applied in as non-discriminatory and as market-oriented a manner as feasible.

I happen to be among those thinking that approach is sensible. In fact, it can work in tandem with prudential measures, for instance by controlling foreign exposures of banks or by 'taxing' short-term capital inflows by means of special reserve requirements. But surely there are questions of the lasting effectiveness of that

approach. The empirical evidence is ambiguous. My sense is that approach, like improved banking supervision, falls into the category of ‘interior decoration’ rather than grand ‘architecture’.

Well, what are the important systemic issues, issues upon which little consensus has emerged? As I reviewed the papers prepared for this conference, I was happily surprised to find they concentrated very largely on precisely these issues, and in particular questions of exchange rates. The authors have quite properly been modest in arriving at firm conclusions. But if we are able to make progress in framing the issues in the next two days, that alone will be worth the price of admission.

There are several characteristics of these recent crises that, in my opinion, have received too little emphasis.

The first is that they hit disproportionately hard on emerging economies that have inherently small banking and financial systems. The aggregate size of banks in Argentina or Thailand or Indonesia falls in the range of a single regional bank in the United States. As a consequence, it doesn’t take more than rather marginal shifts of funds in the massive and fluid international financial markets to overwhelm the absorptive capacity of those banks and their countries. In fact, a handful of individual private institutions can have a large impact on small emerging markets.

As the funds flow in, the prospect of healthy expansion becoming a bubble is all too real. Sooner or later, something triggers an outflow, lenders run for the door, a financial crisis results, and too often the financial crisis turns into a first-class economic debacle.

The difficulty of maintaining a pegged exchange rate in the circumstances is widely recognised. But experience also strongly indicates floating exchange rates provide no effective protection. Volatility is both extreme and inconsistent with smooth and orderly economic adjustment. In fact, few if any, economically small and internationally exposed nations find freely floating exchange rates a feasible system.

For all the commentary about the role of overvalued exchange rates in triggering or aggravating crises, the evidence before this conference is striking. It suggests that, measured by usual approaches, the pre-crisis misalignments were typically not particularly large – in fact, I would judge well within the inherent range of uncertainty in their calculation. (Ironically, the calculated overvaluations are well within the range of fluctuations we have come to take for granted among large countries.) Moreover, the crisis, particularly in the Asian manifestation, hit at countries that had no very obvious macroeconomic disequilibrium; good performance in that respect didn’t provide much protection. Indeed, there is the irony that the perception of good performance will induce the capital inflow that, given the disproportions in size, threatens to disequilibrate the economy.

What does all this mean for the role of the IMF for its conditionality, and for other official support?

We certainly do not lack for a variety of experience. We have had massive, near pure ‘bailout’ packages – that is, only straightforward macroeconomic conditionality,

*à la* Mexico 1995, and the provision of enough resources to meet the potential demands of short-term lenders. We have had late and limited assistance *à la* Thailand in 1997, shortly followed in Indonesia by a nominally very large assistance program accompanied by heavily intrusive conditionality. Korea initially followed in the pattern of those programs in providing for no organised negotiations with private lenders. However, that approach was soon reversed, partly at the initiative of commercial banks themselves, and bank ‘standstills’ were negotiated in Korea and subsequently in Brazil, somewhat along the precedents in the 1980s Latin American crisis.

In sum, no consistent pattern has emerged. Surely, it can be argued that that is practical and appropriate: every situation has its unique characteristics that require particular remedies. But surely the results haven’t been so gratifying as to provide confidence in such *ad hoc* approaches. Moreover, can any international institution, no matter how intelligently run and how well intentioned, successfully devise in emergency circumstances approaches sensitive to the economic, social and financial facts of every situation? And is there any willingness to concede that degree of authority and initiative to an international authority?

My instinct suggests we should be satisfied with broad ‘macro’ conditionality, and official liquidity support should be limited. Structural change may well be needed. But that typically takes time. Incentives to change logically fall more within the province of the World Bank and the regional institutions.

All of this raises a key structural question. To what extent should lenders be expected to face delays and potential losses in the event of financial crisis? The logic seems clear. Lenders bear some share of the responsibility of volatile capital flows. They are rewarded for the risks. They should be prepared to bear more fully and predictably in the pain. That has, in fact, been true fairly regularly for international bank lenders – a relatively small and cohesive group with continuing relationships at stake. It has been less true for other creditors which have proliferated in recent years. Those lenders are less cohesive and identifiable and certainly less responsive to entirely voluntary approaches.

Whatever the logic, there is not today an international equivalent of a bankruptcy court. Moreover, the point is made that imposing new risks on international lenders will tend to reduce the availability of capital to emerging countries just when they need it most. Of course, some cautionary impact on short-term lenders may be welcome, but a lack of consensus is not surprising. In any event, this strikes me as an area that shouldn’t be left in limbo. This and other conferences can make a contribution.

Finally, and most importantly, I hope we can make some progress on one item that is clearly on our agenda. I was a bit concerned that the preliminary program indicated there would be a ‘short paper’ on exchange rates. I am gratified that the issue dominates more than one paper!

To my mind, it is here that we get beyond interior decoration to true architecture, implying a coherent design and some lasting quality. The exchange rate system

surely lies at the heart of any international monetary arrangement. And it is a subject upon which, it seems to me, there has been little fresh thinking in the face of the rather obvious fact that the exchange rate system is gravely flawed – flawed as much or more among the major currencies as among the emerging nations.

The general attitude seems to be that every country should do what it finds most suitable to its particular circumstances – fix, float, or do something in between. But generalising that approach runs into a logical difficulty. An exchange rate by its nature is multi-sided. It can't logically be a matter of free choice for everyone.

One illustration of that point is the dilemma – an insoluble dilemma – for the emerging countries of Asia. Their trade is strongly diversified among Japan, the United States and Europe. What is a coherent exchange rate policy for Asia when the exchange rates among their major trading partners are themselves highly volatile? Individually, the three 'elephants', with large, diversified and relatively self-sufficient economies, may find it possible to live reasonably comfortably with their reciprocal exchange rates fluctuating violently. But what of their small and externally dependent partners whose established trading patterns are thrown askew by factors entirely outside their influence.

To some substantial extent, the radical appreciation of the dollar relative to the yen in the late 1990s surely impaired the perception of the competitiveness of countries tied loosely to the dollar, raising doubts about their currencies. But that is only an extreme example of a systemic problem. It is an important reason why a fixed exchange rate is not a desirable or practical approach for most Asian countries. They simply have no satisfactory currency to which to peg.

At the same time, freely floating exchange rates for small open economies are simply too volatile to be practical. So neither of the two so-called corner solutions set out as the logical textbook alternatives are really useful.

It's a highly unsatisfactory situation. Nonetheless, there is a great reluctance to deal with it. That reluctance seems to me to reflect, in large part, strong vested interests.

Part of that vested interest is intellectual. The academic community has a large commitment to the theorising that floating exchange rates are a means of providing almost automatic and relatively painless external adjustment. They are, in that line of reasoning, a means of reconciling domestic policy autonomy with open markets.

Financial institutions and professional speculators have long since learned that exchange rate volatility can offer large profit opportunities. Their sense is that 'insiders' like themselves, able to recognise and 'ride' – even promote – herd instincts, will on balance make money. The available statistics seem to bear that out. The losers, mainly non-financial businesses, are relatively silent in the face of other, seemingly more immediate, problems.

At the same time, the authorities of major countries are leery of accepting responsibility for maintaining stability. What seems to concern them is a high degree of uncertainty they can even be successful in that purpose.

For all of that resistance to change, it can't be satisfactory to leave the situation as it is.

The present degree of volatility can not fit any conception of an effective exchange rate system. It certainly bears no resemblance to the textbook description of gradual and smooth adjustment, nor to the theorising about identifying comparative advantage.

Most directly, in terms of this conference, exchange rate arrangements among the major countries gravely complicate the ability of emerging economies to deal with capital flow.

My suspicion is that, in time, independent currencies for many smaller countries that wish to participate fully in globalised capital markets will disappear, in substance if not in form. But that is also a proposal for two or three currency blocs, not necessarily an optimum organisation of the world financial system.

One thing is sure, the conference faces critically important – and still unresolved – issues. The way these issues are ultimately dealt with will bear directly on the prospects of much of the world for growth and stability – for, in fact, making good on the promise of the world of global finance.

# Is Our Current International Economic Environment Unusually Crisis Prone?

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Michael Bordo and Barry Eichengreen\*

## 1. Introduction

From popular accounts, one would gain the impression that our current international economic environment is unusually crisis prone. The European crisis of 1992–93, the Mexican crisis of 1994–95, the Asian crisis of 1997–98, and the other currency and banking crises that peppered the 1980s and 1990s dominate journalistic accounts of recent decades. This ‘crisis problem’ is seen as perhaps the single most distinctive financial characteristic of our age.

Is it? Even a cursory review of financial history reveals that the problem is not new. One classic reference, OMW Sprague’s *History of Crises Under the National Banking System* (1910), while concerned with just one country, the United States, contains chapters on the crisis of 1873, the panic of 1884, the stringency of 1890, the crisis of 1893, and the crisis of 1907. One can ask (as does Schwartz 1986) whether it is appropriate to think of these episodes as crises – that is, whether they significantly disrupted the operation of the financial system and impaired the health of the non-financial economy – but precisely the same question can be asked of certain recent crises.<sup>1</sup>

In what follows, we revisit this history with an eye toward establishing what is new and different about the recent wave of crises. We consider banking crises, currency crises and twin crises (where banking and currency crises coincide). The core comparison is with the earlier age of globalisation from 1880 to 1914. Interpretations of recent decades emphasise the role of economic and financial globalisation, and high international capital mobility in particular, in creating a crisis-prone environment.<sup>2</sup> The three decades preceding World War I were similarly marked by high levels of economic and financial integration. If capital mobility is the culprit, we would consequently expect to see a similar incidence of crises prior to 1914. In addition, we consider the interwar period, which is dominated by what is unquestionably the most serious international financial crisis of all, and the post-World War II quarter century, a period of relatively limited capital mobility. The broader comparison allows us to consider not just capital mobility, but also the role of other institutional arrangements like the exchange rate regime and financial regulation.

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\* This paper builds on an earlier paper prepared for the Brookings Trade Policy Forum (Bordo, Eichengreen and Irwin 1999). We thank Doug Irwin for his collaboration and support. Chris Meissner and Antu Murshid provided exceptionally patient research assistance.

1. The European exchange rate crisis of 1992–93, for example.
2. See, for example, World Bank (1999).

We ask questions like the following. What was the frequency of currency and banking crises? How does their severity compare? How long delayed was recovery? What was the impact on ancillary variables like the current account, money supply and interest rates? What was the response of the authorities?

Inherently, the results are no more reliable than the data. Readers who have worked with historical statistics will be aware that the findings reported here should be regarded as fragile. Their appetite for analysis may be affected much as by the proverbial trip to the sausage factory. In addition, there are many more countries now than a century ago with their own currencies and banking systems, and historical statistics for the earlier period are available mainly for the then high-income countries at a relatively advanced stage of economic development. This raises questions about the appropriate reference group.

## **2. Overview**

The classic case with resonance for today is Latin America's experience with lending booms and busts prior to 1914 (Marichal 1989). The first wave of British capital flows to the new states of the region to finance infrastructure and gold and silver mines ended with the crisis of 1825. British investors had purchased Latin American stocks and bonds, some of which were in non-existent companies and even countries, with gay abandon (Neal 1992). The boom ended with a stock market crash and a banking panic. The new countries defaulted on their debts and lost access to international capital markets for decades, until they renegotiated terms and began paying into arrears (Cole, Dow and English 1995).

The second wave of foreign lending to Latin America in the 1850s and 1860s was used to finance railroadisation, and it ended in the 1873 financial crisis. Faced with deteriorating terms of trade and a dearth of external finance, countries defaulted on their debts. The third wave in the 1880s involved massive flows from Britain and Europe generally to finance the interior development of Argentina and Uruguay; it ended with the crash of 1890, leading to the insolvency of Baring's, the famous London merchant bank. Argentine state bonds went into default, a moratorium was declared, and flows to the region dried up for half a decade. In the wake of the Baring's crisis, financial distress in London and heightened awareness of the risks of foreign lending worsened the capital-market access of other 'emerging markets' like Australia and New Zealand. The next wave of capital flows to emerging markets started up only after the turn of the century, once this wreckage had been cleared away.

Latin experience may be the classic, but the United States also experienced lending booms and busts. The first wave of British capital in the 1820s and 1830s went to finance canals and the cotton boom. It ended in the depression of 1837–1843 with defaults by eight states, causing British investors to shun US investments for the rest of the decade. The second wave followed the US Civil War and was used to finance westward expansion. The threat that the country would abandon gold for silver precipitated capital flight in the mid 1890s but, unlike the Latin case,



did not lead to the suspension of convertibility or an extended reversal of capital flows.<sup>3</sup>

Financial crises in this period were precipitated by events in both lending and borrowing countries. A number of crises began in Europe due to harvest failures. On several such occasions (1837; 1847; 1857) the Bank of England raised its discount rate in response to an external drain of gold reserves. This had serious consequences for capital flows to the New World. Thus, the 1837 crisis spread to North America via British intermediaries that financed the export of cotton from New Orleans to Liverpool, leading to the suspension of specie convertibility by the United States and to bank failures across the country.

Not all crises originated in the Old World. Some emanated from Latin America, where they were precipitated by supply shocks that made it impossible for commodity-exporting countries to service their debts, and by expansionary monetary and fiscal policies adopted in the effort to protect the economy from the consequences. Some were triggered by financial instability, especially in the United States, a country hobbled by a fragile unit banking system and lacking a lender of last resort. These crises in the periphery in turn infected the European core. Classic examples include the Argentine crisis of 1889–90 and the US crises of 1893 and 1907.

A fourth wave of flows to emerging markets (and to the ‘re-emerging markets’ of Europe) occurred in the 1920s after leadership in international financial affairs shifted from London to New York. (Bordo, Edelstein and Rockoff 1999). It ended at the end of the decade with the collapse of commodity prices and the Great Depression. Virtually all countries, with the principal exception of Argentina, defaulted on their debts. Private portfolio capital did not return to the region for four decades.

These interwar crises were greater in both severity and scope. They were tied up with the flaws of the gold-exchange standard. These included the fragility of a system in which foreign exchange reserves loomed increasingly large relative to monetary gold, combined with an official commitment to peg the relative price of these two assets; deflationary pressure emanating from an undervalued real price of gold; and the sterilisation of reserve flows by the Federal Reserve and the Bank of France. Compared to the pre-war gold standard, the credibility of the commitment to gold convertibility was weak, and capital flows were not as stabilising. This fragile system came under early strain from changes in the pattern of international settlements, reflecting the persistent weakness of primary commodity prices and the impact on the current account of reparations and war-debt payments.

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3. Australia, the third of the four big recipients of British capital (the fourth being Canada), also experienced a significant boom-bust cycle. A land boom in the 1880s, heavily financed by British capital, turned to bust with the deterioration in the terms of trade in 1890. This led to massive bank insolvencies in 1893, because Australian banks (unlike their counterparts in Canada) had lent against the collateral of land. British depositors, burned by their losses, remained wary of Australia for a decade. See Appendix B for a more detailed account.

Hence, when the Great Depression hit, banking panics spread via the fixed exchange rates of the gold-exchange standard. Countries were only spared the ravages of depression when they cut the link with gold, devaluing their currencies and adopting reflationary policies.

The Bretton Woods System, established in reaction to the problems of the interwar period, placed limits on capital mobility. In response to the interwar experience with banking crises, governments created elaborate systems of regulation to reduce risk-taking in the domestic financial sector and constructed a financial safety net in the form of deposit insurance and lenders of last resort. As we shall see, the result was virtually no banking crises for the better part of four decades. Crises under Bretton Woods were strictly currency crises, in which speculators attacked countries that attempted to defend exchange rates inconsistent with their domestic macroeconomic and financial policies. These attacks ended either in devaluation or, on occasion, in a successful rescue mounted by international authorities (the IMF and the G10). This contrasts with the Victorian era, when there were fewer ‘pure currency crises’ (unaccompanied by banking crises) except at the outbreak of wars.

### 3. Hypotheses

While there are similarities between the ‘emerging market crises’ of the Victorian Age and recent events, a key difference is the monetary regime. Pre-1914 crises occurred under the gold standard, while the recent crises have occurred under a regime of managed flexibility.<sup>4</sup> This has several potential consequences. First, whereas the gold standard quickly transmitted crises between peripheral and core countries, the advanced countries today are likely to be better insulated from shocks at the periphery. Central banks and governments in the advanced-industrial countries now have more room for manoeuvre, not being constrained by a commitment to defend the nominal price of gold. One might say that Alan Greenspan in 1998 should have been thankful that policy-makers had not bought into an earlier Alan Greenspan’s arguments favouring the gold standard!

Second, and working in the other direction, credible adherence to the gold standard – in the sense that maintaining the gold parity was the primary policy goal and, if it had to be abandoned in the face of a war or other emergency, it would be restored at the pre-existing parity – encouraged stabilising capital flows once resolution was in train (Miller 1996; 1998).<sup>5</sup> Because investors expected the pre-crisis exchange rate to be

4. To be sure, this last label covers a multitude of different exchange rate regimes (some would say a multitude of sins), but the essential point is that, Hong Kong and Argentina to the contrary notwithstanding, exchange rates were less firmly pegged during the recent crisis than they had been at the periphery of the international gold standard a century earlier.
5. The roots of this credibility are something we have both discussed elsewhere (viz. Eichengreen 1992; Eichengreen and Temin 1997; Bordo and Kydland 1996) and lack the space to rehearse here. Briefly, the commitment to the gold standard (and to its early resumption) was rooted in ideology, experience and politics. The ideology of *laissez faire*, the absence of a redistributive state, and the fact that there had not yet developed a theory of the countercyclical role for monetary or fiscal policy all supported a passive, rules-based approach to determining the external value of the currency – and to the early reinstatement of that approach when suspending it was necessary. Experience militated in favour of early restoration of the gold standard, insofar as countries that had done so saw a visible improvement in their international credit-market access. And politics worked in the same direction insofar as the limited extent of the franchise and low levels of union density meant that the overarching commitment to defence of the exchange rate was rarely threatened by groups with other priorities, such as the reduction of unemployment.

restored once the crisis had passed, capital and gold could have been quick to return in anticipation of subsequent capital gains. This leads us to expect relatively quick resolution of currency crises prior to 1914 at the core of the gold standard system. The credibility of this commitment to resumption was greatest in the relatively advanced economies of Western Europe, the United States (with the notable exception of the free-silver era in the 1880s and 1890s), and the British Dominions.<sup>6</sup> It was least in countries with poor records of fiscal probity and dubious credibility, including most of those of Latin America, Eastern Europe and the Near East. Other things equal, this would lead us to expect earlier recovery from crises at the centre of the gold standard system than at its periphery.

This was also the period in which core countries developed domestic lenders of last resort (Bordo and Schwartz 1998), lifeboat operations on the part of the banks themselves (Gorton 1985), and an *ad hoc* system of international rescue loans (Eichengreen 1992). None of these arrangements was prevalent at the periphery, however. This contrast would thus lead us to expect to see differences in the frequency and severity of banking crises in the core and the peripheral countries.<sup>7</sup>

Today the vast majority of countries have put in place lenders of last resort and financial safety nets, limiting scope for the kind of wholesale banking collapses seen in the interwar years. Instead, banking panics are transformed into situations where the liabilities of an insolvent banking system are taken over by the government. This can, however, convert a banking crisis into a currency crisis (Dooley 1998). It suggests that while there may be factors at work limiting the macroeconomic effects of banking crises, we should also observe a greater incidence today of ‘twin crises’ (when banking and currency crises come together).<sup>8</sup> It also suggests that recovery from banking crises may be quicker today, reflecting concerted intervention by the authorities. But regulatory intervention has not always been early, and the authorities in many emerging markets are hamstrung by the fact that many of the external liabilities of the banking and corporate sectors are denominated in foreign currency. Thus, the validity of this last hypothesis – like the others – remains to be established.

#### 4. Data and Methods

To compare the depth and duration of crises, we focus on changes in the rate of growth. We examine the growth of real GDP before, during and after crises for

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6. Eichengreen (1992) defines the core countries of the gold standard as those where the commitment to the maintenance of gold convertibility was credible, and the peripheral countries of the system as those where it was not. See also footnote 17 below.

7. As we in fact find below.

8. Again, our results turn out to be broadly consistent with this hypothesis, though there were in fact a substantial number of twin crises prior to 1914.

15 capital-importing ‘emerging markets’ in the period 1880–1914.<sup>9</sup> We also consider six mature markets – read ‘capital exporters’.<sup>10</sup> We then make similar calculations for ten emerging markets experiencing crises in the past 25 years.<sup>11</sup>

We identify currency and banking crises from a survey of the historical literature. The resulting chronology is reproduced in Appendix A. (Appendix B provides capsule histories of the most important pre-1914 episodes.) For an episode to qualify as a banking crisis, we must observe either bank runs, bank failures and the suspension of convertibility of deposits into currency (a banking panic), or else significant banking-sector problems (including failures) that are resolved by a fiscally underwritten bank restructuring.<sup>12</sup> For an episode to qualify as a currency crisis, we must observe a forced change in parity, the abandonment of a pegged exchange rate, or an international rescue. An alternative measure of currency crises that we also use is an index of exchange market pressure, calculated as a weighted average of the percentage change in the exchange rate with respect to the core country (the UK before 1914, the US thereafter), the change in the short-term interest rate differential with respect to the core country, and the difference of the percentage change in reserves of a given country and the percentage change in reserves of the core country.<sup>13</sup> We count an episode as a currency crisis when it shows up according to either of these indicators.

For each country we calculate the growth rate in the crisis year relative to its trend over the five years preceding the crisis; crisis-year growth relative to its three-year trend preceding the crisis; the difference between crisis-year growth and the preceding year’s growth rate; the difference between growth the year following the crisis and the crisis-year growth rate; the difference between the three-year trend

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9. The countries, whose selection is driven by data availability, are Argentina, Australia, Brazil, Canada, Chile, Denmark, Finland, Greece, Italy, Japan, Norway, Portugal, Spain, Sweden and the United States. Our criteria for classifying a country as emerging are (i) whether it was primarily a recipient of capital flows; and (ii) its level of per capita income. Thus, in the pre-1914 era a number of the 20<sup>th</sup> century’s most advanced countries (the US, Japan, and the Scandinavians) are classified as emerging markets on the first of these two ground. A similar comparison is made by Delargy and Goodhart (1999). Their empirical base is more limited, however; they concentrate on a number of famous crisis episodes in the pre-1914 era in five countries (the US, Australia, Argentina, Italy and Austria). An alternative metric would measure the wealth losses associated with the resolution of the crises. This is the approach taken by Caprio and Klingbiel (1996). By this metric the losses associated with banking crises in the 1980s and 1990s is likely to be considerably larger than before 1914 (Calomiris 1999).

10. They are Belgium, France, Germany, the Netherlands, Switzerland, and Great Britain.

11. These are Argentina, Brazil, Chile, Indonesia, Korea, Malaysia, Mexico, Philippines, Singapore and Thailand.

12. This allows us to distinguish between liquidity crises before 1914 in which lender-of-last-resort intervention was either absent or unsuccessful, and events (like those typical of more recent years) where a lender of last resort or deposit insurance is in place and the main problem has been bank insolvency. In fact, however, a number of banking crises which occurred in Europe before 1914 did not involve panics and in this respect were not dissimilar from episodes occurring more recently.

13. This builds on the exchange-market-pressure model of Girton and Roper (1977), following the methodology in Eichengreen, Rose and Wyplosz (1995; 1996).

growth rate following the crisis and the crisis-year growth rate; and finally the difference between the five-year trend growth rate following the crisis and the crisis-year growth rate.<sup>14</sup>

## 5. Depth and Duration of Crises: Pre-1914 and Post-1972

Table 1 presents summary statistics of cross-country averages for the pre-1914 and post-1972 periods (the two ages of financial globalisation). Our discussion focuses on the emerging markets (columns 1 and 3). We identify 22 crises in emerging markets and 7 in their advanced-industrial counterparts prior to 1914.<sup>15</sup>

**The Recessionary Phase:** A key fact is that the output effects of banking and financial crises in emerging markets were roughly the same before 1914 as today. Whereas growth declined by 3 percentage points relative to trend in the typical post-1972 crisis, the comparable number for emerging markets in the pre-1914 period was 2 percentage points. The contrast is sharpest for twin crises (with both banking and currency components), which have been exceptionally disruptive since 1972 (when the average decline in the growth rate was 5 per cent) but were less so prior to 1914 (when the average drop was again ‘only’ 2 per cent). Whatever the contrast, however, these differences are not large. While crises may have been somewhat less severe on average before 1914 than today, t-tests of the difference of means do not permit us to reject the null that the severity of downturns was the same across periods.<sup>16</sup>

By these measures, the fall in output in the recent Asian crises was especially steep: Korea’s growth rate declined 7 percentage points below its pre-crisis five-year-average growth rate, 8 percentage points below its three-year pre-crisis average and 7 percentage points from the year preceding the crisis. Thailand’s performance was similar, while Indonesia’s was the worst (at –13, –13, –11 percentage points respectively). The severity of these countries’ crises in 1997–98 is well known; the point here is that their recessions were dramatic relative to the typical crisis in emerging markets prior to 1914.

Turning from typical to exceptional, how does recent Asian experience compare with the worst of the pre-1914 era? The two most infamous pre-World War I crises in emerging markets, the US in 1893 and Argentina in 1890, were even worse than Asia in recent years.<sup>17</sup> For the US, growth during the crisis years declined by 9 percentage

14. Assuming that the economy is roughly at its trend growth rate for five years before the crisis, this gives a rough measure of the extent to which growth deviated from trend and then recovered.

15. Given 510 country years, these occur at a rate of 4.3 per cent. The comparable incidence for our ten post-1972 emerging markets is higher: 11.5 per cent. Note, however, that the post-1972 sample is not selected randomly; the ten countries considered are selected as well-known crisis cases.

16. The likely direction of bias in the cyclical behaviour of historical national income statistics would tend to exaggerate the severity of recessions prior to 1913 (since these numbers are heavily constructed on the basis of commodity production, which is more volatile than other components of GNP). To the extent that this bias is present, it would tend to work against the conclusion in the text. It suggests that, if anything, we are understating the contrast between then and now.

17. Categorising the United States as an emerging market is likely to be controversial. Our categorisation follows Eichengreen (1992), which classes the US as a ‘peripheral’ country prior to 1913 on the grounds that it was dependent on capital imports for much of the period, lacked a lender of last resort to backstop domestic financial markets, and was incompletely committed to the maintenance of gold convertibility and was thus not the recipient of stabilising capital flows. A contrasting interpretation is Bordo and Schwartz (1996a).

**Table 1: Fluctuations in Annual Growth Rates Around the Time of Crises:  
Emerging and Advanced Countries**  
Summary statistics 1880–1913, 1973–1998

	<b>All crises: means (number of crises)</b>		
	15 emerging countries	6 advanced countries	10 emerging countries
	1880–1913 (22)	1880–1913 (7)	1973–1998 (30)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	-0.02	0.00	-0.03
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	-0.01	0.00	-0.03
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.02	-0.03	-0.03
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	-0.02	-0.01	0.02
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.01	0.00	0.02
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.03	0.00	0.03
	<b>Twin crises: means (number of crises)</b>		
	15 emerging countries	6 advanced countries	10 emerging countries
	1880–1913 (9)	1880–1913 (1)	1973–1998 (14)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	-0.02	-0.01	-0.05
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	-0.02	0.00	-0.05
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.02	-0.14	-0.05
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	0.00	0.06	0.03
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.01	0.04	0.05
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.02	0.04	0.05

*Continued*

**Table 1: Fluctuations in Annual Growth Rates Around the Time of Crises:  
Emerging and Advanced Countries** (*continued*)  
Summary statistics 1880–1913, 1973–1998

<b>Banking crises: means (number of crises)</b>			
	15 emerging countries 1880–1913 (8)	6 advanced countries 1880–1913 (4)	10 emerging countries 1973–1998 (5)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	-0.02	-0.01	-0.03
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	-0.02	-0.01	-0.03
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.03	-0.02	-0.02
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	-0.03	0.01	0.02
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.00	0.01	0.02
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.05	0.01	0.01
<b>Currency crises: means (number of crises)</b>			
	15 emerging countries 1880–1913 (5)	6 advanced countries 1880–1913 (2)	10 emerging countries 1973–1998 (11)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	0.00	0.03	-0.02
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	0.03	0.03	-0.01
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.01	0.02	0.00
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	-0.03	-0.07	0.01
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.02	-0.04	0.00
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.00	-0.03	0.01

Notes:  $\bar{g}_{\text{crisis}}$  is the annual growth rate of real GDP at the crisis year.  $\bar{g}_{(N)}$  is the average annual growth rate of real GDP N years before (-) or after (+) the crisis. Data are in logs; to convert to percentages, multiply by 100.

Sources: Bordo and Schwartz (1996a) database; IFS CD-ROM (1999).

points relative to its previous five-year trend, 12 percentage points below its three-year pre-crisis trend, and 14 percentage points from the pre-crisis year. For Argentina the numbers are even more dramatic if the conventional statistics are to be believed: -17 per cent, -20 per cent, -24 per cent, with recovery in growth not complete after 5 years. The exceptional severity of these episodes should serve as a warning that generalisations about the pre-1914 period must be drawn cautiously, since that period appears to have featured a small number of extraordinarily severe crises along with numerous milder episodes.<sup>18</sup> This is another way of understanding why it is difficult to reject the null that the severity of crises was the same across periods: the standard deviation of the fall in output was large, reflecting the aforementioned heterogeneity, relative to the mean, both before 1914 and after 1972.<sup>19</sup>

That Argentina in 1890 and the US in 1893 were both 'emerging-market' crises might appear to imply that pre-World War I financial crises were most severe outside the more advanced industrial countries. While the small size of our advanced-country sample renders the drawing of strong conclusions problematic, our results do not obviously support this generalisation. The two pure currency crises in our advanced-country sample (Germany in 1903 and 1907) led to sharp drops in growth relative to trend. Pure banking crises, on the other hand, seem to have had milder recessionary effects at the core than the periphery. But the recessionary effects of the one twin crisis we identified, France in 1889, were unusually severe.<sup>20</sup>

**The Recovery Phase:** Generalisations about the aftermath of crises are even more difficult to draw. There is a sense in which emerging markets recovered more quickly from currency crises before 1914 than after 1972, although once again the data do not speak loudly. Before 1914, the growth rate rose by 2 percentage points between the crisis year and the three years following; after 1972, it failed to rise at all.<sup>21</sup> Delargy and Goodhart (1999) find a similar pattern and interpret it in terms of the resumption rule. Prior to 1913, countries driven off the gold standard generally intended to restore convertibility at the previously-prevailing exchange rate once the

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18. Another reason for caution is that the results change when we include the crises that erupted in 1914 due to the outbreak of World War I. These are numerous; including them increases the size of our sample by about half. They are also relatively severe, since the disruption to international financial relations due to the outbreak of the war was extensive. Including these episodes in the averages makes the immediate post-crisis drop in output slightly *more* severe prior to 1915 than after 1972. While there is good reason to regard these wartime shocks as special (and for therefore not including them in the comparison with our day), this is another reminder of the difficulty of generalising about financial stability in the last age of globalisation.

19. For better or for worse, this is a characteristic of all our inter-temporal comparisons, making standard t-tests blunt instruments for assessing differences.

20. See Appendix B for details.

21. We hesitate to place too much emphasis on these patterns, given the small sample size. The same conclusion does not carry over to the one- and five-year post-crisis comparisons. Note that the pattern is not evident in the two advanced-industrial country currency crises in our sample (Germany in 1903 and 1907), where there were mounting doubts about the sustainability of fiscal policy and the monetary regime (Ferguson 1999).



crisis passed. While investors who held domestic-currency-denominated assets suffered losses when the currency collapsed, they anticipated gains as the currency recovered to its traditional parity. To put the point another way, there was little reason to fear that abandoning the currency peg would unleash uncontrolled inflation insofar as the authorities were committed to re-establishing the previous rate of exchange. Hence, devaluation did not unleash persistent capital flight. Rather, gold and capital began flowing back in at a relatively early date, stabilising the economy and stimulating recovery.

In contrast, the recovery from banking crises starts earlier in the modern period, in the first post-crisis year, as opposed to the second or third. This is true whether or not banking crises are accompanied by currency crises. A likely explanation is the absence before 1914 of effective lenders of last resort capable of restoring depositor confidence, stabilising supplies of money and credit, and sustaining the provision of financial services to the economy. The US crises of 1893 and 1907, which were greatly aggravated by the absence of last-resort lending (leading in turn to the establishment of the Fed), make this point.<sup>22</sup> One can argue that regulatory forbearance and central bank bailouts have adverse long-term effects by weakening market discipline and leading to a less efficient allocation of capital. Indeed, there is some suggestion of this in the data: while recovery from banking crises is initiated earlier in the post-1972 period, the subsequent expansion accelerates less dramatically and is sustained less successfully, as if market discipline and the efficiency with which credit is allocated are less (than in comparable episodes a hundred years ago).

Automatic stabilisers were also absent prior to 1914. Some recent commentators have noted that the Asian crisis countries (and other emerging markets) found their use of automatic stabilisers constrained by a lack of confidence and the existence of high capital mobility. That may be true, but the comparison suggests that they may still have been able to adopt a more concerted response than their counterparts a century ago. Other commentators have been critical of regulators for failing to force through an earlier resolution of banking problems. They have a point, but the striking fact is that recovery from banking crises has tended to begin earlier in the recent period than in the typical crisis episode a hundred years ago.

**Summary:** Thus, while the crisis problem is not new, recent crises have some new and distinctive features. The drop in output following their outbreak would seem to be larger. And for currency crises, the subsequent recovery appears to be slower.

## 6. The Behaviour of Ancillary Variables: Pre-1914 and Post-1972

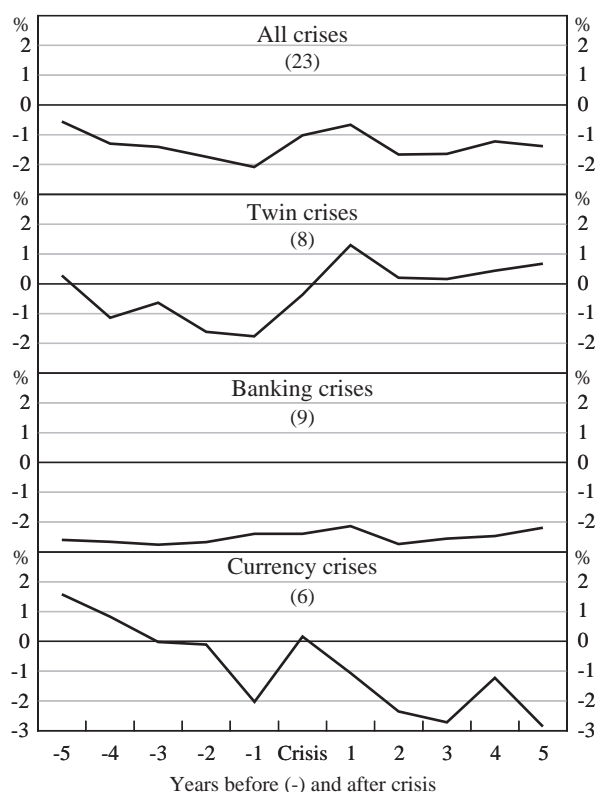
The behaviour of other variables should help us to flesh out these interpretations. We plot their behaviour for five years leading up to each crisis and five years following, again focusing on emerging markets, particularly before 1913.<sup>23</sup>

22. So too does the fact that recovery from banking crises and twin crises was on average initiated earlier in the advanced countries than the pre-war emerging markets, given the fact that lender-of-last-resort capacity was more highly developed at the centre.

23. Data sources for these variables are the same as indicated in Tables 1–2.

**Net Exports:** Figure 1, for emerging markets under the gold standard, shows how crises were preceded by capital inflows (read ‘lending booms’) that peaked on average at about 2 per cent of GDP, before narrowing sharply in the crisis year.<sup>24</sup> Aggregating all emerging-market crises, capital flows never dry up entirely; all we see is the current account deficit narrowing in the crisis year to half its previous amount, and narrowing somewhat further the year following the crisis.<sup>25</sup> The trade deficit then begins widening toward earlier levels, confirming that capital inflows were relatively quick to resume. Indeed, the comparison with the analogous chart for the post-1972 period (Figure 2) suggests that the behaviour of capital flows is not so stabilising: there, the swing is larger, capital flows dry up entirely, and inflows are slower to resume.

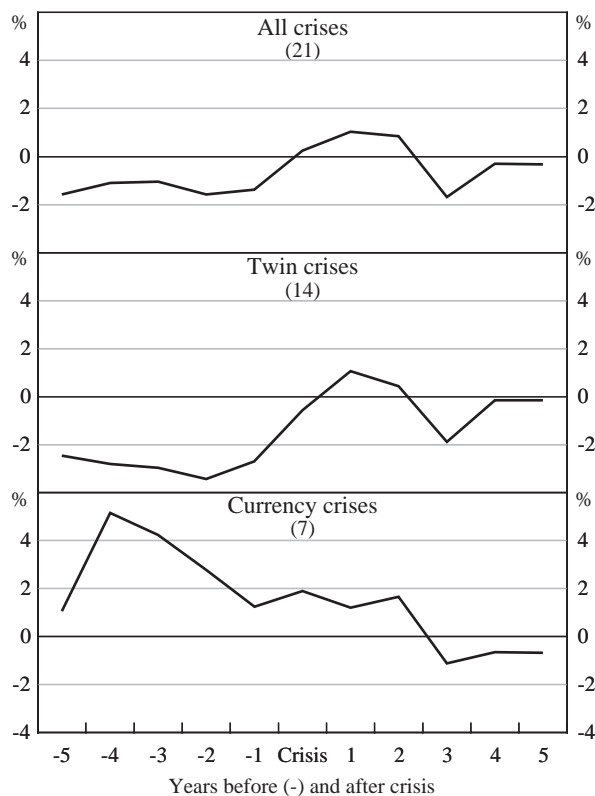
**Figure 1: Ratio of Net Exports to GDP**  
Emerging countries, 1880–1914



24. Sticking with convention, a negative balance denotes a deficit. In what follows we discuss the current account and the inverse of the capital account interchangeably, which is not strictly correct in a world where central banks accumulate and de-accumulate reserves. As is well known, however, reserve movements under the classical gold standard were small (Bloomfield 1959). We approximate the current account using net exports because those are the only estimates available for the entire 120 year time span. For a smaller subset of countries we have shown elsewhere patterns of movement in the current account which are very similar to those shown here (Bordo, Eichengreen and Kim 1998).

25. To the extent that our trade-based measure imperfectly captures the current account, the fact that the countries in our sample were net foreign debtors only reinforces the point.

**Figure 2: Ratio of Net Exports to GDP**  
Ten emerging countries, 1973–1998

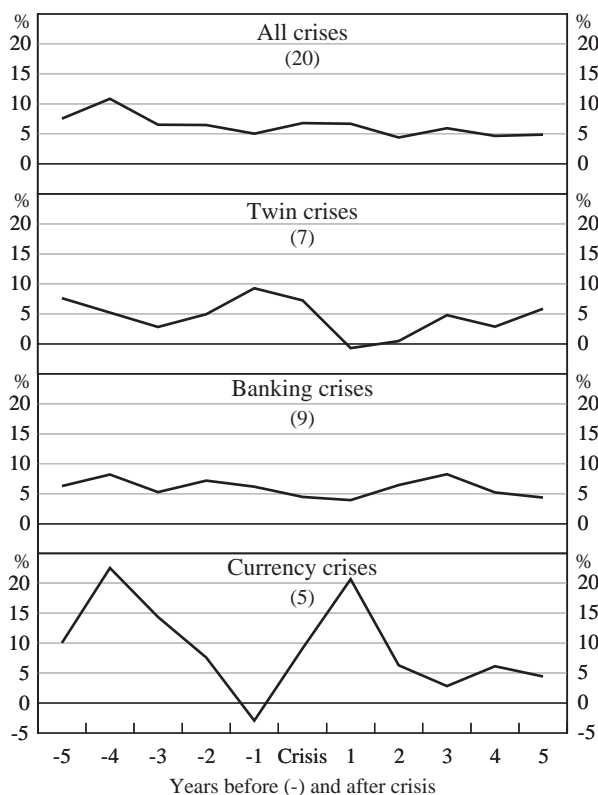


The accompanying panels for the different types of crises indicate that this behaviour is heavily driven by currency crises, as suggested by our earlier interpretation emphasising the resumption rule. While inflows fall sharply in the currency-crisis year, they pick up the year after, presumably reflecting stabilising expectations. In the typical post-1972 currency crisis, in contrast, it takes as much as three years for capital inflows to resume.

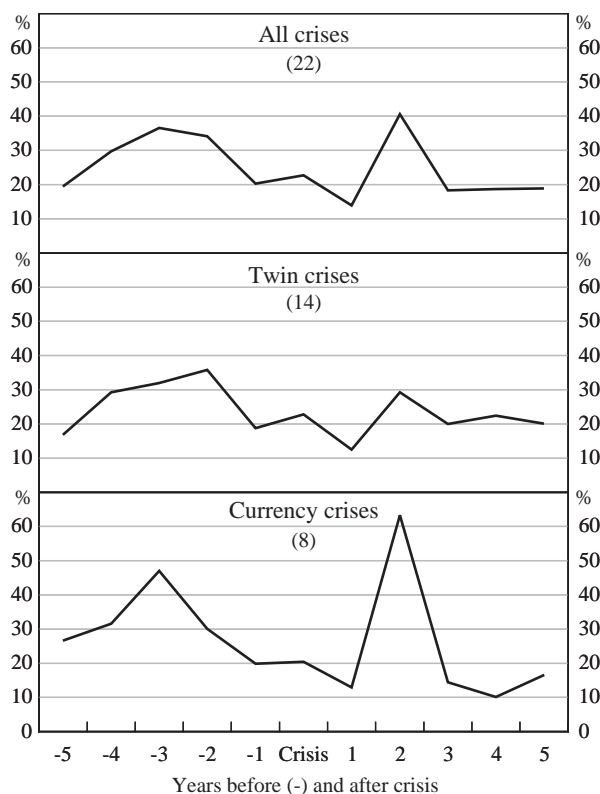
Nineteenth century banking crises, in contrast, do not seem to be driven by, or to drive, large swings in the current account. Twin crises show the opposite. Persistent current account deficits typically preceded these crises, while the current-account swing around the outbreak of crisis is large. Importantly, there is little sign of resumption of capital inflows even five years following the eruption of the crisis. The coincidence of a banking crisis, it would appear, undermined the credibility of the resumption rule and hence the power of stabilising capital flows. This is not something that would surprise a historian of the US in the 1870s or Argentina in the 1890s.

**Money Growth:** These patterns are reflected in the behaviour of domestic financial variables. The capital inflow fuels a rise in the rate of domestic money growth (Figure 3 – we use M2 wherever possible), particularly in the run-up to twin crises. The rate of growth of the money stock then falls sharply for several years following the event and recovers only slowly thereafter. The pattern is similar after 1972 (Figure 4). Note, however, the differences in the scale on the vertical axis, reflecting the shift from commodity to fiat money.

**Figure 3: Growth Rate of Money**  
Emerging countries, 1880–1914



**Figure 4: Growth Rate of Money**  
Ten emerging countries, 1973–1998



The pattern is different when either banking or currency crises come alone. For pre-1914 currency crises, the dip in the rate of money growth precedes the crisis, as reserves are run down and credit creation slows. In the year of the crisis, when the exchange rate is typically let go, domestic credit creation recovers to previous levels and even makes up ground lost previously, before falling to sustainable levels consistent with the resumption rule. Again, the post-1972 pattern is similar, though the post-crisis spike in money growth is larger and longer delayed.

When pre-1914 banking crises come alone, money growth rates are less volatile: money supplies fall gradually through the crisis and recover gradually thereafter.<sup>26</sup>

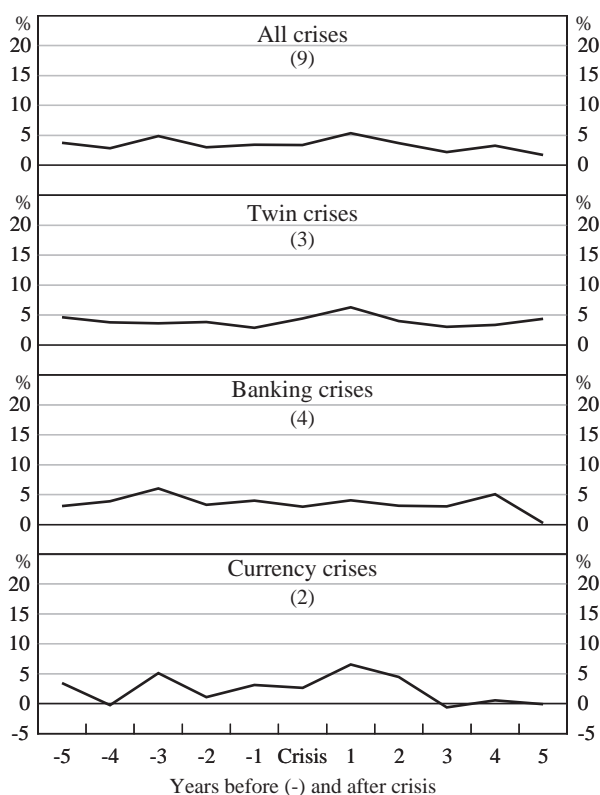
**Real Interest Rates:** Prior to 1914, real interest rates were stable or slightly falling in the run-up to emerging-market crises (Figure 5), but rose sharply in the year following the event.<sup>27</sup> Interest rates had fallen back to pre-crisis levels by the second

26. The growth of international reserves (not shown) echoes the pattern for money growth, rising well before the crisis, then falling in the crisis year and recovering thereafter. The pattern is evident in particularly accentuated form during twin crises.

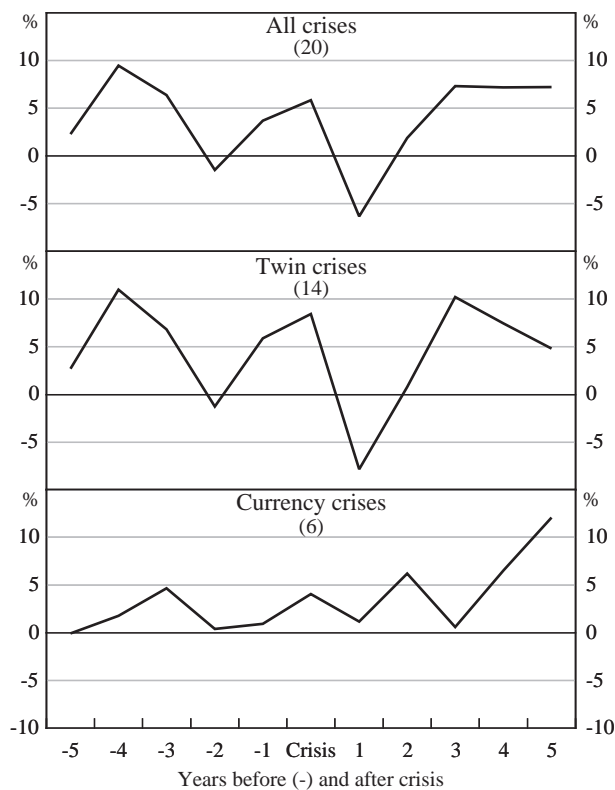
27. We consider *ex post* real rates measured as the difference between the nominal interest rates (short-term market rates where available) and the inflation rate.

post-crisis year (in the cases of both banking and currency crises). It would be particularly interesting to be able to argue that interest rates came down more quickly following 19<sup>th</sup> century crises, reflecting the operation of the resumption rule. But this is not clear from the data. For one thing, the fall in interest rates is slowest for pure currency crises, where the resumption rule should have operated most powerfully. For another, it is hard to detect a strong contrast in the post-crisis behaviour of interest rates between the pre-1914 era and post-1972 period (Figure 6), other than the sharper fall in *ex post* rates in the modern era owing to the more dramatic acceleration of inflation. We are still inclined toward the resumption-rule interpretation, but the data may be too fragile to lend it strong support.

**Figure 5: Real Interest Rate**  
Emerging countries, 1880–1914



**Figure 6: Real Interest Rate**  
Ten emerging countries, 1973–1998



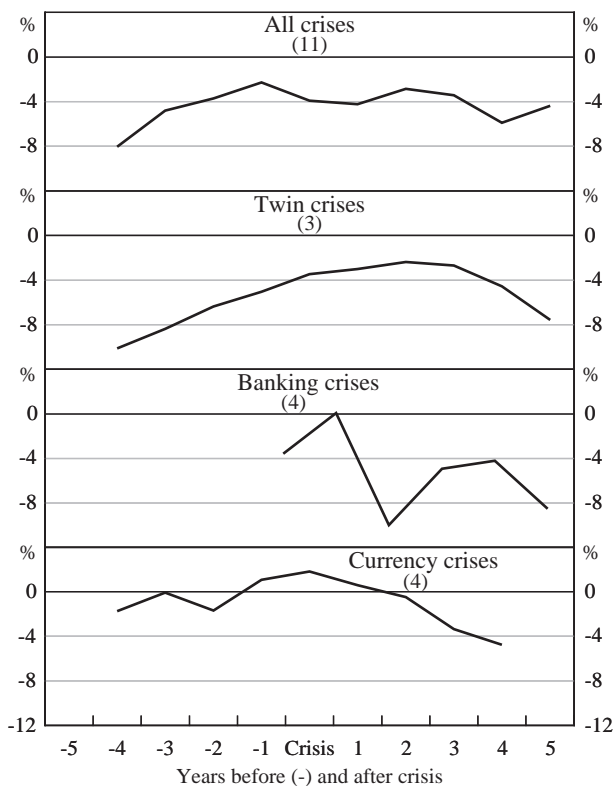
## 7. Interwar and Bretton Woods Comparisons

Crisis in the interwar and Bretton Woods periods are different, as shown in Table 2.<sup>28</sup>

**Interwar Years:** The interwar years were notoriously crisis prone: the incidence of crises per country-year was ten per cent. As is to be expected, the drop in output following crises was exceptionally sharp. Note that this was not due to a different mix of crises from the pre-World War I period: the ratio of currency crises to banking crises, and the ratio of twin crises to pure banking and currency crises, remained unchanged from before World War I. The difference is attributable instead to the exceptional severity of the banking and twin crises of the 1930s. This was of course Friedman and Schwartz's (1963) explanation for the severity of the Great Depression in the United States, which they attribute to the failure of the Federal Reserve to act

28. Here our six emerging markets are Argentina, Brazil, Chile, Greece, Portugal and Spain. The advanced countries, in addition to the six from the pre-1914 period, now include Australia, Canada, Denmark, Finland, Italy, Japan, Norway, Sweden and the United States.

**Figure 7: Ratio of Net Exports to GDP**  
Emerging countries, 1919–1939



as a lender of last resort, in conjunction with the disappearance of the private lifeboat operations that were so important before the war. The twin-crisis version is the explanation for the exceptional depth of the global slump elaborated by Bernanke and James (1991).<sup>29</sup>

29. Note also that the four pure currency crises affecting emerging markets in our sample for the 1930s had unusually severe recessionary effects. But the recovery from those crises is also unusually dramatic, reflecting the effectiveness of reflationary monetary policies (Campa 1990).



**Table 2: Fluctuations in Annual Growth Rates Around the Time of Crises:  
Emerging and Advanced Countries**  
Summary statistics 1919–1939, 1945–1971

<b>All crises: means (number of crises)</b>				
	6 emerging countries	15 advanced countries	6 emerging countries	15 advanced countries
	1919–1939 (14)	1919–1939 (28)	1945–1971 (14)	1945–1971 (13)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	-0.05	-0.04	-0.02	0.01
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	-0.06	-0.04	-0.04	0.00
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.05	-0.04	-0.03	-0.01
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	0.02	0.03	0.04	0.01
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.07	0.04	0.03	0.00
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.07	0.04	0.02	0.00
<b>Twin crises: means (number of crises)</b>				
	6 emerging countries	15 advanced countries	6 emerging countries	15 advanced countries
	1919–1939 (3)	1919–1939 (10)	1945–1971 (1)	1945–1971 (0)
$\bar{g}_{\text{crisis}} - \bar{g}_{(-5)}$	-0.04	-0.06		
$\bar{g}_{\text{crisis}} - \bar{g}_{(-3)}$	-0.04	-0.05		
$\bar{g}_{\text{crisis}} - \bar{g}_{(-1)}$	-0.04	-0.05	-0.13	
$\bar{g}_{(+1)} - \bar{g}_{\text{crisis}}$	0.01	0.05	0.17	
$\bar{g}_{(+3)} - \bar{g}_{\text{crisis}}$	0.02	0.07	0.06	
$\bar{g}_{(+5)} - \bar{g}_{\text{crisis}}$	0.02	0.07	0.06	

*Continued*

**Table 2: Fluctuations in Annual Growth Rates Around the Time of Crises:  
Emerging and Advanced Countries (continued)**  
Summary statistics 1919–1939, 1945–1971

<b>Banking crises: means (number of crises)</b>				
	6 emerging countries 1919–1939 (7)	15 advanced countries 1919–1939 (8)	6 emerging countries 1945–1971 (0)	15 advanced countries 1945–1971 (0)
$g_{\text{crisis}} - g_{(-5)}$	0.00	-0.03		
$g_{\text{crisis}} - g_{(-3)}$	0.00	-0.04		
$g_{\text{crisis}} - g_{(-1)}$	-0.06	-0.06		
$g_{(+1)} - g_{\text{crisis}}$	-0.01	0.02		
$g_{(+3)} - g_{\text{crisis}}$	0.01	0.02		
$g_{(+5)} - g_{\text{crisis}}$	0.01	0.03		
<b>Currency crises: means (number of crises)</b>				
	6 emerging countries 1919–1939 (4)	15 advanced countries 1919–1939 (10)	6 emerging countries 1945–1971 (13)	15 advanced countries 1945–1971 (13)
$g_{\text{crisis}} - g_{(-5)}$	-0.11	-0.03	-0.02	0.01
$g_{\text{crisis}} - g_{(-3)}$	-0.13	-0.02	-0.04	0.00
$g_{\text{crisis}} - g_{(-1)}$	-0.06	-0.03	-0.02	-0.01
$g_{(+1)} - g_{\text{crisis}}$	0.07	0.02	0.03	0.01
$g_{(+3)} - g_{\text{crisis}}$	0.18	0.02	0.03	0.00
$g_{(+5)} - g_{\text{crisis}}$	0.18	0.02	0.02	0.00

Notes:  $g_{\text{crisis}}$  is the annual growth rate of real GDP at the crisis year.  $g_{(N)}$  is the average annual growth rate of real GDP N years before (-) or after (+) the crisis. Data are in logs; to convert to percentages, multiply by 100.

Source: Bordo and Schwartz (1996a) database.

Twin crises, currency crises and banking crises were of roughly comparable severity in the 1930s. One noticeable contrast is between the recessionary impact of currency crises in emerging and advanced economies: the unusual severity of the former is plausibly attributable to the impact of devaluation on the cost of servicing foreign-currency denominated debts.

Under Bretton Woods, crises were mild. There were no banking crises in our sample, reflecting the restrictions imposed on banking systems in response to the disasters of the 1930s. While currency crises continued to occur despite the adoption of restrictions on capital mobility, their output effects were mild by the standards of the pre-1914 and interwar periods. This plausibly reflects the more limited scope for capital flight in the controlled financial environment of the 1950s and 1960s and the greater scope for central banks to continue pursuing policies to sustain output and demand behind the shelter of controls (*à la* Malaysia in the late 1990s). Those recessionary effects were more pronounced in emerging markets than advanced economies, but the contrast is less than in either of the preceding periods, plausibly reflecting the prevalence of capital controls and the quiescence of international financial markets.

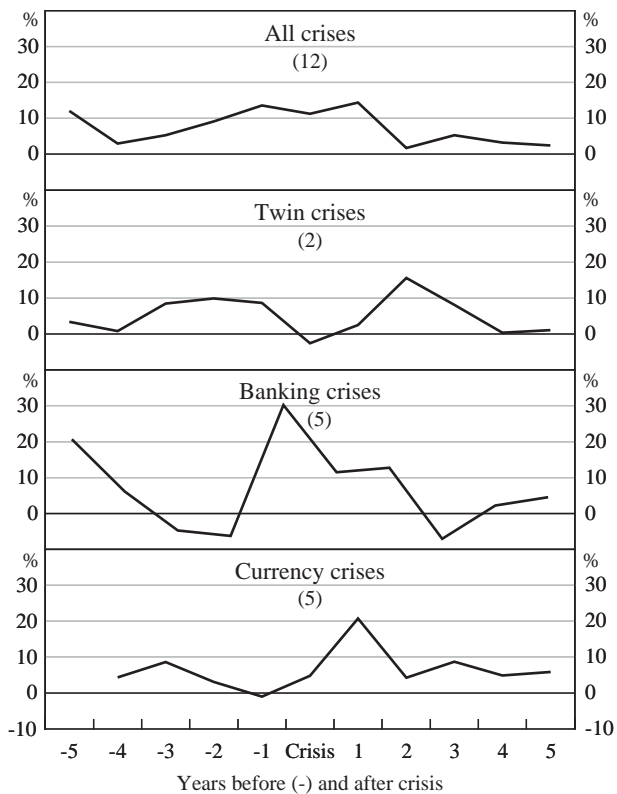
We will be brief on the ancillary variables between the wars and under Bretton Woods, since they bear out previously mentioned patterns, with a few notable exceptions. The behaviour of the current account differed in the run-up to the crises of the 1930s (Figure 7), in that capital inflows had already dried up (generally in 1928), and emerging markets were carrying out net resource transfers to their creditors for several years before their crises broke out (generally in 1931).<sup>30</sup> Those reverse transfers continued in the crises, reflecting the collapse of new lending and international capital markets generally in the 1930s.

Money supplies fluctuate as usual around the crises of the 1930s (Figure 8); the main difference from earlier (pre-1914) crises is the collapse of money growth following the interwar banking crises (a fact that is, to repeat, duly emphasised in the historical literature).

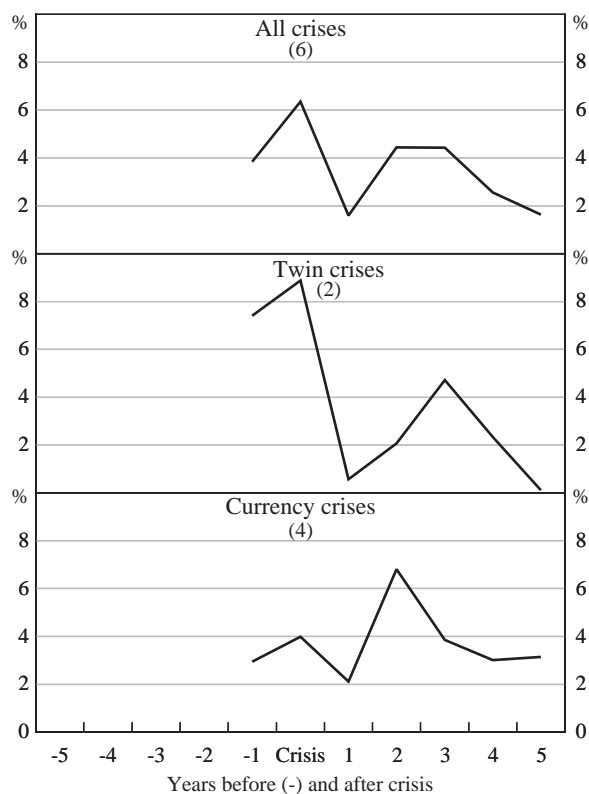
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30. Figure 7 shows that inflows to emerging countries dry up prior to currency crises. Complicating the interpretation, however, are isolated banking crises in our emerging economies in the 1920s (1923 in Brazil, 1925 in Chile, 1920–23 in Portugal, 1920–23 in Spain) when capital was flowing, albeit not to the extent it did in the second half of the decade.

**Figure 8: Growth Rate of Money**  
Emerging countries, 1919–1939

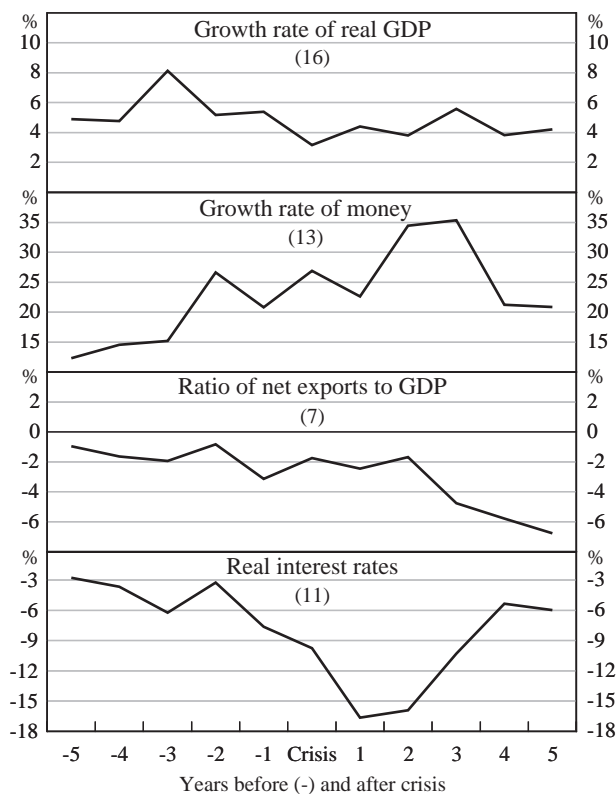


**Figure 9: Real Interest Rate**  
Emerging countries, 1919–1939



**Bretton Woods:** The Bretton Woods period, to repeat, featured only currency crises in our emerging-market sample and one twin crisis (Brazil in 1963). The drop in output associated with these currency crises was limited by the standards of the immediately preceding and succeeding periods. The most notable difference from the other periods is probably the decline in real interest rates (Figure 10) following the crisis, which is more pronounced than in either the pre-1914 or interwar periods. This presumably reflects policies of financial repression (the maintenance of binding interest-rate ceilings in conjunction with accelerating inflation, itself evident in the post-crisis acceleration in the rate of money growth).

**Figure 10: Currency Crises**  
Emerging countries, 1945–1971



## 8. Summary and Implications

Our review of 120 years of currency and banking crises has pinpointed a number of striking regularities and some obvious differences. Both have policy implications.

We have provided more evidence that the gold standard was different. At its centre, currency crises were relatively few. This is attributable to the credibility of the commitment to the maintenance of the exchange-rate peg in the countries at the centre of the system, a credibility rooted in politics and ideology. The limited extent of the franchise and low levels of union density meant that the overarching commitment to defence of the exchange rate was rarely threatened by groups with other priorities such as unemployment, while the ideology of *laissez faire* and hard money reigned supreme. Readers will be reminded of the argument that the only crisis-resilient currency peg in a world of high capital mobility is a permanently fixed peg rooted in an overarching political commitment to convertibility. It is no coincidence, from this point of view, that Argentines refer to their pegged-rate regime as ‘convertibility’.

Those currency crises that occurred at the periphery of the gold standard were short. By and large, countries recovered quickly. This is attributable to the commitment to resume convertibility at the pre-crisis parity where events made temporary suspension unavoidable.<sup>31</sup> The pattern can be interpreted, controversially, as support for the advice that crisis countries push their currencies back up to pre-crisis levels to punish the speculators, reassure investors, and restore the credibility of their hard-currency policies.<sup>32</sup> The caveat is that the deflation required for resumption not destabilise the banking system and transform the currency crisis into a twin crisis. Twin crises, we have seen, were serious under the gold standard.

The interwar gold-exchange standard was a different animal. Due to declining credibility and rising financial fragility, it was notoriously crisis prone. This finds reflection in the unusual incidence of crises in our interwar sample. The drop in output is sharp for twin crises, banking crises and currency crises alike.

The one surprise is how countries bounced back relatively quickly. We show this for the four regimes, for all crises, in Figure 11. There we compare emerging markets prior to 1914 and after 1972 but advanced as well as emerging markets for the interwar period and Bretton Woods. We do this because crises in the earliest and most recent periods were largely emerging-market events, while those occurring in the intervening half century were centred on the advanced-industrial countries. The typical pattern was a crisis followed in short order by devaluation and then the adoption of a more expansionary monetary policy, initiating recovery (Eichengreen and Sachs 1985).<sup>33</sup> Readers will be reminded of the debate over economic policy in today's Japan and the argument that monetary policy should have been used more aggressively to jumpstart the economy.

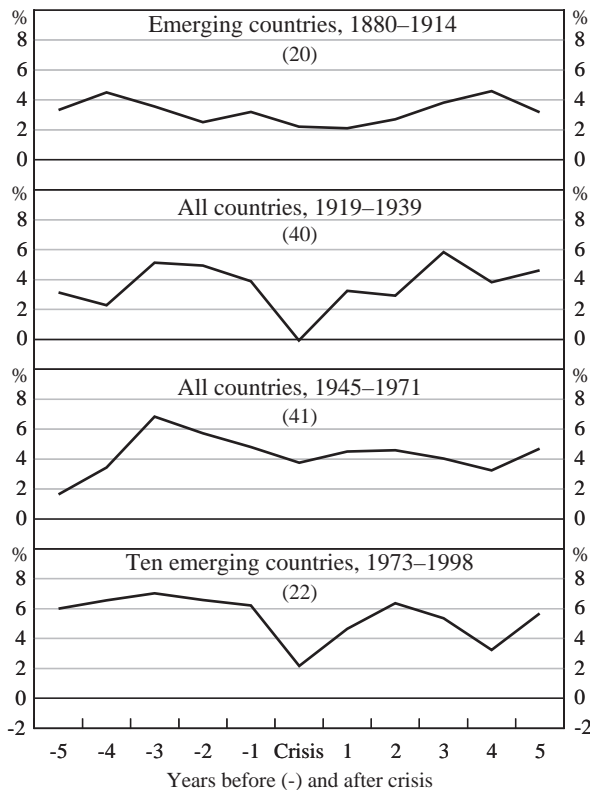
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31. Although this strategy was only successfully followed by some pre-1914 emerging markets (e.g. the US, Canada, Australia and the Scandinavians) and not others (e.g. the Latin American and Southern European countries); again, see Bordo and Schwartz (1996a) and Eichengreen (1992).

32. Thus, it was argued by critics of IMF advice in Asia (and advocates of the currency-board solution in particular) that countries like Indonesia attempt to push their currencies back up to their pre-devaluation levels before re-pegging them.

33. The textbook picture of the United States becalmed in a decade-long recession would appear to be the exception, not the rule.

**Figure 11: Growth Rate of Real GDP**  
All crises, by regimes



Under Bretton Woods, banking crises were essentially non-existent, and the effects of currency crises were mild. This is more evidence, as if Chinese or Malaysian policy-makers needed it, that strict controls on domestic and international financial transactions can suppress the symptoms of financial instability. Whether there are costs, in terms of slower growth than would have obtained otherwise, is, of course, the question of the day. The speed of growth in this period provides no obvious support for those who would emphasise the negative side effects.

What then is distinctive about our period? Not the fact of currency and banking crises in emerging markets; both have been seen before. Perhaps the consequences, though the differences in macroeconomic effects are not large. If one thing is distinctive, it is the coincidence of banking and currency crises – the twin-crisis problem – and the severity of the associated effects. This is more evidence, if more is needed, of the importance of preventing and containing this particularly virulent strain of the virus.



## Appendix A

Table 1: Chronology of Banking and Currency Crises 1880–1971: 21 Countries

## Classical Gold Standard: 1880–1914

## 1. Emerging countries

Year	Argentina	Australia	Brazil	Canada	Chile	Denmark	Greece	Italy	Japan	Finland	Norway	Portugal	Spain	Sweden	United States
	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.	B.C.C.C.
1883															*
1885	•					•									
1887					•										
1889			•												
1890	•		•									•			#
1891	*		•	#				*				•			*
1892															#
1893		*		#				*							
1894								•#							•
1897						•								•	
1898			•		*	•									
1900			*												
1901			•						•						
1904									*					*	
1907					•			*							*
1908	#			#				#							
1914	*		•	•	*		•	*							•
1915				•		*									
1917									•						

Continued

2. Advanced countries

Year	Belgium	France	Germany	Netherlands	Switzerland	United Kingdom
1882	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.
1888		*				
1889		#				
1890		*				
1893			#			
1894						
1897			*			
1901						
1907						
1914	*			*		

Interwar 1919–1939

1. Emerging countries

Year	Argentina	Brazil	Chile	Greece	Portugal	Spain
1920	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.
1922						
1923						
1925						
1929						
1930						
1931						
1932						
1934						
1937						

Continued

## 2. Advanced countries

Year	Australia	Belgium	Canada	Denmark	France	Germany	Italy	Japan	Finland	Nether-lands	Norway	Sweden	Switzer-land	United Kingdom	United States
	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.
1921			#	•			*	#	•	•	•				
1922				#					•	•					
1923			•		•					#	•				
1924															
1925															
1926					#										
1927								*							
1929			•												
1930							•								*
1931			•	•		*	•	•	•		•	•	•	•	*
1932				#				#				#		#	*
1933															*
1934															*
1935						#	•								*
1936													•		
1937															
1938															
1939									*	#			#		

Continued

**Bretton Woods: 1945–1971**

1. Emerging countries

Year	Argentina		Brazil		Chile		Greece		Portugal		Spain	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1950		•						#				
1953						•						
1956												
1958												
1959		•		#								
1962		•		•#		•						#
1963				•								
1965				#								
1967		•										
1968						•						
1970		•										
1971												•

*Continued*

## 2. Advanced countries

Year	Australia	Belgium	Canada	Denmark	France	Germany	Italy	Japan	Finland	Nether-lands	Norway	Sweden	Switzer-land	United Kingdom	United States
	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.	B.C. C.C.
1947															
1948					•									•	
1949	•#	•				•			#	•#		#		•#	
1950			•												
1957					•#										
1960															•
1961															
1962															
1964															
1965															
1966															
1967															
1968															
1971	•	•		•					•	•	•	•	•	•	•

Notes: B.C. defined as banking panics (\*) and/or banking crisis (significant bank failures) (•). C.C. defined as forced change in parity, abandonment of peg or successful rescue, chronology derived from historical narratives (•); defined based on an annual currency crisis indicator as developed in Eichengreen, Rose and Wyplosz (1995) with UK as base country 1880–1914 and the US thereafter (#).

Sources: Banking crises: Bernanke and James (1991), Bonelli (1982), Bordo (1986), Bordo and Schwartz (1996a), Caprio and Klingbiel (1996), Dertilis and Costis (1995), DeLanghe (1999), Hansen (1999), Herrala (1998), Kindleberger (1989), Klovland (1999), Lloja (1990), Macedo (1999), Martin-Accena (1995), Nordvik (1995), Reis (1995), Thorp (1926), Triner (1999). We were unable to find evidence on banking crises in Greece or Spain before 1914. Currency crises: Bordo and Eichengreen (1998), Bordo and Schwartz (1996b), *International Financial Statistics* (various years).

**Table 2: Chronology of Banking and Currency Crises: Emerging Countries: 1973–1998**

Year	Argentina		Brazil		Chile		Korea		Indonesia		Malaysia		Mexico		Philippines		Singapore		Thailand	
	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.	B.C.	C.C.
1976	†		†						••											••
1978																				•
1979			†																	
1980			†				•													•
1981	†	†*			†															••
1982	†	*	†		†	†*														•
1983		†*	†		†					••										•
1984		*																		•
1985		*																		•
1986		†*								•										•
1987		*																		•
1988		*																		•
1989										•										
1990	†																			•
1991	†																			
1992																				
1993										•										
1994																				•
1995																				•
1997	†																			•
1998																				•

Sources: Banking crises: († and •), Caprio and Klingbiel (1996), Kaminsky (1998), Schwartz (1998), Kaminsky (1998), Calvo and Vegh (1999). Currency Crisis Index: († and •), *International Financial Statistics* (CD-ROM).

## Appendix B: Pre-1914 Crisis Histories

### Argentina: 1885 currency crisis

Foreign journalists cited the cause of this crisis as Argentina's 'continual desire to advance its prosperity artificially' by making use of foreign loans. There was a burst of new issues in London between 1880 and 1885, the foreign debt rising by 105 million pesos. Predictably, the supply of domestic credit and the volume of imports rose concurrently.

Reserve losses accelerated in 1885. The government attempted to defend parity initially but failed. Upon suspending convertibility, it then sought to restrain note issue (although a handful of banks was still allowed to issue inconvertible currency). The peso fell by about 27 per cent during the crisis, having been pegged at 47 pence prior to the events but falling to 37 in mid 1885. It hit a low of 29 in 1886.

Williams (1920) describes the crisis as brief and having relatively little impact on industrial production. The following table shows the percentage change in growth relative to the pre-crisis year, relative to the pre-crisis three- and five-year trends, and for comparable post-crisis periods. (Subsequent tables in this appendix are to be read similarly.)

Fluctuations in Real GNP Growth Rates						
Percentage points						
Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1885	—	—	—	–6.0	1.0	0.5

Source: For this and subsequent tables: see Table 1 in the text and accompanying discussion.

In 1886 a new president was elected and attempted to reflate the economy by authorising additional note issues. This was followed by a move to free banking and a loosely regulated financial system that paved the way for the 1890 crisis.

### Argentina: 1890 twin crisis

The years leading up to this crisis were ones of notable excess, according to Conant (1915). Banks made extensive loans without requiring much in the way of collateral. Real estate prices soared as banks issued notes in excess of the legal limit.

When land prices fell by 50 per cent between 1889 and 1890, the *Banco de la Nacion* found itself unable to pay its dividend, triggering a run. The peso fell by 36 per cent against sterling in 1890 and by 37 per cent in 1891.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg (–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1890	–24.0	–17.0	–20.0	17.0	15.0	14.0

---

To cope with the crisis, the government created the Bank of the Argentine Nation from the ruins of the old Bank of the Nation and other provincial banks. It took bad loans off their books while requiring the old banks surrender their specie and bonds and declared a three-year moratorium on interest payments.

In January 1891, Argentina secured a £15 million funding loan in London at 6 per cent. As conditions, investors demanded the government not incur additional liabilities for three years and that it retire 15 million pesos worth of notes in any year in which the gold premium exceeded 50 per cent. Though this loan provided breathing space, by 1892 it was clear the plan would not sustain the public finances. The ‘Romero fix’ (*arreglo Romero*) of 1893 rescheduled Argentina’s debt repayment plan. Under this agreement, Argentina was obligated to pay only half its contractual obligations until 1901, when the amortisation of principal resumed.

### Australia: 1893 banking crisis

This crisis reflected a domestic lending boom, as a result of which the quality of bank assets deteriorated significantly, and stringency on global credit markets increasingly reflecting the fallout from the Baring crisis. Scholars disagree on the relative importance of the two factors – with Australian specialists like Merrett (1989) emphasising the former, comparativists like Kindleberger (1984b) emphasising the latter – but there seems little question that both were at work.

The run-up to the crisis saw a frenzied land boom involving both pastoral and urban real estate. The period was one of rapid entry into the financial system by new intermediaries into an essentially unregulated banking system. New banks with weak internal controls and high costs were most inclined to commit to speculative, illiquid investments, but older banks may have succumbed to the same temptation under growing pressure of competition and declining spreads. In addition, the banking system increasingly funded itself by taking English and Scottish deposits from overseas investors who committed their savings on the assumption that such deposits were safe but were quick to liquidate them when they discovered otherwise.

The immediate lead-up to the crisis saw falling export prices, which made it hard for the pastoral sector to repay its loans (in turn undermining real estate speculation based upon pastoral expansion). The trigger was the closure of the Mercantile Bank of Australia and the Federal Bank of Australia, two of the new institutions, followed by the Commercial Bank of Australia. British deposits ran off, and residents moved theirs from smaller to larger banks. Cork (1894) puts deposits lost in the crisis at 7.5 per cent.



In New South Wales, bank notes were given legal-tender status to ease access to means of payment, and the government declared a 5-day bank holiday. Some banks never re-opened their doors. Tens of thousands of depositors had their claims extended – for four years and more – before any withdrawals could be made, and in some cases claims were converted into stock and preference shares. Bank share prices fell heavily. The banks retrenched, withdrawing from the business of long-term lending. The ‘depression’ of the 1890s followed.

Dowd (1992) challenges the conventional wisdom about this crisis, noting that the fall in the loans to capital ratio from 20 per cent in 1880 to 12.5 per cent in 1892 was not representative of the condition of most banks. He dismisses a domestic credit crunch on the grounds that advances did not actually decline in the period of failures. He argues that the big banks had already adjusted their portfolios by holding less speculative assets by 1890. In conclusion, he argues that the crisis was mainly caused by inadvisable government intervention in the financial sector. The bank holiday, he concludes, was unnecessary and damaged confidence. Consistent with his view, the standard historical statistics do not show much of an output decline.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1893	8.0	0.0	2.0	0.0	1.0	4.0

---

### Brazil: 1889–1891 twin crisis

In Brazilian history, this period of frantic expansion is known as the ‘*encilhamento*’. Brazil experienced an expansion of commerce so large, according to Subercaseaux (1922), that there was a shortage of names for new companies in 1890.

Wileman (1896) cites governmental borrowing as the motive force. Much of this was financed through note issue, milreis in circulation rising by 60 per cent in the year leading up to the crisis. Brazil had a paper currency regime up to 1889, though the milreis had strongly appreciated just prior to 1889. The crisis broke this streak, the milreis falling by 16 per cent in 1890.

Currency speculation set in once a new government assumed power, the transfer of responsibilities and revenues from the old administration to the new being disorganised. The government continued running large budget deficits in the face of a deteriorating balance of payments. It proposed further note issues to meet obligations. Goldsmith (1986) estimates the money supply, having equalled 200 million milreis in 1889, had shot up to one billion milreis by 1891.

As banks came under pressure in 1890, the government allowed the *Banco Nacional de Brasil* and the *Banco do Brasil* to issue 100 million milreis to solve

liquidity problems. While these notes were to have a 50 per cent metallic backing, convertibility was only to take place after the milreis had been at par for at least a year. As the milreis was an inconvertible paper currency and had suffered a massive depreciation in 1890, the law effectively allowed an increase in unbacked circulation.

In December of 1890 the government consolidated the banking sector. The *Banco Nacional de Brasil* and the *Banco do Brasil* were merged to form the *Banco de la Republica do Estados Unidos do Brasil*, which enjoyed a note-issuing monopoly. The note issue continued to increase rapidly from 515 million milreis in 1891 to 781 million in 1895.

Output declined sharply in the face of the financial-sector turmoil.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1889–1891	2.0	–5.0	–8.0	–6.0	–3.0	–4.0

---

### Brazil: 1897–1898 twin crisis

Conant (1915) notes that Brazil was in civil war and that the government had ‘sponsored extravagance at home’. The milreis depreciated by 16 per cent against the dollar in 1897 and 7 per cent in 1898. From parity (at 27 pence) in 1889, it fell to under 10 pence in 1898. One adverse effect was to increase the milreis value of Brazil’s sterling-denominated external debt.

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### Fluctuations in Real GNP Growth Rates

Percentage points

---

Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1897	–6.0	–8.0	–6.0	5.0	14.0	17.0
1898	5.0	–2.0	0.0	6.0	15.0	14.0

---

The crisis was ameliorated by a funding loan from Rothschild’s in London, whose terms stipulated that the federal government could, Argentine-style, suspend its payments on its foreign debts, interior gold loans, and its gold railway guarantees until July 1901. Creditors were issued coupons or gold funding bonds at 5 per cent, secured by the customs revenues of Rio De Janeiro. The government was to deposit, with three Rio banks, securities which would back new note issues up to an equal amount. Eventually these securities would be retired, destroyed or used to buy drafts on Rothschild’s; the money would thus constitute a fund for resuming payment on

the interest of the outstanding debt. Finally, provision was made for constituting an emergency gold fund to be held in London. In the case of a future confidence crisis in Brazil, this fund would be used to meet demands of British creditors.

### **Brazil: 1900–1901 banking crisis**

Murtinho is alleged to have held the value of the currency in an overvalued position in the run-up to the crisis. Manuel Pelaez argues that the crisis was then aggravated by the failure of inelastically supplied coffee exports to respond to the declining value of the milreis. Murtinho's deflationary policy was meant to expel inefficient coffee producers from the industry. The net effect was to concentrate the industry and limit competition. Pelaez and Suzigan (1976) claim this stifled coffee exports that normally would have accompanied depreciation and hastened recovery.

#### **Fluctuations in Real GNP Growth Rates**

Percentage points

Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1900	17.0	22.0	22.0	–7.0	–9.0	–9.0
1901	–7.0	11.0	6.0	–1.0	–3.0	–1.5

1900 brought a new round of reforms, as Murtinho attempted to usurp the Bank of Brazil's and commercial bankers' right of note emission. Congress authorised £1 million for the Bank of Brazil in order to help calm the money market and the banking system. But deposits nonetheless continued to run off, and loans were recalled.

### **Canada: 1893 currency crisis**

As financial difficulties mounted south of the US-Canadian border, panic was communicated to Canada's financial system. Conant (1915) argues that Canada nonetheless remained an island of calm in a sea of financial turbulence, which he attributes to the custom of the Canadian banking houses of dealing in call rather than time bills of exchange in New York, assets that could be brought home in the case of a shock to the Canadian system. When crisis hit in 1893, Canadian banks recalled \$8 million from New York. In addition, they raised their discount rates, sacrificed high profits, and protected their customers.

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**Fluctuations in Real GNP Growth Rates**

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1894	0.0	—	—	0.0	0.0	0.0

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Although the rise in interest rates justifies the classification of this episode as a currency crisis, no impact on the country's growth rate is apparent.

**Canada: 1908 currency crisis**

Canada in 1907 was running a current account deficit which it financed out of foreign capital inflows. It then experienced a crop failure and encountered international financial turbulence. The combination rendered eastern banks unwilling to ship funds west to move crops to market. The banks raised loan rates, cut lending to all but the most creditworthy borrowers, and limited credit to farmers.

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**Fluctuations in Real GNP Growth Rates**

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1908	–5.0	–10.0	–10.0	15.0	10.0	10.0

---

The subsequent recession was sharp but short. In response to credit stringency, the government authorised an increase in the dominion note issue to finance crop moving. Between November 1907 and May 1908, Canadian banks borrowed \$5 million in dominion notes. Further relief appeared in 1908 when the banks were allowed to increase their note issue to 115 per cent of their paid-in capital plus reserves. The increase was legal only during the crop moving season (i.e. October to January).

**Chile: 1887 currency crisis**

The Chilean peso depreciated by 37 per cent between January 1881 and February 1887 (from 36 to 23 pence per peso). The country had just finished fighting a war with Bolivia. Commercially it seems to have been in fine shape, especially since valuable nitrate fields had been won in the war. It carried a current account surplus from 1884 through to 1886, although imports surpassed exports in 1887.

The fiscal house was in disarray, however. Chile ran a budget deficit in each year from 1884 to 1887.

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### Fluctuations in Real GNP Growth Rates

Percentage points

---

Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1887	–4.0	9.0	16.0	1.0	4.0	4.0

---

After falling victim to a run on the peso, the government established a multi-part plan to establish convertibility. It retired 100 000 pesos of Treasury notes a month until the level reached 18 million (starting from a circulation of 25 million). It increased customs duties by up to 15 per cent to raise additional revenues. It aimed to establish a silver fund of 1.2 million pesos in the first year and 1.5 million pesos in each year thereafter. It imposed a limit on domestic note issue and required a 50 per cent backing of note emissions with bonds and/or gold to be held by the government.

### Chile: 1898 twin crisis

The years leading up to this crisis have two histories. One is that there was no trouble on the horizon. There was an ample gold fund, and the bond-secured notes of the banks were on an even keel. Subercaseaux (1922) advances a more negative view, insisting that financial difficulties were already evident in 1895, when the mortgage market collapsed and interest rates rose.

During the crisis, 4 of the 7 Chilean incorporated banks closed their doors. The peso had been freely convertible into gold since 1895; the crisis ended this attempt at maintaining the gold standard. In July, Chile declared a 30-day moratorium and moved to a paper currency regime.

By the end of 1899, the exchange rate had begun to recover, and by 1902 the economy had done the same. This can be attributed in part to the rise in nitrate and copper prices that occurred in the first years of the new century and in part to the government's reforms. The reform of 31 July 1898 had two essential elements. First, the government authorised the printing of 50 million pesos in notes with legal tender status, while cancelling all outstanding bank notes. Second, it set January 1902 as the date for the return to (gold) convertibility.

Inconvertibility and the injection of domestic credit quelled the banking panics, according to Subercaseaux. Suspension of convertibility was the only feasible option because physical gold imports would have had to come over the snowy Andean range from Argentina, taking a minimum of 15 days.

The macroeconomic data needed to judge the severity of the ensuing recession are not available. (This also means that this crisis is not included in our empirical work.)

### Chile: 1907 currency crisis

The period 1904 to 1907 was witness to an enormous commercial expansion. The capitalisation of firms increased by 400 per cent between 1900 and 1906. The crisis was foreshadowed in 1905, when the Chilean stock market crashed. The government's response was inflationary: the period 1904–07 saw a 200 per cent increase in government notes outstanding.

The peso fell by some 30 per cent in the crisis. To contain the financial consequences and prevent the currency crisis from precipitating a banking crisis, the government loaned treasury notes to banks that requested them. The policy obliged bankers to secure these borrowings with bonds from the mortgage banks and charged interest at 6 per cent.

Again, the macroeconomic data needed to judge the severity of the ensuing recession are not available. (Once more this also means that this crisis is not included in our empirical work.)

### Denmark: 1908 banking panic

The main culprit in this crisis was turbulence on world markets. Conant (1915) attributes the crisis specifically to financial problems in neighbouring Germany (see below). In addition, banks such as the Freeholders Bank were known to possess non-performing assets, whose existence undermined confidence in the banking sector.

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#### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg (+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1908	–8.0	–8.0	–7.8	5.0	7.0	8.0

---

The conventional explanation for the speedy recovery is that Denmark's financial difficulties took place against a generally favourable economic backdrop. In addition, the Ministry of Finance and the Treasury orchestrated a consortium of five leading banks to assist and guarantee the liabilities of weak banks (notably the *Grundegerbank* and the *Detailhandlersbank*). This consortium created a fund that guaranteed all liabilities of the suspended banks and those of the Retailer's Bank, which also looked to be in a precarious state. This commitment by the banks secured the full payment to domestic and foreign creditors.

### Finland: 1900 banking crisis

Frederiksen (1902) implicates the crisis in Russia and the Balkans and a drop in iron and steel prices in Finland's difficulties in this period, which placed much of its banking system at risk.

In response to the crisis, the Bank of Finland extended loans and rediscounts to other banks against their pledge of securities. It increased its note issue from 35 to 40 million markka without a corresponding increase in specie reserves. Banks were authorised to use foreign bills as legal cover for their own note issues, which permitted the latter to be increased by an additional five million.

Output effects of this crisis were noticeable, with the growth rate of real GDP falling by 4 per cent in the crisis year.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1900	–4.0	1.0	2.0	–4.0	–3.0	–3.0

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### France: 1882 banking panic

France seems to have passed through a speculative period prior to 1882. The *Credit Foncier* increased its loans from 50 million francs in 1879 to 278 million in 1881, while other banks enjoyed huge increases in their stock prices. There was evidently a shift occurring in savings behaviour, as this was the period in which French citizens began to place their savings in financial assets.

Conant (1915) emphasises the overuse of negotiable securities afforded by the payment of the war indemnity to Germany and blames the financial innovations of the period, combined with speculation, for the crisis. Foreign influences include events in the United States, which was attracting gold due to its rapid growth and current account surplus. These pressures forced the Bank of France to adopt a more restrictive monetary policy to stem gold outflows.

Although treasury receipts rose in the years leading up to 1882, spending rose even faster. Historians have complained that most of the government's projects had little economic value (Conant 1915).

In response to problems among the banks, the Bank of France loaned 80 million francs in Paris to banks in distress and accepted nearly 100 million francs worth of securities in Lyon. Notwithstanding these actions, the Bank has been criticised (by, *inter alia*, Levy-Leboyer (1990) for not doing more. It kept interest rates high; as many firms were financing on a short-term basis, this policy had a deleterious effect on the economy.

Resolution was also expedited by international co-operation. The Bank of France borrowed £924 000 from the Bank of England on 30 January 1882, and an additional £2 million the following week, which it used to replenish its reserves and augment domestic credit.

Growth fell by five percentage points between 1882 and 1883 and failed to recover to the previous trend for sometime thereafter.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1882	–5.0	—	—	–1.0	–3.0	–3.0

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### France: 1888–1889 twin crisis

In 1888, a French financier attempted to corner the copper market, and the *Comptoir d'Escompte* discounted copper warrants in conjunction with the scheme. In the event, production limits broke down, copper prices fell, and the *Comptoir* suffered heavy losses. Its head committed suicide, prompting a run. Though its assets seemed to be generally sound, they were not sufficiently liquid to satisfy the demands of depositors.

The *Comptoir* appealed to the Bank of France for assistance, and the latter advanced it 200 million francs on the guarantee of several Parisian banks. This enabled the *Comptoir* to meet the demands of its depositors and creditors, and even to repay a portion of the capital subscribed to its shareholders.

Conditions imposed on the *Comptoir* included paying a sum of 1.7 million francs to the government annually, creating a credit line of 180 million francs for the government with no interest charge, rendering services to place consols at no charge, and opening new branches. These obligations depended on approval by parliament, however, and in the end they were not enacted because the bill containing them became embroiled in parliamentary debate.

If the standard statistics are to be believed, growth fell by 14 percentage points in the crisis.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1888–1889	–14.0	–1.0	0.0	6.0	4.0	4.0

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### France: 1907 banking panic

According to Conant (1915), the main cause of this crisis was trouble in the United States, which raised demands for gold and money worldwide. France seems to have been in a strong position as far as reserves and the banking system were concerned. The governor of the Bank of France claimed that the majority of losses during 1907 were in silver and that these went to colonies and members of the



Latin Union, all of whom France had an interest in protecting. In this light it is not surprising that the visible impact on GDP growth was mild.

<b>Fluctuations in Real GNP Growth Rates</b>						
Percentage points						
Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907	0.0	0.0	0.0	–2.0	–1.0	1.0

### Germany: 1893 currency crisis

In 1892 and 1893, the Reichsbank lost 18 per cent of its gold reserves. The literature points to several factors behind this pressure. One was the crisis in the United States, which led to a loss of confidence in German investments in that country. In addition, Italy's financial sector, in which Germany also had considerable investments, was undergoing a shakeout. The upcoming federal elections were unsettling; according to *The Economist*, it was possible that agricultural (bimetallist and protectionist) interests would make large gains. The federal finances were a cause for concern, as Germany had run chronic budget deficits in preceding years. And Russia raised tariffs on German goods early in 1893, creating fears of a trade war.

The government responded quickly. Increases in import duties were announced to make up deficiencies in revenues. The trade war with Russia was neutralised as officials pursued trade-treaty negotiations in 1894. And once problems abroad subsided toward the end of the year, the discount rate was reduced. By December, gold began to flow back in.

The growth effects of this crisis seem to have been significant once they set in, a year following its outbreak.

<b>Fluctuations in Real GNP Growth Rates</b>						
Percentage points						
Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1893	2.0	5.0	5.0	–9.0	–5.0	–4.0

### Germany: 1901 banking crisis

Russia had just experienced a crisis, and German banks with large investments there found their balance-sheet positions impaired. Stock prices in Berlin fell by 61 per cent during the crisis, electrical and tramway companies being hardest hit.

Distress surfaced first among mortgage banks like the Bank of Pomerania and the Mortgage Bank of Mecklenburg Strelits, which were then rescued by the big discount banks. The discount banks also provided liquidity to other banks coming under pressure. Notwithstanding these efforts, the *Dresdner Creditanstalt* and the Bank of Leipzig were both forced to close their doors, and the Leipzig Bank was allowed to fail.

Visible output effects were a modest slowdown in the rate of growth in the crisis year.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1901	0.0	–3.0	–2.0	3.0	6.0	5.0

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### Germany: 1907 currency crisis

US interest rates were high in 1905–06, placing German capital markets under strain. Raffalovich (1907) notes in addition evidence of fiscal excesses associated with the arms race with France and Britain. As evidence of the weakening state of German finances, *The Banker's Magazine* cites the Prussian loan issued in London in 1907, which aimed to raise £20 million but succeeded in attracting just £9 million.

Germany lost some 13 per cent of its gold reserves in the two years leading up to this crisis, forcing the Reichsbank to tighten. The tightness of monetary policy is the natural explanation for the slow recovery that followed.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907	2.0	0.0	1.0	–4.0	–3.0	–2.0

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### Great Britain: 1890 banking crisis

This was the famous episode when the failure of the Buenos Aires Water Supply and Drainage Company loan threatened to bring down the House of Baring. Argentina enjoyed a massive influx of European capital. Baring's was the largest single creditor. Three-quarters of Baring's portfolio was in the securities of Argentina and Uruguay, despite mounting evidence of financial excesses on the part of the recipients.

In 1889, international markets were disturbed by an increase in the Bank of England's discount rate. Political unrest and increases in tariffs then fed pessimism about the Argentine market and brought about an end to the boom in Argentine securities issues.

The Bank of England increased its note issue during the crisis, but only for notes held in the Banking Department. (There was no increase in the fiduciary issue, in other words.) The Governor of the Bank of England also organised a rescue fund for Barings on the order of £17 million to help meet current interest obligations. These funds came from the Bank of England and leading merchant banks. The bank rate was meanwhile raised to 6 per cent.

International co-operation played a role in resolving this crisis. The Bank of England was assisted by the Bank of France and the Bank of Russia. From the former it borrowed nearly £3 million, while from the latter the government obtained a pledge of £1.5 million.

Capie (1992) argues that the impact in the British banking sector was not large, noting that there was no change in the reserve-deposit ratio. Nor is there evidence of a serious recession; the downturn that followed was both short and mild.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1890	–2.0	–1.0	–2.0	3.0	0.0	1.0

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### Greece: 1885 currency crisis

The drachma had been inconvertible since 1877. Between 1884 and 1895, the exchange rate on Paris fell by 16 per cent. The popular explanations for this Greek tragedy are a bad harvest and, more importantly, fiscal excesses. Deficits had led to the accumulation of a large debt which Greece was trying to augment with yet more loans to finance military and public works spending. While government outlays doubled between 1884 and 1885, tax increases were negligible. The currency suffered the consequences.

Since the relevant macroeconomic data are not available, this crisis is not included in our empirical analysis.

### Italy: 1891–1894 twin crisis

The 1880s seem to have been a decade of strong demand for Italian securities, securities issued by manufacturing concerns in particular. In addition, the period saw a real estate boom funded by short-term credit from the banks of issue. The government did its part: the deficit reached five per cent of GNP by 1888–1889.

When failures broke out in real estate companies, those companies brought their banks down with them.

Kindleberger (1984a) cites as one of the triggers of this crisis the tariff war between Italy and France. Raising the tariff in 1887 curtailed capital inflows and depressed the price of Italian government bonds. The rise in interest rates in turn pricked the land bubble.

One indication of the magnitude of the crisis was that the price of Bank of Tiberin stock fell from 600 in 1887 to 35 in 1891. Growth slowed significantly and remained depressed for the better part of five years (although the 1894 banking crisis, discussed below, had something to do with this).

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1891	–6.0	–8.0	–9.0	–15	–10	–9.2

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In June and July of 1891, the government allowed banks of issue to increase their note issues from three to four times capital. Arguably, this limited the immediate severity of the crisis but without purging the underlying sources of financial weakness. In 1893 it came to light through that nearly 200 million lire in loans by the banks of issue were bad. In particular, one large bank, the *Banca Romana*, had issued excessive notes and duplicate notes.

The government overhauled the banking system by merging various banks and authorised an expansion of the note issue to address problems of credit stringency. In January of 1894, it authorised a further expansion of credit, which appears to have provided the immediate trigger for the currency crisis.

The recessionary impact of this second crisis was relatively mild. Not so its financial effects: the lira depreciated from 104 to more than 115 to the franc over the course of 1893. Italy lost 63 million lire in monetary gold in 1893 and 5 million lire in 1894.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1893	5.0	–1.0	–2.0	3.0	0.0	–2.0
1894	3.0	–4.0	–6.0	–8.0	–7.0	–4.8

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### Italy: 1907–1908 twin crisis

The years before 1907 were ones of rapid economic expansion. Italy was the recipient of large immigrant remittances, fuelling an increase in liquidity. The period was also marked by a frothy stock market. Kindleberger (1984a) argues that the mania spilled over to the banking system, as banks extended loans to individuals engaged in financial speculation and engaged in such speculation themselves.

With mounting financial difficulties in New York, London and Paris in 1906, pressure was placed on interest rates, and air was let out of the Italian financial bubble. The crash was followed by a sharp drop in output.

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#### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907–1908	8.0	8.0	7.0	–11.0	–10.0	–8.0

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This was the period when the Bank of Italy began to assume its role as lender of last resort. Bonelli (1982) concludes that the subsequent recession was milder than would have been the case otherwise as a result of its intervention, although the standard statistics suggest that recovery was slow in coming.

### Japan: 1900 twin crisis

Japan ran trade deficits in the period leading up to this crisis, fuelling persistent reserve losses. In addition, the gold stock of the Bank of Japan was the equivalent of only about \$1 per person, which seemed to many as inadequate to support convertibility (which had only been established in 1897) and may have contributed to speculation on the yen.

Japan exported nearly 45 million yen in gold and silver in 1900. The currency depreciated by 2 per cent in 1897 and another two per cent in 1898, but recovered (by one per cent) in 1899, before giving back that ground in 1900. Between 1897 and 1900, the country exported nearly 42.8 million yen in gold. The gold stock in the country fell to a low of 53 million yen (\$26 million) in 1900.

The output effects of the crisis were substantial: growth fell by 6 percentage points between 1900 and 1901.

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**Fluctuations in Real GNP Growth Rates**

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1900–1901	–6.0	–2.0	–2.0	–3.0	2.0	0.0

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**Japan: 1904 currency crisis**

The crisis of 1904 is conventionally portrayed as the result of reckless government spending and a monetary policy gone awry. Tamaki (1995) refers to Japanese colonial possessions in Taiwan and Korea as sinks for government funds. Advances from the central bank to the government were used to underwrite the country's colonial operations there.

One consequence of these fiscal excesses was large current account deficits, reaching 130 million yen in 1904 (compared to a level of reserves on the order of 90 million yen at year's end). Gold losses ran at nearly 14 million yen per month for four straight months. Cumulatively, this was a 50 per cent fall in reserves.

During the crisis, the government called upon the public to bring gold to the central bank for deposit. In addition, a loan from the London market of £10 million eased reserve constraints. Finance Minister Takahashi reported he was able to maintain order by taking loans on London and on New York. Conant (1915) cites Takahashi's vigorous work, Japan's renewed access to foreign capital, and public support in a period of diplomatic crisis as the reasons for the dissipation of the crisis, although it took some time for growth to recover to pre-crisis levels.

A serious recession ensued.

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**Fluctuations in Real GNP Growth Rates**

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1904	10.0	8.4	9.0	–15.0	–10.0	–9.0

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**Japan: 1907–1908 twin crisis**

The Tokyo stock market crashed in early 1907. This was followed by a brief recovery, but news of instability in the United States then sent financial markets into a tailspin. The weakness of silver prices and the consequent depreciation of China's currency then undermined the market position of Japanese producers further.

*The Oriental Economist* reports a loss of 10 million yen in gold and silver in 1907. The Bank of Japan intervened to rescue a number of distressed banks, while at the same time allowing others to fail. The recession that followed was severe.

<b>Fluctuations in Real GNP Growth Rates</b>						
Percentage points						
Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907–1908	–9.0	–3.0	–4.0	–10.0	0.0	1.0

### **Portugal: 1891 twin crisis**

Portugal ran large budget deficits in the period leading up to this crisis. It was then hit by the Baring crisis, and by the revolution in Brazil where it had substantial investments.

Corruption is frequently cited in connection with the fiscal problem. The Public Works and Navy Ministries were spending extravagantly. Poor colonial administration was a further drain on Portugal's resources. Raffalovich (1892) points in addition to the close relationship between the Treasury and various public works companies.

The Milreis fell about 21 per cent from  $53^{13}/16$  in January of 1891 to 43 and  $1/8$  in December. The government addressed the crisis by attempting to sell French investors a five per cent interest in the national tobacco company, authorising a general moratorium for the *Banco Nacional de Portugal* and the *Banco Lusitano*, and passing a law allowing note emissions up to three times the paid-in capital of the banks. In 1892 the troubles had not yet been sorted out, and the government threatened holders of foreign debt with the same treatment given domestic debtors (i.e. a thirty per cent tax on coupon payments) if they did not renegotiate. Negotiations were then successfully concluded; the debt consolidation reduced interest payments on the foreign debt substantially.

This crisis appears to have had a fairly large impact on Portuguese growth.

<b>Fluctuations in Real GNP Growth Rates</b>						
Percentage points						
Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1891	0.0	–7.0	–6.0	4.0	3.0	6.0

## Sweden: 1907 banking crisis

The period up to 1907 was one of steady expansion. Following reorganisation in 1897, the banking industry prospered. Between 1900 and 1907, branches of the non-note issuing (*enskilda*) banks rose from 157 to 261, branches of the Riksbank from 330 to 579. Their competition fuelled a lending boom. When loans and advances increased by 29 per cent in the 22 months prior to October 1907, confidence in the stability of the banking system began to weaken. The markets were then further disturbed by turbulence abroad, triggering bank runs.

The banks lost 6 million crowns from a reserve of 76 million, mainly in the last week of November. In response to gold losses, the Riksbank raised its discount rate, holding it at higher levels through January 1908. The exchange rate was successfully held.

The Riksbank helped national banks by lending when their foreign creditors called in loans. The government also arranged a 65 million franc loan from France, which it used to help distressed banks and to replenish the resources of the Riksbank. The Riksbank itself contracted abroad for a \$5 million loan in foreign exchange on three month drafts.

Output effects of this crisis were substantial, although the economy bounced back quickly.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907	–11.0	–4.0	–5.0	1.0	3.0	2.0

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## United States: 1884 banking panic

Friedman and Schwartz (1963) point to several causes of this crisis. Britain had raised the bank rate in 1883. The American commitment to the gold standard fell under a cloud due to bimetallist agitation. Commodity prices were weak; steel rail, for example, fell from \$71 in 1880 to \$35 in 1883. In May 1884, a series of brokerage firms failed, leading the public to grow suspicious of the position of others.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg (+1)– (Crisis)	Avg (+3)– (Crisis)	Avg (+5)– (Crisis)
1884	4.0	—	1.0	–2.0	0.0	–1.0

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Conant (1915) estimates that national bank deposits declined in this crisis by some 8 per cent. A number of important banks were forced to suspend payments in a panic that was largely confined to the New York region. The New York Clearinghouse played a key role in containing it, issuing \$22 million of clearinghouse certificates.

The output effects of this crisis were mild.

### United States: 1891 currency crisis

Friedman and Schwartz (1963) cite international turbulence (fallout from the Baring crisis) as precipitating this crisis. In addition, some commentators emphasise increasing expenditure on government pensions as worsening the fiscal outlook and intensifying the pressure of demand. Large gold outflows occurred in the spring of 1891, stripping the US of about 10 per cent of its monetary gold stock in the first half of the year.

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#### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1891	–3.0	1.0	1.0	5.0	–4.0	–2.0

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A short recession ensued. Treasury open-market purchases, which helped to calm the markets, may have been part of the explanation for its brevity. In addition, the Treasury imposed a tax of 40 cents per \$1 000 on gold bars for export to discourage gold outflows (although the main effect of this was to cause gold to be exported instead in the form of coins). It charged 60 cents per \$1 000 less than normal rates on sales of western legal tender exchange under the condition of being paid in gold (taking a page from the book of the Bank of France).

### United States: 1893 twin crisis

Few observers noted signs of business trouble at the beginning of 1893, although some expressed uneasiness over the debate on the monetary standard. Conditions changed in February with the stock market crash, which was widely attributed to monetary uncertainty. That the Treasury reported only having about \$108 million in gold reserves, down from over \$200 million in 1888, did not boost confidence. Redemption of Treasury notes for gold became widespread in the spring of 1893. Many banks were called to ship reserves to the West where money and specie were in high demand. From 2 June to 24 June, New York banks lost more than \$30 million in reserves, pushing them dangerously close to their minimum legally required reserve.

The crisis was resolved through political and financial action. The President made clear his disdain for the Silver Purchase Act. The Senate then voted on 30 October to repeal the Sherman Act, and the House followed on 1 November. This endorsement of the gold standard provided a boost to confidence. Meanwhile, Belmont purchased

\$62 million of government bonds, providing the Treasury with nearly \$35 million ounces of gold. Belmont, Morgan and Rothschild restricted access to foreign exchange, imposing heavy costs on those wishing to purchase foreign bills.

The crisis occasioned a severe decline in output, according to the standard statistics, although the economy bounced back quickly.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis– (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1893	–14.0	–9.0	–12.0	2.0	7.0	8.0

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### United States: 1907 banking panic

Global credit stringency and domestic financial excesses helped to set the stage for the 1907 panic. Britain had required funds for its war in South Africa, and now Japan and Russia similarly raised funding for their war. The price of British consols dropped from 114 in 1896 to near 80 in 1907.

In the US, meanwhile, the number of state banks had been on the rise, from 9 500 in 1900 to near 13 000 in 1907. While their liabilities had risen by \$5 billion, their cash reserves had only increased by \$171 million. Friedman and Schwartz (1963) note that the ratio of deposits to cash reserves rose from 2:1 in 1897 to 6:1 in 1907. In addition, there was speculation in the stock and real estate markets.

The crisis began in New York but soon spread nationwide. A national restriction of payments of currency for deposits went into effect.

Between 1907 and 1908, the growth rate fell by 9 per cent.

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### Fluctuations in Real GNP Growth Rates

Percentage points

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Year	Crisis (–1)	(Crisis)– Avg(–5)	(Crisis)– Avg(–3)	Avg(+1)– (Crisis)	Avg(+3)– (Crisis)	Avg(+5)– (Crisis)
1907	–9.0	–3.0	–4.0	–10.0	0.0	1.0

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Both domestic and foreign intervention helped to limit the consequences. J.P. Morgan, in co-operation with the New York Clearinghouse Syndicate and the Treasury, placed deposits with national banks with the goal of replenishing their liquidity. In the west, goods could not be transported due to difficulties in the conversion of bills of exchange; the Bank of Montreal promptly deposited gold at the Treasury of New York to grease these wheels. The French loaned nearly \$16 million in silver eagles on the security of French commercial paper.

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# *Discussion*

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## **1. General Discussion**

Discussion of Bordo and Eichengreen's paper focused on the apparent differences in the severity of currency crises over time. Some participants shared the view that changes to an economy, other than to the extent of its capital controls, could affect the depth and duration of currency and financial crises. For example, the flexibility of labour markets may partly determine the effect of an external crisis on output. These participants argued that by downplaying such considerations, the paper's demarcation of history according to the global regime governing capital flows may give a misleading impression of the reasons why currency crises are more severe under some regimes than others.

One factor complicating comparison of crises is that different shocks or macroeconomic imbalances will affect economic growth differently, even if they all cause currency crises. For example, uncontrolled budget deficits were a key feature of many Latin American currency and financial crises. But they were not present in east Asia, where problems were more diverse. This inevitably compromises comparison of the east Asian and Latin American experiences.

In general discussion of the propagation of shocks, the role of capital controls was stressed. One participant conjectured that the lower frequency of international capital market crises under the Bretton Woods system might generate support for a return to restricted capital flows and fixed exchange rates. Other participants argued that this would be impractical and that there was, in any case, no clear evidence that capital controls had been of net economic benefit at the time.

One participant added that financial markets are now more important to the efficient allocation of capital than in the early postwar years. It was argued that with the slowing of trend growth in the industrialised world since the early 1970s, the efficient allocation of resources relies increasingly on capital being free to move into those sectors and countries where it is most profitably employed. In general, international capital controls are a costly impediment to this process.

When evaluating the effects of currency crises on output, it is useful to separate the initial shock from the factors which determine how it is propagated through the economy. These were thought to include the exchange rate regime, the degree to which international bank lending is diversified (particularly in emerging markets), and the change in the nature of capital flows, with the so-called democratisation of capital, which may see international capital originate from a wider variety of sources.

Some participants inferred from the paper that currency crises have indeed been more frequent and severe in the aftermath of capital account liberalisations, and they wondered about the implications of this for macroeconomic policy. One felt that the east Asian experience justified more vigorous expansionary macroeconomic policies in immediate response to crises, and that the paper made a case for limited capital controls to reduce countries' vulnerability to crises.



# Capital Flows to East Asia: The Facts

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Gordon de Brouwer

## 1. Introduction

With the passing of time, we now have a clearer story of what happened to capital flows in east Asia during the financial crisis. This paper briefly summarises the available data, drawing primarily on material published by the Bank for International Settlements (BIS) and the International Monetary Fund (IMF). It focuses first on the size and volatility of capital flows to and from emerging markets, and Asia in particular, and then examines the distribution of international bank lending by sector and country during the crisis. The paper concludes by assessing prospects for the return of capital inflows to Asia.

## 2. The Size and Volatility of Capital Flows

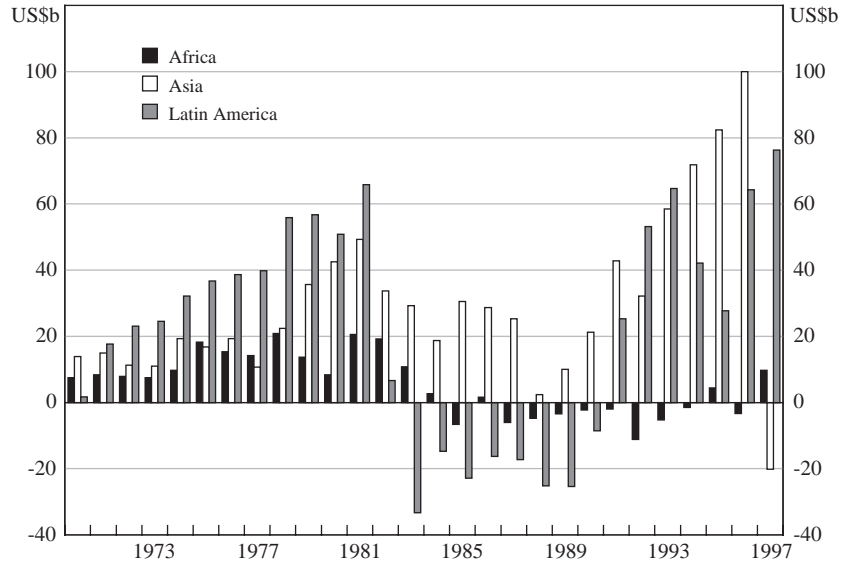
Measured either in current or constant US dollars, net private capital inflows to Asia in the mid 1990s were unprecedented in terms of the size of the flow to emerging markets in the postwar period (Figure 1 and Table 1).<sup>1</sup> Most notably, the mid-1990s inflows to Asia were larger, in both nominal and real terms, than the recycled petrodollar inflows to Latin America in the late 1970s and early 1980s.<sup>2</sup> The flows to Asia were also large relative to the size of the recipient economies: while capital inflows in 1996 to the five affected Asian countries – Indonesia, Korea, Malaysia, the Philippines and Thailand – were less than half the size of flows into the United States, these countries' combined economies, credit systems and share markets were but a tenth of the size of those of the United States (Grenville 1998) (Figure 2).

Capital flows to emerging markets have also been highly volatile: the flows to Latin America of two decades ago were abruptly reversed in the early 1980s, and the flows to Asia similarly so in 1997. In the 1990s, foreign direct investment (FDI) to emerging markets remained the most stable source of capital inflows, even at the peak of the financial crisis, while bank loans were the most volatile and underwent the most violent reversal (Table 1).

This was especially the case in Asia (Figure 3). Capital flows flipped from an inflow of over US\$100 billion in 1996 to outflows of over US\$55 billion in 1998

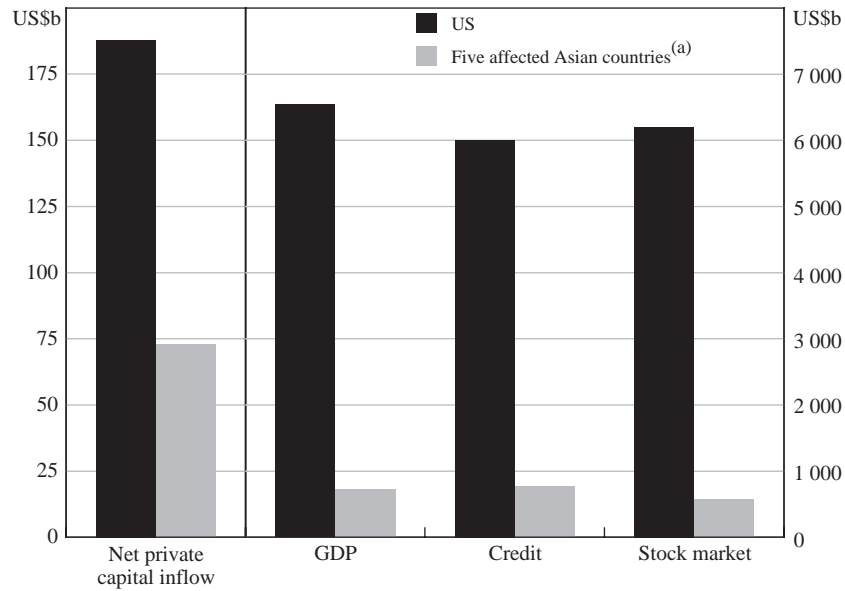
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1. In Figure 1, net private capital inflows are measured as aggregate capital and financial accounts, including net errors and omissions but excluding reserve assets, use of IMF credit and exceptional financing. Flows in constant 1997 US dollar prices are obtained by deflating the nominal series by the US GDP deflator based at 1997.
  2. The inflows to east Asia were driven by a mix of push-pull factors, including the pursuit of perceived large profit opportunities in a globally low interest rate environment, the diversion of Japanese investment offshore, the expansion of institutional investors and country funds, the development of regional ratings, and the easing of local capital controls (Grenville 1998; de Brouwer 1999).

**Figure 1: Real Net Private Capital Inflows**  
1997 prices

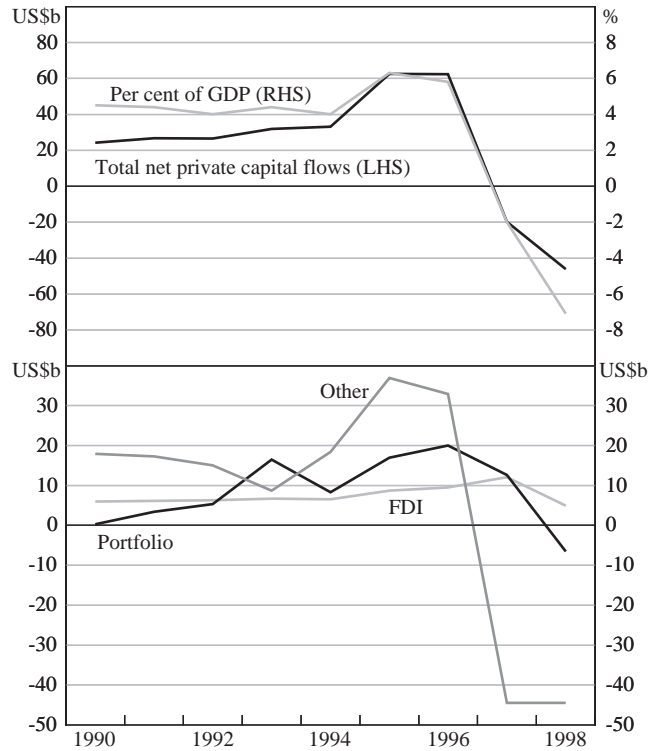


Source: IMF, *International Financial Statistics*

**Figure 2: Output, Credit and Equity Capitalisation**  
1996



Note: (a) Indonesia, Korea, Malaysia, Philippines and Thailand  
Source: IMF, *International Financial Statistics*

**Figure 3: Capital Flows to the Affected Asian Countries<sup>(a)</sup>**

Note: (a) Indonesia, Korea, Malaysia, Philippines and Thailand  
 Source: IMF 1999

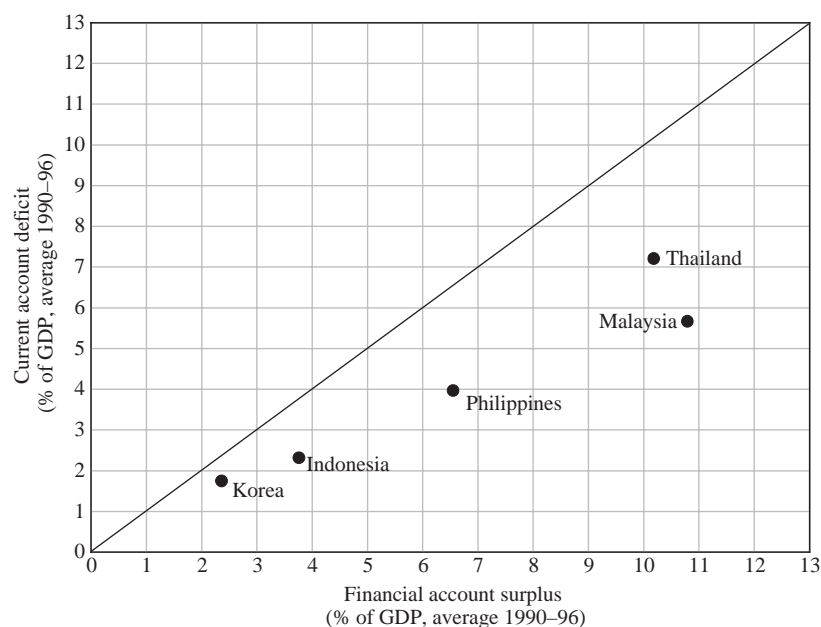
(Table 1). The reversal of capital flows is consistent with the abrupt change from current account deficit to surplus, as shown in Grenville and Gruen (this volume), although it is worth noting that capital inflows to emerging east Asia in the first half of the 1990s were substantially larger than these countries' current account deficits since their central banks were acquiring reserves – Figure 4 shows that the surpluses on the financial account (i.e. FDI, portfolio investment and loans) were consistently larger than the deficits on the current account in this period. For the five affected countries, total capital inflows peaked at over US\$60 billion in both 1995 and 1996, equivalent to over 6 per cent of their combined national income (and appreciably higher in some individual cases); outflows in 1998 amounted to more than 7 per cent of combined GDP. The flip in capital flows was concentrated in a sharp reversal of bank loans (and other), which turned from inflows of around US\$35 billion in 1995 and 1996 to outflows of US\$45 billion in 1997 and 1998. The violence of the reversal in capital flows was reflected in the widening of the risk premium on emerging market securities (Figure 5) and the subsequent downgrade of credit ratings (Figure 6).

**Table 1: Net Private Capital Flows to Emerging Markets**  
Annual averages, US\$ billion

	1977–82	1983–89	1990–94	1995	1996	1997	1998
Total private capital flows	30.5	8.8	125.1	193.3	212.1	149.2	64.3
By type:							
– Net FDI	11.2	13.3	44.9	96.7	115.0	140.0	131.0
– Net portfolio investment	–10.5	6.5	64.9	41.2	80.8	66.8	36.7
– Bank loans and other	29.8	–11.0	15.2	55.4	16.3	–57.6	–103.5
By region:							
– Asia	15.8	16.7	39.1	95.1	100.5	3.2	–55.1
– Latin America	26.3	–16.6	40.8	38.3	82.0	87.3	69.0
– Other	–11.6	8.7	45.2	59.9	29.7	58.7	50.4

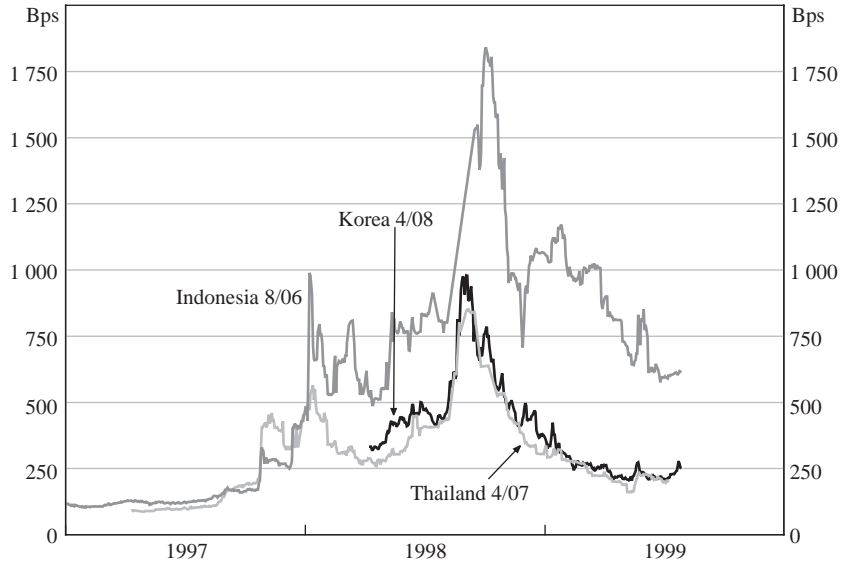
Sources: IMF 1995 for 1977–89 data; IMF 1999 for 1990s data

**Figure 4: Indicators of Capital Flows**



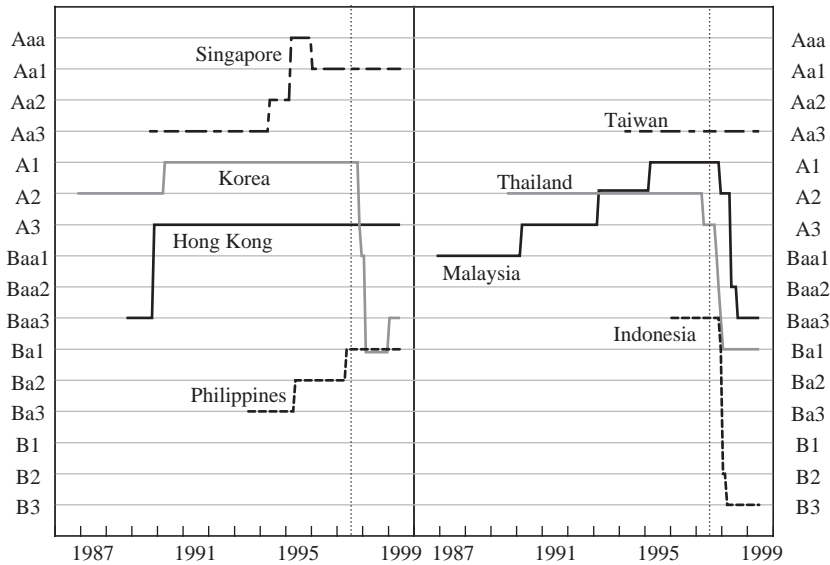
Source: IMF, *International Financial Statistics*

**Figure 5: Asian Long-term Bond Spreads**  
US dollar denominated, spread to US 10-year Treasury

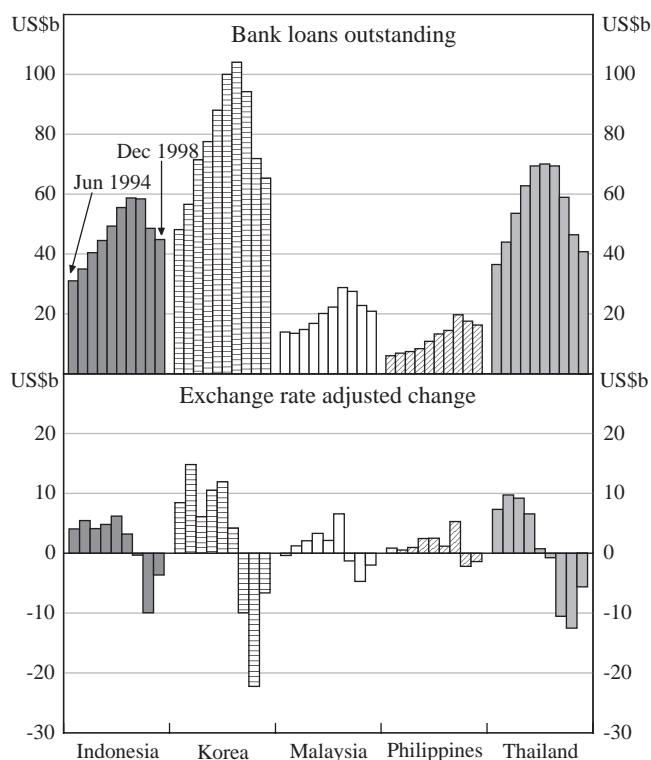


Source: Bloomberg

**Figure 6: Asian Credit Ratings**  
Moody's Credit Rating Agency



**Figure 7: Bank Lending to the Affected Asian Countries**  
Half-yearly, June 1994 to December 1998



Source: BIS, *International Banking and Financial Market Developments*

The BIS provides a detailed breakdown of the shift in bank lending. Figure 7 shows banks' consolidated lending to the five affected countries for each six-month period from 1994 to 1998: the top panel shows bank loans outstanding; the bottom panel shows the exchange rate adjusted change. The fall in bank lending – i.e. loan repayment – is most striking in Indonesia, Korea and Thailand. Table 2 provides detail on banks' unconsolidated assets in selected Asian economies (and in this case loans account for about 90 per cent of assets). Banks' unconsolidated assets in the affected countries rose about US\$60 billion in the year to June 1997, but fell by almost US\$110 billion in the next year and a half to December 1998. Assets in Thailand were the first to contract, spreading to Indonesia and Korea in the last quarter of 1997. Despite the loan roll-over agreement in late December 1997, banks' assets in Korea contracted markedly in the March quarter of 1998, partly reflecting the reversal of repurchase agreements with Korean banks. Repayment of loans continued throughout 1998, except for China, the Philippines, and Taiwan. Net debt issues also declined, although less markedly (Table 3).

**Table 2: Changes<sup>(a)</sup> in Banks' Unconsolidated Assets in Asia**  
US\$ billion

	1997				1998				Outstandings
	Mar	June	Sep	Dec	Mar	June	Sep	Dec	Dec 1998
Indonesia	1.8	2.8	3.3	-2.1	-5.0	-3.9	-2.1	-1.6	50.5
Korea	4.3	4.8	-1.9	-11.5	-16.4	-4.2	-4.6	-4.9	74.6
Malaysia	5.3	1.8	0.2	-3.7	-2.8	-1.5	-1.1	-0.7	23.2
Philippines	1.6	1.9	-0.8	0.5	-0.8	0.8	-2.0	1.7	16.3
Thailand	0.5	-0.3	-10.5	-7.2	-8.5	-5.3	-4.8	-5.4	56.6
<b>Affected-5</b>	<b>13.5</b>	<b>11.0</b>	<b>-9.7</b>	<b>-24.0</b>	<b>-33.5</b>	<b>-14.1</b>	<b>-14.6</b>	<b>-10.9</b>	<b>221.2</b>
China	2.4	4.2	5.2	-0.3	0.3	-3.3	-6.2	1.0	82.7
Taiwan	1.9	0.5	-0.3	-2.3	-0.4	0.3	-1.3	2.0	23.2
<b>Total</b>	<b>17.8</b>	<b>15.7</b>	<b>-4.8</b>	<b>-26.6</b>	<b>-33.6</b>	<b>-17.1</b>	<b>-22.1</b>	<b>-7.9</b>	<b>327.1</b>

Note: (a) Exchange rate adjusted

Source: BIS, *International Banking and Financial Market Developments*

**Table 3: Net Issues of Debt Securities<sup>(a)</sup> in Asia**  
US\$ billion

	1997				1998				1999	Outstandings
	Mar	June	Sep	Dec	Mar	June	Sep	Dec	Mar	Mar 1999
Indonesia	1.0	0.9	2.1	2.0	-0.3	1.0	-0.2	-0.3	-0.6	16.5
Korea	2.3	2.3	4.3	0.2	-0.9	3.5	-0.4	-0.7	-1.1	51.7
Malaysia	0.2	1.8	0.7	0.4	-0.5	0.0	-0.2	0.0	0.3	13.1
Philippines	1.1	1.1	1.2	-0.1	0.0	0.7	-0.4	-0.5	1.1	11.9
Thailand	0.6	0.9	0.5	0.0	-0.4	0.1	-0.1	0.1	0.5	14.7
<b>Affected-5</b>	<b>5.2</b>	<b>7.0</b>	<b>8.8</b>	<b>2.5</b>	<b>-2.1</b>	<b>5.3</b>	<b>-1.3</b>	<b>-1.4</b>	<b>0.2</b>	<b>107.9</b>
China	0.5	2.2	0.6	0.2	0.3	-0.3	-0.9	0.6	-0.4	17.0
Taiwan	0.7	0.7	0.7	0.6	0.3	0.6	-0.1	-0.1	0.0	7.4
<b>Total</b>	<b>6.4</b>	<b>9.9</b>	<b>10.1</b>	<b>3.3</b>	<b>-1.5</b>	<b>5.6</b>	<b>-2.3</b>	<b>-0.9</b>	<b>-0.2</b>	<b>132.3</b>

Note: (a) Money market instruments, bonds and notes by nationality of issuer

Source: BIS, *International Banking and Financial Market Developments*

### 3. The Distribution of Capital Flows by Sector and Country

Seventy-five per cent of the fall in bank lending to Asia has been in lending to other banks, even though interbank lending only accounted for 45 per cent of total bank lending at the peak of inflows in mid 1997 (Table 4). With the exception of Korea, most cross-border bank lending to Asia is concentrated in the non-bank private sector rather than the bank sector (Table 5). Even in Korea's case, however, the effect was disproportionate: about 65 per cent of cross-border lending to Korea in mid 1997 was to banks, but 80 per cent of the subsequent fall in loans was to banks. The concentration of outflows in the interbank market reflects that market's liquidity and short maturity profile. Table 5 also provides some information about the changing maturity of bank lending. Before the crisis, short-term (less than one year) debt generally exceeded long-term debt in east Asia, notably in Korea where over 70 per cent of bank claims at June 1996 were due in one year. The BIS data indicate that the maturity profile has changed most in Korea, where only 45 per cent of bank claims are now short-term.

**Table 4: Consolidated International Claims of BIS-reporting Banks**  
US\$ billion

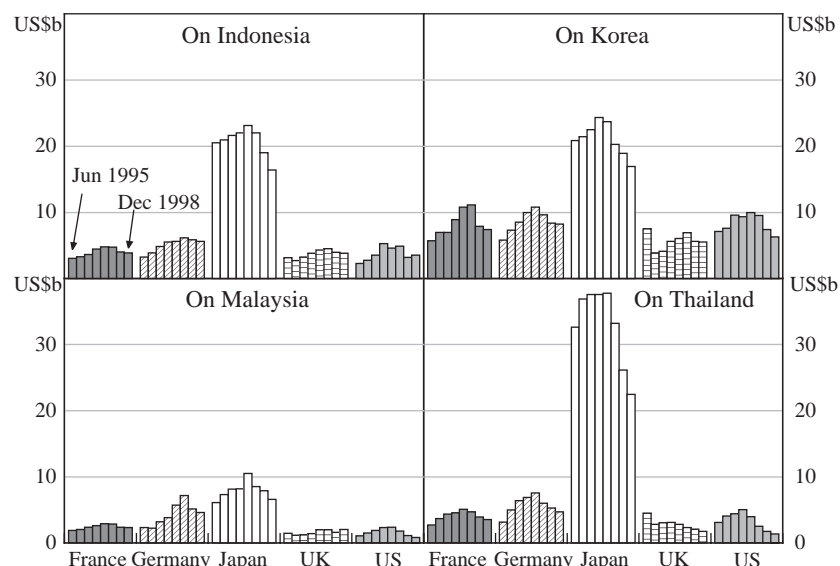
	On Asia		On Indonesia		On Korea		On Malaysia		On Thailand	
	Total	To banks	Total	To banks	Total	To banks	Total	To banks	Total	To banks
June 96	337.9	147.3	49.3	10.1	88.0	57.9	20.1	5.6	69.4	28.0
Dec 96	367.0	158.9	55.5	11.8	100.0	65.9	22.2	6.5	70.1	25.9
June 97	390.5	172.4	58.7	12.4	104.2	68.0	28.1	10.5	69.4	26.1
Dec 97	381.3	155.4	58.4	11.7	94.2	56.0	27.5	9.9	58.9	17.8
June 98	320.2	118.6	48.5	6.6	71.9	40.8	22.8	7.1	46.4	12.0
Dec 98	297.9	103.3	44.8	5.2	65.3	37.2	20.8	5.8	40.8	8.8

Source: BIS, *International Banking and Financial Market Developments*

According to the BIS, consolidated claims by banks on Asia fell 25 per cent from a peak of US\$390 billion in June 1997 to US\$298 billion in December 1998. Japan is the principal creditor to the rest of east Asia, with Japanese banks accounting for over 30 per cent of claims on the region at the height of inflows. But Japanese banks were also the biggest repatriators of funds during the crisis, withdrawing US\$38 billion in the six quarters to December 1998, accounting for more than 40 per cent of loan repayments from the region. Figure 8 shows bank claims of the five key lending countries – France, Germany, Japan, the United Kingdom and the United States – on four of the affected Asian countries from June 1995 to December 1998. Obviously,



**Figure 8: Banks' Consolidated Claims**  
Half-yearly, June 1995 to December 1998



Source: BIS, *International Banking and Financial Market Developments*

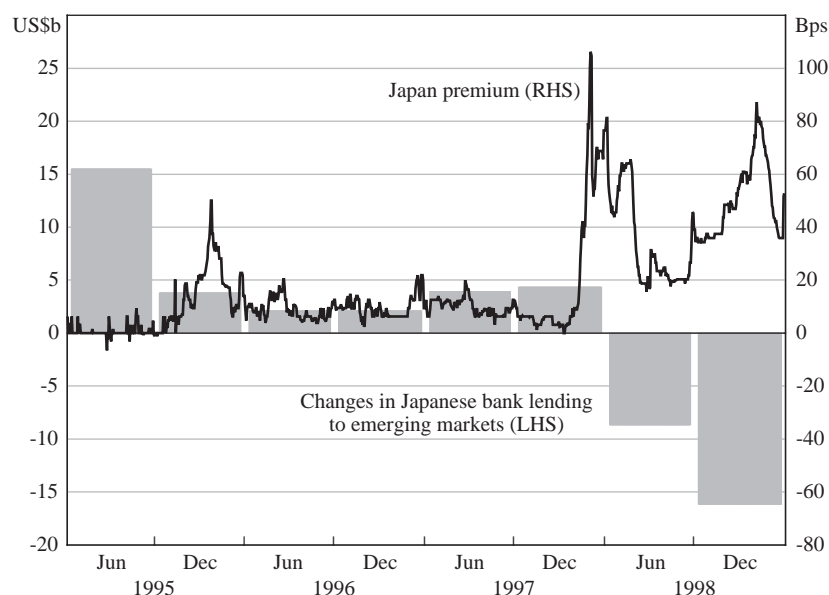
Japan is the principal lender in all cases. Both the loan concentration and the loan reversal are greatest in the case of Thailand.<sup>3</sup> The more concentrated the fund supply, the greater the reversal.<sup>4</sup> One driving factor behind the sharp contraction in Japanese banks' exposure was weakness in the Japanese banking system, with the withdrawal of Japanese funds from emerging markets coincident with the rise in the Japan premium (Figure 9).<sup>5</sup>

3. The data may overstate the reduction in Japanese banks' exposure to Thailand. Some proportion of Japanese bank loans is to Thai-Japanese joint ventures or to subsidiaries of Japanese companies operating in Thailand. As direct loans were withdrawn, loans were reportedly made by Japanese banks to the head office company in Japan, which in turn directed funds to the joint venture or subsidiary in Thailand. This will appear as a reduction in loans and an increase in FDI in the financial account of the balance of payments.
4. This parallels Brazil's experience in late 1998 and early 1999 with rolling over interbank loans: some of the countries with the largest exposures relative to the size of their banking sectors – like the Netherlands and Spain – were also the ones with the lowest roll-over rates.
5. The Japan premium is the additional cost Japanese banks face in borrowing short-term funds relative to other banks. The premium shown in Figure 9 is for 3-month US dollar LIBOR.

**Table 5: Banks' Consolidated Cross-border Claims by Maturity and Sector**

Position in regard to:		Total US\$ billion	By maturity		By sector		
			Per cent total		Per cent total		
			To 1 year	More than one year	Banks	Public sector	Non-bank private sector
Indonesia	mid 96	49.3	60.0	35.8	20.5	13.3	66.2
	mid 97	58.7	59.0	35.0	21.1	11.1	67.7
	mid 98	48.4	54.1	42.6	13.7	15.6	70.6
	end 98	44.8	52.6	43.7	11.5	14.9	73.6
Korea	mid 96	88.0	70.8	19.2	65.7	6.7	27.4
	mid 97	104.2	68.0	19.7	65.3	4.2	30.4
	mid 98	71.9	45.4	39.2	56.7	6.7	36.5
	end 98	65.3	45.3	38.0	56.9	8.4	34.7
Malaysia	mid 96	20.1	49.7	41.1	28.1	11.4	60.5
	mid 97	28.8	56.4	30.8	36.4	6.4	57.1
	mid 98	22.8	48.6	41.6	31.2	6.6	62.1
	end 98	20.8	44.5	44.1	27.6	8.7	63.6
Philippines	mid 96	10.8	55.1	39.3	32.0	25.4	42.6
	mid 97	14.1	58.8	30.7	38.9	13.1	48.0
	mid 98	17.5	56.4	37.2	45.8	12.6	42.1
	end 98	16.2	53.7	41.5	37.1	12.8	50.1
Thailand	mid 96	69.4	68.9	27.4	40.3	3.1	56.4
	mid 97	69.4	65.7	30.4	37.6	2.8	59.5
	mid 98	46.3	59.1	36.6	25.9	4.3	69.8
	end 98	40.7	58.2	37.3	21.7	4.7	73.6

Sources: BIS, *International Banking and Financial Market Developments* and *The Maturity, Sectoral and Nationality Distribution of International Bank Lending*

**Figure 9: Japanese Bank Lending and Japan Premium**

Sources: BIS, *International Banking and Financial Market Developments*; Bloomberg

#### 4. Looking Forward

The paper has focused on documenting the extraordinary reversal of capital inflows to emerging east Asia in the past few years. It is worth keeping in mind, however, that volatility in capital flows is unlikely to have come to an end: the outflows were preceded by inflows and they will most likely also be followed by inflows. As shown in Figure 1, the pattern of capital movement to emerging markets over the past 30 years or so has been one of ebb and flow, rather than stasis. The issue is how strongly and quickly capital inflows will return.

On the one hand, possible impediments to inflows come from increased risk aversion by governments and markets. Regional governments may pursue risk-averse policies to reduce international exposure, such as limiting current account deficits or imposing capital controls of various degrees of stringency. More generally, markets also have become more risk averse, with spreads on corporate and emerging market bonds still wider than a few years ago.

On the other hand, there are also powerful forces at work which presage a return to robust inflows to the region. With global inflation benign, world interest rates relatively low and the recent soaring returns on major industrial-country share markets (possibly) slowing, capital will return to emerging markets in search of better yield. Moreover, investment portfolios in the major economies are still extremely overweight their own domestic securities – the so-called ‘international

diversification puzzle'<sup>6</sup> – and the continued expansion of international markets should therefore generate even greater international diversification into emerging markets. The Asian region is well placed to take advantage of this since its prospects are fundamentally favourable. While the Latin American debt crisis scared off new capital for over a decade, this was against a backdrop of a century of economic instability. East Asia's economic history is different, and many of the fundamental strengths recognised in Asia before the financial crisis (like high thrift and a strong work ethic) remain in place.

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6. French and Poterba (1991) present evidence that portfolio allocations are excessively weighted towards domestic assets. Baxter and Jermann (1997) argue that the divergence between optimally diversified and observed portfolios is even greater once account is taken of the correlation between returns on human capital and domestic physical capital, implying that investors should hold a substantial short position in domestic marketable assets and a long position in foreign marketable assets to offset their human-capital risk.

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# Academic Views of Capital Flows: An Expanding Universe

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Michael P Dooley and Carl E Walsh

## 1. Introduction

Recent crises in emerging markets have generated a fundamental re-appraisal of theoretical models of international capital flows. It is now generally recognised that crises have occurred in circumstances that cannot be explained by first generation models of speculative attacks that seemed quite acceptable only a few years ago. First generation models (Krugman 1979; Flood and Garber 1980) and their descendants dominated thinking about capital flows and crises partly because they explained several important features of balance of payments crises based on very simple behavioural assumptions about governments and private investors.

In these models, governments are assumed to follow, stubbornly and naively, an inconsistent policy regime. In contrast, private investors are well informed and act on rational, forward-looking expectations. As we have observed one crisis after another in recent years, the predictive power of the model has diminished to the point where it has not been a serious factor in recent discussions of the crises in Asia. The failure of this theoretical framework to help anticipate crises has proven extremely costly. Governments that followed the rules of the game suggested by first generation models have suffered costly recessions following crises. We are in the midst of a crisis for the theory of crises.

To bring some order to the current debate, four important departures from first generation models are discussed in the following pages. In the next section, second generation models are reviewed. These models are based on more complicated assumptions about governments' behaviour. This is followed by two approaches that incorporate assumptions about private speculative behaviour that are fundamental departures from the rational expectations or efficient market framework. The first is based on a variety of capital market imperfections that have been associated with crises in closed economies. The second is based on the assumption that speculative behaviour is inherently destabilising and that behaviour varies across types of investors. Finally, we discuss an alternative first generation insurance model.

## 2. First and Second Generation Models

The primary accomplishment of first generation models is that they relate fundamentals that evolve smoothly to discrete changes in regimes and asset holdings. The mechanism that accomplishes this is an anticipated sequence of yields on real or financial assets that shapes the behaviour of competitive and rational investors. Salant and Henderson (1978) consider a situation in which the government distorts the real interest rate earned on stocks of gold by fixing its nominal price. As

long as the return on holding gold is below the risk-free alternative, private investors are happy to let the government hold the buffer stock. But investors know that if a speculative attack exhausts the buffer stock, the price of the commodity will henceforth rise at the real interest rate. At this time private investors will buy the entire stock of government holdings in a speculative attack.

Krugman (1979) adapted this idea to a fixed exchange rate system. In Krugman's model, the driving force is a conflict between the government's exchange rate commitment and its fiscal policy. As long as the fixed exchange rate regime survives, a deficit is financed by gradual reductions in the government's reserves. On the day the attack occurs, the government's reserves fall discretely to zero and the exchange rate is allowed to float. There is nothing apparently special about that day in terms of the fiscal deficit, but there is something special about yields on assets, in this case on money balances.

Because the exchange rate regime ends when reserves go to zero, subsequent deficits are financed by money creation. The associated increase in expected inflation and nominal interest rates reduces the real return on, and demand for, real money balances. This is accommodated by the discrete sale of international reserves (the foreign part of the monetary base) to the private sector.

Like its antecedents, this model teaches the important lesson that rational economic behaviour driven by fundamentals that evolve smoothly over time can involve dramatic attacks (asset exchanges between the government and the private sector) and changes in regimes that seem to be unrelated to contemporaneous changes in the fundamentals.

Because first generation models are driven by observable policy rules, we would not expect crises in countries where the policy conflict is clearly absent. Yet this has been the case in most recent crises. The natural response has been to re-examine the simple behavioural assumptions behind the model.

Second generation models retain the assumption of rational private investors but assume governments recognise and exploit trade-offs among policy objectives. This quite modest extension of the analysis suggests that crises are more difficult to predict because the government acts on forecasts of future developments. Moreover, because private investors have to guess the government's future policies, changes in private expectations can generate self-fulfilling, multiple equilibria.

These models provided a better understanding of the 1992 ERM crises but, as with first generation models, do not seem to provide a convincing story for the events that followed, particularly in Asia. Their primary lasting contribution to the debate over capital flows is the idea that under certain conditions, regimes can be vulnerable to shifts in private expectations. The nature of the circumstances is, of course, specific to each model. The stringent condition for a self-fulfilling attack is that a shift in private expectations about government behaviour generates a change in the *optimal* policy regime. Calvo (1988) summarises the implications of the argument as follows: 'The implications for policy could be staggering: for our results suggest that postponing taxes (i.e. falling into debt) may generate the seeds of indeterminacy; it may, in other words, generate a situation in which the effects of policy are at the

mercy of people's expectations – gone would be the hopes of leading the economy along an optimal path'.

Flood and Garber (1984) and Obstfeld (1986) showed that if a government is expected to follow more expansionary monetary policies following a successful speculative attack on the fixed exchange rate regime, policy regimes that would otherwise be viable can be forced to collapse by self-fulfilling private expectations.

Obstfeld (1994) refines the argument by specifying the political economy that might account for the government's behaviour before and after an attack. The analysis sets out a rational government that seeks to maximise a plausible objective function. Since the government's objectives are the same in any exchange rate regime, it follows that policy-setting under different regimes must reflect changes in the economic environment rather than arbitrary assumptions concerning the government's behaviour.

Eichengreen and Wyplosz (1993) argue that self-fulfilling models offer a better interpretation of the ERM crises in 1992 compared with the first generation models. Their general point is that the ERM members that were forced to abandon their exchange rate commitments played by the rules of the game for a viable system as long as entry into the European Monetary Union was a feasible objective. To buttress this interpretation, Eichengreen, Rose and Wyplosz (1994) offer empirical evidence that the fundamentals behaved differently in the months leading up to the ERM crisis compared with a sample of crises in other fixed exchange rate regimes. In particular, they argue that the ERM crisis was not preceded by excessive money growth, growth in domestic assets, fiscal deficits, or a number of other variables usually associated with inconsistent policies.

More recently, several papers have examined crises in emerging markets and concluded that shifts in private expectations are important elements in an attack sequence. Calvo and Mendoza (1995) argue that the crisis in Mexico in 1994 is consistent with the idea that the government's short-term debt and the anticipation of a bailout for a weak banking system made it vulnerable to a shift in private expectations. Cole and Kehoe (1996) also argue that events in Mexico are consistent with a self-fulfilling crisis. Sachs, Tornell and Velasco (1996) examine characteristics of 20 countries that seem to contribute to their vulnerability to speculative attacks following the Mexican crisis in 1994. They find that prior lending booms, overvalued exchange rates and low levels of reserves relative to M2 explain a large part of this experience. They also find that fiscal and current account deficits seem to be unrelated to a country's vulnerability to attack.

Another interesting approach seeks to extend second generation models by expanding the empirical counterpart of government finance to include implicit assets and liabilities. An important branch of this research is developed by Guillermo Calvo. In a series of papers, he has argued that debt service on the *stock* of government liabilities that might be subject to self-fulfilling shifts in private expectations is much larger than the explicit debt numbers usually considered. Calvo (1996) adds a banking system and a domestic market for government bonds and shows that a more realistic balance sheet for the government and the private



sector is important in evaluating the vulnerability of the regime to shifts in private expectations. In this model, if the government acts as a lender of last resort, it takes on liquid liabilities and illiquid bank assets. This generates an interesting link between banking and balance of payments crises. The domestic bond market is also a source of vulnerability since debt service costs are probably reduced by short-term debt, but such debt is an immediate fiscal problem if a shift in inflationary expectations causes domestic interest rates to rise. This paper also offers an explanation of why expectations might shift, a topic we will return to in Section 3 below.

In retrospect, the striking feature of first- and second-generation models is that they are models of government finance rather than international finance. The private sector is composed of representative, competitive, rational, well-informed, utility maximising speculator/households. There are no financial intermediaries, no incomplete contracts or information asymmetries, and certainly no noise traders. In terms that will please readers of a certain age, Friedman's speculators had clearly driven Kindeleberger and Mackay's speculators from the academic playing field.

### **3. Alternative Models of Private Speculative Behaviour**

Two quite different approaches to modelling private behaviour have emerged in the past year or so. Both are modern adaptations of models with a rich historical background. Our main objective in the following pages is to offer a very preliminary review and assessment of these recent contributions to the analysis of capital flows and crises.

The first approach maintains the assumption that investors are rational, but emphasises the fact that capital markets do not offer a complete menu of contracts and that investors are not uniformly informed. Thus, both domestic and international financial markets are subject to important distortions. This approach draws on a rich literature developed in the context of a closed economy that attempts to explain crises and the role of governments in stabilising financial markets.

The second approach attributes behavioural peculiarities to different types of private investors and attempts to interpret the data as manifestations of that behaviour. This analysis is very closely related to the traditional view in international finance that types of flows reported in the balance of payments statistics, such as direct investment or short-term capital flows, are useful behavioural aggregates. In general, this approach asserts that there are such things as noise traders and focuses on the empirical content of the model of the assumed behaviour.

The distinction between these approaches is more than an academic issue. If some types of speculators are inherently destabilising, the appropriate policy response is to curtail the behaviour of these speculators. This was the approach favoured by the founding fathers of the Bretton Woods system. If decisions of normal speculators are distorted by market failures, the policy response is to minimise the distortions. More importantly, curtailing the activities of one set of investors that are motivated by a distortion will not solve the problem because others will take their place. The stakes,

therefore, are much higher since direct controls over capital flows will have to be comprehensive in order to be effective.

### **3.1 Behavioural finance**

The idea that private capital flows are inherently unstable even in the context of a perfectly sound policy regime is a very old one. In fact, it was the dominant view at the inception of the Bretton Woods system, a system that not so long ago required IMF member countries to control capital movements. The idea that the perfectly informed competitive speculator might be a bit of a stretch has received considerable support in the modern analysis of domestic financial markets. The equity market crash in the United States in 1987 generated renewed interest in the idea that the behaviour of investors or particular groups of investors might account for changes in market conditions that seemed unrelated to fundamentals. This approach is once again threatening to dominate analysis of international capital movements. In our view, this line of research is like a virus that cannot attack a healthy theoretical framework, but is opportunistic when we are confused about what is going on.

The idea that private behaviour destabilises international financial markets has a long history. In part, the problem is that the balance of payments data condition us to believe that the motivation for a capital flow is related to the type of transactor and the type of financial instrument traded. Thus, direct investors' purchases of shares in emerging market firms are thought to have entirely different motivation compared to foreign banks' purchases of short-term deposits in emerging market banks. Clearly the founding fathers of the Bretton Woods system believed in what is now called behavioural finance and designed the balance of payments statistics so that we could keep careful track of, and control over, poorly motivated capital flows.

These arguments seem plausible. Aggressive hedge funds seem to destabilise virtuous regimes. Moreover, they profit at the expense of honest governments. Direct investment seems to be associated with capital formation. Short-term capital flows seem to be associated with investors that focus on the dynamics of the market rather than fundamentals.

Dooley (1996) provides a review of the arguments in support of a 'Tobin Tax'. This literature argues that investors with short holding periods tend to destabilise prices, while investors with long holding periods stabilise prices near fundamental values. The conclusion of this review is that there is no convincing evidence from either domestic or international markets that such a correlation between holding periods and speculative behaviour has been found in the data.

There are, of course, many alternative hypotheses about the nature of destabilising speculation. Kim and Wei (1999) examine data on positions of non-residents in the Korean equity market in the 18 months surrounding the recent crisis. Using measures of herding and positive feedback speculation, the authors conclude that non-resident institutional investors were subject to herding and sold equities that performed relatively badly in the preceding month. While we have considerable misgivings about the power of such tests, they clearly suggest that more empirical research is warranted.

In contrast, Claessens, Dooley and Warner (1995) find that balance of payments labels do not help in predicting the time-series behaviour or the predictability of different types of capital flows. It is, of course, possible that more carefully defined data sets could find predictable behaviour missed by the balance of payments accounts. In general, it now seems pretty clear that we cannot rule out destabilising speculation as irrational, or assume that such speculators will always suffer losses that leads to their disappearance. This is an empirical issue.

The obvious problem with interpreting the data is that we can never be sure whose behaviour we are observing when we look at transaction data. Friedman's observation that new information changes prices, and differences of opinion generate trades, remains an important insight. A complete analysis must consider interactions among different types of capital flows. Indeed, it can be argued that all the detailed accounting for international capital flows is of little use in understanding the economics behind capital flows. The possibility of sovereign default means that if trouble comes, all foreign claims on residents of the emerging market are thrown into a pool and renegotiated. It is this anticipated aggregation of claims that is at the heart of the problem in interpreting types of capital flows. Where default is a possibility, the nature of individual claims is important to the extent that it determines the place in line for repayment during a renegotiation of debt.

### **3.2 Incomplete contracts and capital flows**

Before taking on this new literature, it is worth reviewing how thoroughly the behaviour of private investors had been simplified in the standard model of sovereign debt. The first step in submerging the private investor is to aggregate all capital flows. Total private and official net capital flows must equal the current account imbalance. The current account balance is the difference between domestic output and absorption, so the net capital flow must augment or diminish current consumption or investment. Either can provide a rational expectation for repayment. Models of sovereign default focused on the interaction between net capital inflows and net service payments to creditors as the problem of international finance. Max Corden's famous consenting adults model focuses on the optimality of this intertemporal trade among countries. The message from the models is that as long as private incentives are not distorted, private net capital flows are not a policy problem. Notice that it has nothing to say about the structure of financial capital flows or the structure of financial intermediation in the country.

There are many distortions that have made their way into the Corden model. The most important is the difficulty in enforcing cross-border claims. But we think a fair reading of this literature is that it has not provided a compelling explanation for recent crises in emerging markets. External debt and debt service were not so large relative to capacity to pay that default could have been an optimal strategic policy for governments.

The Corden model has recently been extended by incorporating a very sensible insight – the transformation of foreign savings into productive capital or deferred consumption might generate the same liquidity problems for the international

monetary system as are generated for domestic financial systems. This brings the structure of markets, contracts, and financial intermediation to centre stage. An important focus of this literature is the trade-off between liquidity and the productivity of capital. In an ideal world financial intermediation and contingent contracts can provide both. Investors that want to liquidate can do so as long as the financial intermediary can satisfy aggregate liquidity needs while the bulk of the economy's savings can be transformed into illiquid, but high return capital. The problem, of course, is that an unusual or unexpected demand for liquidity can generate forced sales of assets at a loss for the community. The possibility that a crisis can be caused by a self-fulfilling shift in private expectations lies behind many recent interpretations of crises in emerging markets.

Related work focuses on the idea that financial intermediation is an inherently risky business and may be prone to crises. An important part of the story leading up to crises in Asia was liberalisation of both domestic financial markets and the access of residents of these countries to international financial markets. While the implications of capital mobility for macroeconomic policy are the bread and butter of international economists, the implications of capital mobility for the efficiency and stability of financial markets are much less a part of the standard tool kit. Models that fit international capital flows into models in which financial intermediation is explicitly considered may hold the key to a better understanding of international capital flows.

### **3.3 Sources of financial fragility**

Economists have developed and studied a range of models that provide insights into the structure of financial markets, the sources of financial fragility, and the role that policies might have on both the efficiency of financial markets and their stability. By and large, these have been closed economy models, not designed to address directly the issues associated with international capital flows. Typically, theory deals with broad classes of agents – lenders versus borrowers, consumers versus firms, entrepreneurs versus savers. These categories do not necessarily correspond to whether the market participants are foreign or domestic residents. However, economic theory does highlight important sources of credit market imperfections and their implications for financial instability.

A useful starting point for an analysis of financial fragility is the Diamond-Dybvig (1983) model of bank runs. This model provides a well-defined environment in which there is a demand for liquidity, and banks can perform a maturity transformation function that, in equilibrium, is welfare-improving. However, there is a second equilibrium in which a bank run occurs. In this second equilibrium, all depositors attempt to withdraw their funds from the bank. Losses are suffered as the bank liquidates its assets to meet these withdrawals.

The basic Diamond-Dybvig model focuses on two key factors. First, investments normally require that funds be committed for some period of time. This can be thought of as reflecting higher expected returns on long-term investments, or simply the costs of liquidating asset holdings. Assets held to maturity offer higher returns than assets sold before maturity. Second, individuals are uncertain as to when they

will need their funds. There is a chance an investor will need to liquidate before maturity.

In the absence of aggregate uncertainty, a bank can provide liquidity risk insurance to individual agents, accepting deposits and investing in the long-term asset. The deposit contract specifies the amount a depositor may withdraw prior to the asset's maturity. Because there is no aggregate uncertainty, banks can always hold exactly the level of reserves necessary to meet withdrawals by impatient consumers. Patient consumers will be better off if they leave their funds in the bank and receive a higher payout when the investment asset matures.

A bank run can take place, however, if patient depositors believe that other patient depositors will withdraw their deposits. If all patient depositors attempt to withdraw their funds from the bank, the bank will, even after liquidating its assets, have insufficient funds to meet withdrawals – the bank falls. So if a patient depositor expects others to withdraw early, it is individually rational to try to withdraw early as well.

The basic insights of this model have focused attention on two issues. First, what might cause panic runs on the bank? This is essentially a question about equilibrium selection. What determines whether the good (no-run) equilibrium or the bad (run) equilibrium occurs? The role of information as a generator of runs is of particular interest here, a subject we will discuss below. Second, can the deposit contract offered by the bank be restructured to eliminate the possibility of a bank run? This question is of particular relevance for an analysis of capital flows. Can the nature of domestic liabilities held by foreign investors be altered via regulations in ways that reduce the possibility of a panic? Four basic solutions that focus on the nature of the deposit contract have been examined.

The first is narrow banking. A bank could be required to hold a level of reserves sufficient to meet withdrawals in all possible circumstances. While narrow banking eliminates the possibility of a run, it does so by eliminating the ability of banks to offer maturity transformation services. Since this was the benefit to be derived from banks in the first place, narrow banking essentially returns the economy to an inefficient, autarchic equilibrium.<sup>1</sup>

Diamond and Dybvig offer a second solution – suspension of convertibility. If the bank can predict perfectly the number of impatient consumers, it can hold reserves sufficient to meet the withdrawals of impatient consumers. If additional depositors attempt to withdraw funds, the bank simply suspends convertibility. All the impatient consumers are able to withdraw their funds, and the patient consumers have no incentive to withdraw early since they know the bank will always have adequate funds in the future. The bank will have adequate funds because it suspends convertibility if deposit withdrawals threaten its reserves.

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1. In autarky, each individual would self insure by investing less than his whole wealth in the productive asset, holding some wealth in liquid form. If a bond market opens, an agent who discovers that he needs liquidity can finance early consumption by issuing a bond rather than liquidating (at a cost) the long-term asset. This improves over autarky, but still fails to provide liquidity insurance efficiently.

Allowing for a suspension of convertibility does not affect the fundamental maturity transformation service which banks provide. It acts more as an equilibrium selection device, ensuring that the economy achieves the good equilibrium without runs. Prior to the founding of the Federal Reserve System, US banks normally suspended convertibility during banking crises.

The parallels with international crises are evident. The counterpart to a suspension of convertibility would be a 'standstill' enforced by the IMF or some other organisation. If capital outflows reach a certain limit, convertibility could be suspended. Properly designed, this would eliminate the need for fire sales of assets as banks attempt to liquidate their asset portfolios. However, such a policy can achieve efficient risk-sharing only if the appropriate cut-off at which suspension should occur is known. A suspension policy cannot achieve the optimal allocation when the true fraction of impatient consumers is stochastic (i.e. when there is aggregate uncertainty).

A third class of solutions is the most commonly observed – deposit insurance. Under a deposit insurance scheme, patient depositors have no incentive to withdraw their deposits.<sup>2</sup> Of course the presence of deposit insurance can lead to a moral hazard problem, as banks have an incentive to hold riskier assets. The role of government insurance in creating the conditions for a crisis is discussed below.

A fourth solution, due to Jacklin (1987), alters the nature of the deposit contract, essentially replacing it with an equity stake in the bank. Depositors who discover they are impatient can sell their shares at a market-determined price. Depositors who discover they are patient will wish to buy additional shares in the bank. While eliminating the possibility of a run, equity contracts may do worse than deposit contracts as a means of providing liquidity insurance.

The potential inefficiency with equity contracts may be of less concern when applied to international capital flows. There, the stability of the domestic financial sector, rather than the provision of liquidity to international investors, would be of primary concern.

While equity contracts do solve the problem of runs, in that banks cannot be forced to close, the attractiveness of equity contracts is diminished as soon as additional credit market imperfections are recognised. Imperfect information about investment projects, for example, can lead to agency costs that, in turn, give rise to a role for collateral. In such an environment, fluctuations in the share price of the bank may affect the bank's ability to raise funds.

Chang and Velasco (1998) have used the Diamond-Dybvig structure to analyse international capital flows. They focus on the problem of illiquidity, defined as a situation in which the domestic financial sector's short-term potential liabilities exceed the liquidation value of its assets. Access to foreign borrowing can reduce the chances of a bank run by providing the domestic bank with an additional source of short-term funds. However, failure of foreign lenders to extend lending when

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2. Leaving their deposits in the bank involves no risk since the government guarantees they will receive full value. This is enough to ensure that a bank run never emerges as an equilibrium.

domestic banks experience a run has the effect of making banks more vulnerable to runs. The belief on the part of domestic depositors that foreign lenders will refuse to extend short-term credit can trigger a bank run and force the closure of domestic banks. The presence of short-term foreign borrowing makes the domestic financial sector more vulnerable to a decision by foreign lenders not to roll over the existing stock of debt. In that sense, short-term foreign debt increases financial sector fragility.

Models of bank runs direct attention to two aspects of the financial environment. One aspect is the nature of financial contracts. The second is the possibility for multiple equilibria, with a crisis being a possible equilibrium phenomenon. In the next section, we review the literature on herd behaviour and informational cascades to better understand the nature of such self-fulfilling runs.

### **3.4 Sequential service constraints, herding and financial fragility**

The first-come-first-serve nature of deposit contracts creates an incentive for even patient depositors to withdraw funds immediately if they fear others may withdraw their deposits. Investors' beliefs about what other investors will do become critically important, and multiple self-fulfilling expectational equilibria can exist. A set of financial institutions and regulations may support an efficient and welfare-enhancing equilibrium, but the same set of institutions may also be vulnerable to shifts in expectations that push it into a bad equilibrium.

The fragility of financial markets to runs and investor panics has always provided a primary rationale for regulation. Regulations typically are designed to reduce the incentive for runs by such means as deposit insurance and to limit the riskiness of the underlying asset portfolio held by the bank through prudential regulation. Capital controls can be viewed as one mechanism for changing the incentives to run, but to evaluate their possible role requires some consideration of the underlying reasons for investor panics.

One approach has emphasised the problems that may arise when investors have little information themselves, and so base their actions to a large extent on what they see others doing. Seeing others invest in emerging markets, for example, other investors draw the conclusion that such investments are promising, leading to a large flow of capital to emerging markets. Seeing others pull their funds out, others follow suit. This highlights the potentially important role of 'herd' behaviour and informational cascades. Investors may base their actions on what they see others doing, rather than on their own information about underlying fundamental conditions.<sup>3</sup>

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3. Banerjee (1992) and Bikhchandani, Hirshleifer and Welch (1992) provide models of herd behaviour. The common structure of these models involves a discrete choice (leave funds in the bank or withdraw them, for example) that must be made sequentially by agents on the basis of limited information. Agents are assumed to have two sources of information. First, they have a private but noisy signal about which choice is the correct one. Second, they can observe what others before them have done. A key assumption is that while agents can observe the choices made by those who have gone before them, they cannot observe the signals the earlier movers received.

The distinction between observing the information of others versus simply observing what others have done is critical, but it is also quite realistic. Particularly in the environment of a crisis, ‘actions speak louder than words’.

If enough individuals are observed having made one choice (say withdrawing funds), subsequent agents will disregard their own private information and mimic the actions of others. The weight of the evidence of the choices others have made outweighs the individual’s own information. Agents may behave in ways that are inconsistent with their own private information if others have made a different choice. At some point, herd behaviour results. Everyone ignores their own information and follows the behaviour of the earlier movers.

In this environment, the decisions by the early movers can be critical. For example, if a few investors liquidate holdings in a country, others may assume that they must have had good reason to do so (whether in fact they did or not). Drawing such an inference, they also liquidate positions, and a run occurs. This can happen even if the later movers all had private information that indicated they should not liquidate.

Three important points are worth emphasising. First, the quality of the individual agent’s own information will be important. If an individual believes he has very good information, he may ignore the actions taken by others, deciding instead to act on his own private information. Second, beliefs about the quality of the information others possess is also important. If investors think that the first to liquidate are likely to be better informed on average, more herd behaviour will result. Third, herding behaviour can result in the wrong choice being made.

When multiple equilibria based on non-fundamental factors are possible, it may be possible for government policies to serve a co-ordinating role that focuses expectations, and therefore the actual outcomes, on the good equilibrium. When capital outflows result from herding behaviour, can capital controls help select the correct equilibrium? If capital flows are particularly sensitive to herd behaviour, does a role for controls emerge?

The heart of the problem is information, or rather the lack of accurate information. Public information might help, but two difficulties present themselves. First, it is not clear that anyone knows the true state. Second, a government might attempt to provide information on the state of the economy, but clearly a domestic government faced with a financial crisis has an incentive only to release information that would stem the panic. Credibility becomes a critical issue.

Pure information cascades may have implications for contagion effects as well. Key is what inferences investors make based on the actions of others that they observe. The information provided by observing actions is very coarse – in the case of a currency crisis, for example, the general conclusion drawn might simply be that expected returns have fallen, but it will matter greatly whether international investors assume this is due to country specific factors or more general factors. In the case of the latter, they will conclude that expected returns are now lower not just in the country under attack, but in all countries viewed as similar.



This type of contagion might be expected to be the norm. Herding behaviour is most likely to arise when individual agents have relatively poor private information. This is why they may ignore their own information and follow the herd. In such situations, it is unlikely that investors will be able to draw a clear inference about whether a crisis results from country specific factors or whether it results from factors affecting all countries in a similar risk class. Any signs of a crisis spreading may lead quickly to attacks on other countries.

Because information cascades can lead to runs that, *ex post*, are based on incorrect information, they generate inefficient outcomes. As noted earlier, the solution is to provide better information, but this may not be possible. Governments may have little credibility since they clearly have no incentive to provide accurate information unless it is 'good' news. International agencies might have greater credibility, but again the likelihood is that they too would be viewed as unlikely to provide truthful information unless it is good news.

Calvo and Mendoza (1999) argue that it is rational for speculators to remain poorly informed if they have small positions in a number of small emerging markets. For this reason it may be rational for international investors to react to information generated by trades of other investors.

Calvo (1995) develops a simple model of signal extraction that might account for herd behaviour in emerging markets. Informed traders sell either because fundamentals have changed or because they must meet a margin call generated by losses on some part of their portfolios. Poorly informed investors observe the sale but not the reason. If most sales are due to fundamentals it is rational for uninformed traders to misinterpret a margin call sale. Calvo emphasises quantity information rather than price; emerging markets prices are volatile and do not seem to be related to fundamentals.

### 3.5 Rational information-based runs

Both the Diamond-Dybvig model of runs and the herd behaviour that results from information cascades are essentially reflections of bubble phenomena – there is no fundamental reason for the runs. An alternative view of bank runs is that they are based on fundamentals and, in particular, that they can be information-based (Gorton 1985).

The basic idea is that bank portfolios are subject to risk, and depositors have only imperfect information about the value of these underlying portfolios. As in any model of the pricing of risky assets, current portfolio choices and asset prices will depend critically on the perceived co-movements among asset returns. Thus, any new information about returns on one class of assets will also affect prices of other assets with correlated returns.<sup>4</sup> In particular, bad news about returns in one country will lead investors to sell off holdings in other countries viewed as similar. Contagion arises as the rational response to new information.

A rational, information-based financial panic bears some resemblance to inefficient, information cascades. Imperfect information plays a key role in each case. A key

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4. See Reinhart and Kaminsky (1999) and Kodres and Pritsker (1998).

distinction is that information cascades can lead to inefficient equilibria in which agents ignore valuable information. Information-based runs of the type Gorton analyses reflect rational re-assessments of risk on the basis of new information. Since agents cannot distinguish solvent from insolvent borrowers, any inefficiencies are *ex post*, not *ex ante*, in nature.

As in any information-based crisis, there may be a role for policy that either provides information or that limits the ability of investors to run. The first type of policy emphasises the role of prudential regulation. Countries with adequate systems of financial supervision and regulation are unlikely to suffer contagion effects. When runs are based on a re-assessment of risks, standard recommendations to limit short-term capital flows may also play a role in limiting a crisis. Again, however, this is only the case if the underlying system is actually solvent.

### 3.6 Collateral, asset prices and credit cycles

The Diamond-Dybvig model and the informational cascade model focus on the behaviour of depositors or lenders. The fundamental problem in the Diamond-Dybvig model is the uncertain demand for liquidity. The maturity transformation provided by banks renders their liabilities more liquid than their assets. The ‘bad’ equilibrium, though, is not due to any problem with the underlying assets the bank holds. Information-based panics are based on depositors’ incomplete information about asset portfolios. However, the specific implications of such imperfect information for financial contracts are not fully spelled out.

Actual banking crises do seem to be associated with concerns over asset quality. Two issues are particularly relevant for international capital market fragility. What is the role of asset prices and collateral in propagating economic disturbances? Does international borrowing raise special issues with regard to collateral?

A number of models show how asymmetric information about borrowers’ projects can generate a role for collateral, producing the potential for credit rationing, financial fragility, and credit cycles. These models are often classified as Costly State Verification (CSV) models since they emphasise the effects that arise when lenders can verify borrower actions and project outcomes only by bearing some cost.

Two characteristics of financial markets that may arise with costly state verification are (i) credit rationing; and (ii) financial accelerator effects. The former implies credit availability will be limited by the value of the borrower’s collateral; the latter implies that asset price declines and the resulting deterioration of collateral values can amplify the impact of an initial negative shock.

Suppose all firms have access to an investment project yielding either a good return (success) or a bad return (failure). Firms differ in the amount of internal funds they can invest in a project. If lenders can observe project outcomes only by incurring a cost, the firm has a clear incentive to always announce that the bad outcome has occurred unless it is monitored. So lenders will have to occasionally audit firms. The optimal loan contract must satisfy an incentive compatibility constraint – it must ensure that the firm has no incentive to report the bad state when, in fact, the good state has occurred.

Bernanke and Gertler (1989) characterise the expected costs of project auditing as the agency costs due to asymmetric information. These costs generate a wedge between the cost to the firm of internal versus external funds. As they show, some borrowers will find the investment project is not worth undertaking if they have only low levels of internal funds to invest. The probability of auditing that lenders require can make agency costs too high to justify investment. With a higher level of internal funds the project would have been undertaken.

The number of projects undertaken in this situation can vary with changes in the value of internal funds even if neither the opportunity costs of funds nor the project returns have changed. Agency costs drive a wedge between the costs of internal and external funds so that investment decisions will depend on factors, such as cash flow, that would not play a role if information were perfect.

Financial accelerator effects arise when internal funds are sensitive to the state of the business cycle. Since a recession will worsen firms' balance sheets, reducing the availability of internal funds, the resulting rise in agency costs and reduction in investment may serve to amplify the initial cause of a recession. An initial negative shock can be magnified if it worsens the balance sheet and induces additional cuts in investment spending.

This type of financial accelerator effect can also generate endogenous credit cycles. The amount of credit firms use in production is determined by their ability to borrow funds, and this is limited by the value of their collateral. The value of collateral, though, depends on the market price of assets. Hence, an asset price decline can limit borrowers' access to funds by reducing the value of their collateral. In addition, borrowing is limited by the expected future value of the collateral since lenders are concerned with the market value of the collateral at the time they might have to liquidate it. Thus, future asset prices affect current collateral values and borrowing constraints.

An initial negative shock to asset prices reduces the ability of firms to borrow, lowering productive activity. Because firms have reduced their borrowing, however, their future debt is lower. Eventually, this allows them to increase their borrowing since less of their cash flow is absorbed by debt repayment. They are now able to increase borrowing, and productive activity increases. Endogenous cycles occur.

This type of financial accelerator is most clearly evident in the model developed by Kiyotaki and Moore (1997) and adapted to international capital flows by Miller and Stiglitz (1999). There are four key elements in their model. First, firms must borrow to finance productive activity. Second, borrowers are credit constrained by a lack of collateral. They motivate this by assuming borrowers (firms) can walk away from projects if they choose. Lenders will therefore never lend firms more than the value of the collateral they could capture if a borrower were to walk away. Third, the model assumes that a productive asset, land in their terminology, is required as an input into production. Land has an alternative use that will serve to determine its rental value. Finally, there is an exogenous riskless rate of return that the net return on land must equal.

Bernanke and Gertler (1990) focus on a slightly different form of asymmetric information. Suppose firms can screen investment projects but are unable to credibly

communicate their information to potential investors. Because firms are leveraged, a classic moral hazard problem arises. Firms will undertake low-quality, high-risk projects since they gain if the project pays off, while creditors bear part of the cost if the project fails. Too many projects are undertaken.

This has some interesting policy implications. Because too many projects are undertaken, a policy that limits the number of investment projects may be welfare-improving. For example, a tax on successful projects would be welfare-improving. Such a tax would induce firms with low-quality projects to forgo their investment opportunity.

It is important to note that costly state verification and moral hazard result in agency costs, but do not imply lenders are not providing the 'right' level of oversight or monitoring. Perfect monitoring is an inefficient use of resources whenever monitoring is costly. Policies that lower agency costs can potentially be socially beneficial. Adequate reporting and auditing requirements that lower the costs of monitoring faced by private investors (either domestic or foreign) would improve the efficiency of the match between borrowers and lenders.

### 3.7 Domestic and international collateral

Collateral matters when information is imperfect and monitoring is costly. These two characteristics are unavoidable when domestic firms borrow from international lending sources. If international lenders have less information about domestic borrowers than do domestic lenders, a distinction arises between international collateral – assets against which international lenders will advance funds – and domestic collateral – assets that can be pledged to domestic lenders.

Caballero and Krishnamurthy (1999) examine the implications of this distinction. Their model, like that of Holmström and Tirole (1998), assumes that borrowers invest funds in projects that are then subject to both aggregate and idiosyncratic shocks. Depending on the realisations of these shocks, borrowers may need to borrow additional funds or face abandoning their projects. Borrowing against the future project returns is limited due to moral hazard. Holmström and Tirole show how aggregate shocks can produce a crisis in a closed economy since even firms with projects with expected positive returns will be unable to finance their short-term liquidity needs.<sup>5</sup>

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5. Holmström and Tirole (1998) consider a general equilibrium environment to determine whether there will be a sufficient supply of liquidity. The only marketable assets (in the absence of government debt) are claims on firms, since individuals are assumed to be able to default with impunity. If there is no aggregate uncertainty, an individual firm can hold a diversified portfolio of claims on other firms. This outcome is much like the autarky equilibrium in the Diamond-Dybvig model. The efficient outcome can be obtained in the absence of aggregate uncertainty if financial intermediaries are introduced. An intermediary pools firm risks and offers liquidity insurance to individual firms. With aggregate uncertainty, however, the private market cannot always supply sufficient liquidity. If all firms experience a large liquidity shock, the aggregate demand for liquidity may exceed the ability of intermediaries to provide it. The problem is ultimately related to the moral hazard that limits the funds that can be raised by pledging the expected returns from the underlying investment projects. While private intermediaries may be unable to meet the liquidity needs of firms in the presence of aggregate uncertainty, the government can play a role as a supplier of liquidity. This role arises from a government's ability to commit the future resource of the economy through future tax payments.

Caballero and Krishnamurthy emphasise the role of collateral in debt contracts in the presence of moral hazard *and* the implications of asymmetric information between foreign and domestic lenders. This asymmetric plays out in two ways. First, a broader range of assets may qualify to serve as collateral for domestic lenders than would be accepted by international lenders.<sup>6</sup> Second, foreign lenders will advance less against acceptable collateral than will domestic lenders. With frictionless domestic credit markets, firms would be able to borrow the full value of their domestic collateral from domestic lenders. However, this assumption is unrealistic when dealing with emerging markets. Instead, the types of moral hazard problems that limit borrowing from international sources will also limit the amount that can be borrowed domestically.

In this environment, distressed firms, i.e. those firms with large negative idiosyncratic shocks, may exhaust their international collateral. In this case, a crisis occurs in which the excess demand for funds pushes up the domestic interest rate. But this rise in the interest rate serves to reduce the present value of the distressed firms' domestic collateral, further weakening their financial position. Fire sales and asset price declines exacerbate adverse effects of the initial shocks.

Critical in this approach is the notion that emerging economies need to rely on foreign resources for normal activities – when a crisis hits, access to these resources is limited, placing a binding constraint on economic activity. In developing economies, banks play a central role in the financial system. Often this involves borrowing internationally to lend domestically to those unable to access international capital markets directly. During a crisis, asset price declines and the resulting deterioration of the banking sectors' balance sheets reduce their ability to intermediate between foreign lenders and domestic borrowers.

The policy implications of this view of crises depend critically on what is meant by 'international collateral'. Caballero and Krishnamurthy assume that it is closely related to the size of the export sector, on the argument that foreign lenders can seize revenues from export sales. With this identification, policies that promote the export sector would serve to make the economy more stable.

There is a second type of policy that increases the economy's access to international lending. What can be thought of as effective collateral depends on the underlying assets that can be pledged *and* the fraction of the asset value that can be borrowed per dollar of collateral. This fraction is less than one because of the moral hazard problems inherent when there is imperfect information. Policies that reduce moral hazard problems would increase the amount that could be borrowed against a given value of collateral. This implication again serves to emphasise the importance of prudential supervision and regulation of both the financial and non-financial sectors.

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6. In their model, Caballero and Krishnamurthy (1999) assume international lenders will accept shares of firms in the tradeables sector as collateral, but will not accept shares of firms in the non-tradeables sector as collateral. Domestic lenders will accept either.

## 4. Insurance Attacks

In our view, the virtues of the approaches outlined in Section 3 include more realistic and potentially useful treatments of governments' and private sectors' behaviour. But complexity is also a vice since it will be difficult to discriminate among a host of models with a very limited data set. Dooley (1999) argues that we may have abandoned first-generation models prematurely. The policy conflict considered by these models does not seem to be consistent with the behaviour of governments preceding the Asian crisis. But rather than appealing to more complicated behavioural assumptions, it may be fruitful to consider an alternative policy conflict within the discipline provided by a first generation model. In particular, the insurance model assumes that the private sector is rational and has perfect foresight. Moreover, the government follows a simple set of policy rules.

The policy conflict is generated by the desire of a credit-constrained government to hold reserve assets as a form of self-insurance and the government's inability to credibly commit not to liquidate these assets in order to lend to domestic financial and non-financial firms. This policy regime generates incentives for investors to acquire insured claims on residents and to then acquire the government's assets when yield differentials make this optimal. Dooley (1999) provides an estimate that US\$0.68 of every US\$1.00 private capital inflow after 1989 to the six emerging market countries that have experienced crises was matched, at the time of crisis, by liquidation of governments' liquid assets and lines of credit.

A key feature of the model is that free insurance raises the market yield on a set of liabilities issued by residents *for a predictable time period*. This yield differential generates a private gross capital inflow (a sale of domestic liabilities to non-residents) that continues until the day of attack. The private inflow is necessarily associated with some combination of an increase in the government's international reserve assets, a current account deficit and a gross private capital outflow. When the government's reserves are exactly matched by its contingent insurance liabilities, the expected yield on domestic liabilities falls below market rates and investors sell the insured assets to the government, exhausting its reserves. The speculative attack is fully anticipated and at the time of the attack nothing special happens to the fundamentals or expectations about the fundamentals.

A plausible sequence of events that would trigger an inflow/crisis sequence is financial liberalisation. Liberalisation involves both opening of domestic financial markets and improved access to international financial markets. These programs relax three constraints. First, they make domestic liabilities available to foreign investors. Second, they make the existing regulatory framework less effective. Finally, and perhaps most importantly, liberalisation provides an insurance pool because creditor governments and international organisations have provided generous lines of credit to support reform programs.

## **5. Conclusions**

These are exciting times for students of international financial markets. We are faced with a number of interesting and quite different academic views on what motivates capital flows and what has made them turn out so badly in many countries. Important lessons have been suggested by the existing literature that seeks to understand the behaviour of financial markets in closed economies as well as the government's role in promoting stability and instability. To borrow a phrase that one of our favourite economists borrowed following the 1982 debt crisis, 'I don't think we are in Kansas' – again.

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# Capital Flows and Exchange Rates

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Stephen Grenville and David Gruen\*

## 1. Introduction

In summarising the state of play on the ‘New International Financial Architecture’, *The Economist*<sup>1</sup> has noted that ‘the official architects are strangely silent about another crucial aspect of global financial reform: exchange rates’. In part, this is because something quite abnormal happened with exchange rates (perhaps before, and certainly during, the crisis) which does not fit comfortably with the theoretical models of exchange rate behaviour. Looking forward, the importance of exchange rates is acknowledged, but there is no agreement on what should be done. The discussion has been, at best, partial, focusing on the need for greater flexibility in exchange rates for emerging market countries, with some suggesting that corner solutions (either rigidly fixed – probably via a Currency Board – or pure floating) may be inevitable.<sup>2</sup> The latter point seems debatable,<sup>3</sup> and the former begs the question of just what *would* have happened had these countries floated earlier.

While there is room for different opinion on exchange rate regimes, the basic core ideas seem straightforward enough, at least in principle. The anchor for a real exchange rate is found in the real productive sector of an economy – an exchange rate reflects a country’s international competitiveness. This may need to change over time. So, as a starting point, there may be a presumption that exchange rates should have the capacity to adjust – to some degree – over time, in response to shocks or (gradually) in response to the changing productive capacity of an economy.

This view – that a country’s real exchange rate or international competitiveness finds its basic fundamentals in its capacity to produce tradeable goods – puts the focus on the goods and services components of the external account. Even where there are external capital flows or cyclical changes in policy settings, these cause temporary departures from the anchor-point provided by the fundamentals – a country has to service, and eventually repay, its debt. We might not expect to see perfect purchasing power parity, but we would expect to see strong tendencies to reversion-to-mean of the real exchange rate – or at least reversion to a slowly shifting notion of fundamentals-based international competitiveness. These forces are analogous to other asset prices – equity prices will be anchored (however imperfectly) by company earnings.

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\* Special thanks to Luke Gower, Jonathan Kearns and Amanda Thornton for their help in preparing this paper.

1. 30 January 1999.
2. Eichengreen (1994).
3. See Frankel (1999).

With the real exchange rate firmly based in the productive sector, capital flows tend to play a rather secondary role in standard versions of the exchange rate story. They are often treated, essentially, as a residual. Implicitly, there is a ready supply of world capital, so that the current account is determined by a country's saving/investment balance, and the capital account is a residual to fund this. There is also a presumption that there is a ready supply of stabilising speculators, so any significant departures from fundamentals will be ironed out promptly.<sup>4</sup> The standard model for incorporating capital flows into the analysis is the portfolio balance view, where the main action is with interest differentials. With some interest differential in place, enough capital flows to the country to push up the exchange rate so that expected returns are equalised internationally (risk-adjusted, of course). The higher exchange rate helps to open up a current account deficit, which provides the real transfer counterpart of the financial flows. So this model plots out the path over time of interest rates and the exchange rate, without saying too much about the size of the capital inflows which are associated with these changing price relativities.

A classic exposition of these exchange rate dynamics is Dornbusch (1976). This analysis relates to the exchange rate response to different monetary settings between countries over the cycle. But the same approach can be applied over a longer time period, relevant to the Asian countries. While they are making the transition towards the technological frontier, it is quite likely that higher returns will be available to capital, so a real interest rate differential will exist over the medium term – decades rather than years. Capital inflow cannot immediately reduce this interest differential, and in the meantime equilibrium could be maintained by the real exchange rate being bid up, so that the higher domestic interest rate is balanced by the prospect of subsequent depreciation. This is analogous to the classic Dornbusch overshooting pattern, but drawn out over a much longer period.

How well does this fit the real world? For major currencies, there is reasonable general evidence of anchoring in the fundamentals over time, reflected by a general reversion to purchasing power parity. But even for these currencies – where the fundamentals are much more stable and better understood by market participants – reversion is a very slow process. Deviations from purchasing power parity take about four years to decay to half their original size (Froot and Rogoff 1995). Over shorter periods, moreover, macroeconomic fundamentals explain almost none of the movement in these exchange rates.<sup>5</sup>

4. 'A freely flexible exchange rate would tend to remain constant so long as underlying economic conditions (including government policies) remain constant; random deviations from the equilibrium level would be limited by the activities of speculators' (Harry Johnson 1973, p. 208), quoted by Cooper (1999, p. 8).
5. The classic reference, Meese and Rogoff (1983), showed that existing exchange rate models based on economic fundamentals could not reliably out-predict the naïve alternative of a 'no-change' forecast for year-to-year changes in major industrial-country exchange rates. Some more recent models can out-predict a 'no-change' forecast (for example, MacDonald and Taylor 1993), but the basic empirical fact remains largely intact. No-one has yet been able to uncover macroeconomic fundamentals that explain more than a modest fraction of year-to-year changes in industrial-country floating exchange rates. Frankel and Rose (1995, p. 1707) summarise the dismal state of exchange rate empirical research: '... the case for macroeconomic determinants of exchange rates is in a sorry state. With the exception of some significance in bits of statistical innovation and announcements at very short horizons, and some hazy predictive power at long horizons, there is little support for standard macroeconomic models'.

There have also been episodes in which exchange rates exhibited long-lived swings, with no apparent changes in fundamentals significant enough to justify them. The US dollar cycle in the 1980s – with the US dollar appreciating by about 90 per cent against the Deutsche Mark in the first half of the 1980s, only to completely unwind this appreciation by 1988 – is an example of this. The yen appreciated by about 75 per cent against the US dollar in the first half of the 1990s, and unwound this appreciation by 1998.<sup>6</sup>

There is a form of overshooting which goes beyond Dornbusch-type overshooting. Changing sentiment – unanchored by the fundamentals – seems to be the cause. There are not enough stabilising speculators to shorten the anchor chain, and achieve the reversion-to-mean reasonably quickly. This is not all that surprising – few financial institutions can take medium-term open positions over the length of time necessary to profit from the cyclical overshooting. As noted by Frankel (1989/90) and Frankel and Froot (1990), over time chartists (usually using some extrapolative technique) have become more important in financial markets, helping to put more impetus into swings. And clearly the model is not so well-defined that stabilising speculation is a low-risk activity: the fact that the path of the exchange rate over time does not follow the model at all closely is both the cause of the overshooting and the explanation of why stabilising speculators do not smooth out the path – they cannot be at all confident about the path of the exchange rate, and because they are not confident about the path over time periods relevant to them, they are reluctant to take speculative positions, so that the path can deviate from the model very substantially.

If this is a problem for developed countries' exchange rates, how much more serious is it for *emerging countries* which have:

- Much less well-defined trade-based fundamentals.
- No long empirical experience of market-determined exchange rates.
- Rapidly evolving production structures.
- Much larger capital flows, in relation to the size of their domestic capital markets and economies more generally. These flows were also changing rapidly over time. As these countries became more integrated into international financial markets, the amount of foreign capital available expanded enormously.
- Fewer Friedmanite speculators.

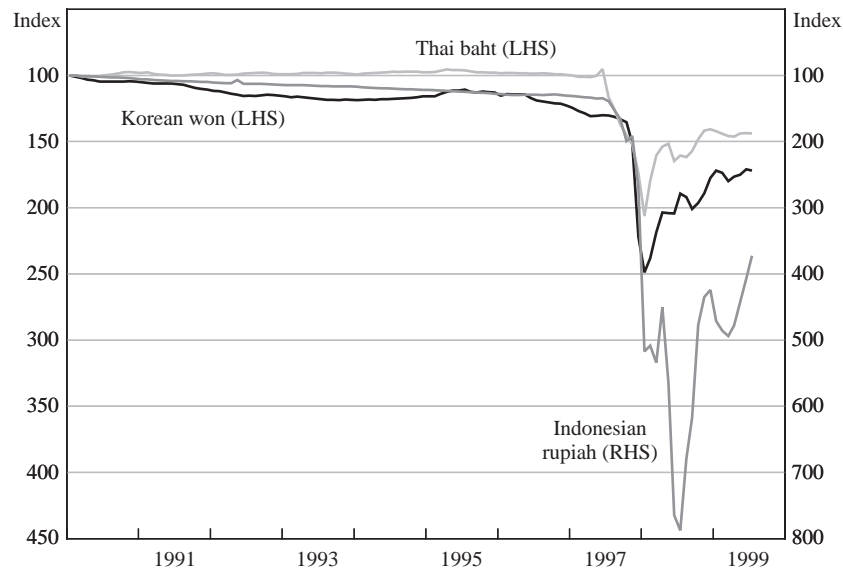
These capital flows are not simply responding to short-term cyclical interest differentials (*à la* Dornbusch – which might require exchange rate deviations from the mean of less than 10 per cent), but might need to compensate for real interest differentials of, say, 3 per cent which might last for a decade or more. If these numbers are realistic, the portfolio balance model would suggest that exchange rates have to appreciate initially by some 30 per cent, before depreciating by 3 per cent per year over the following decade. So the potential swings in real exchange rates, even within the well-functioning model, are much greater for emerging markets.

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6. The combination of tight monetary and loose fiscal policy in the US was consistent with some appreciation of the US dollar in the early 1980s. Nevertheless, the magnitude of the observed appreciation still seems hard to justify on the basis of fundamentals alone.

For the Asian emerging-economy exchange rates in the decade before the crisis, there was continued upward pressure, restrained by the officially imposed fixity, followed by a sudden unprecedented depreciation.<sup>7</sup> Figure 1 shows the result, in terms of nominal exchange rates, for the three crisis countries.

**Figure 1: Asian Currencies per US Dollar**  
January 1990 = 100, inverted scale



## 2. Country Experience

### 2.1 The crisis countries

If theory gives limited insights into the links between exchange rates and capital flows, we can look at the empirical experience to see what can be distilled from it. To focus the search, we might ask three questions.

- What part did exchange rates play in the pre-crisis period – e.g. in encouraging excessive inflows?
- Did overvalued exchange rates act as the trigger to set off the crisis in already-vulnerable economies?
- Once the crisis unfolded, what part did exchange rates play?

7. Over the year to June 1998, Indonesia's real exchange rate fell by 69 per cent – a fall with no known precedent. While Latin America records similar nominal depreciations, these were in high-inflation countries, which were often simply restoring their competitiveness.

### 2.1.1 The pre-crisis period

This period was characterised by two stylised facts: domestic interest rates were significantly higher than foreign rates; and there were semi-fixed exchange rates vis-à-vis the US dollar. It might be expected that this would encourage capital inflow. There was a sharp rise in inflow in the first half of the 1990s (Table 1). Capital inflows had been significant but not huge until the early 1990s, but then rose to 10.5, 4.8 and 4.9 per cent of GDP in Thailand, Indonesia and Korea in 1996.

**Table 1: Capital Flows to Three East Asian Economies**

Annual averages, US\$ billion

	1977–82	1983–89	1990–94	1995	1996	1997
Thailand	1.8	2.5	10.6	21.9	19.5	–15.8
Indonesia	1.5	3.4	5.2	10.3	10.9	–0.6
Korea	3.9	–6.1	6.1	17.3	23.9	–9.2

Note: Capital account flows adjusted for changes in official foreign exchange reserves.

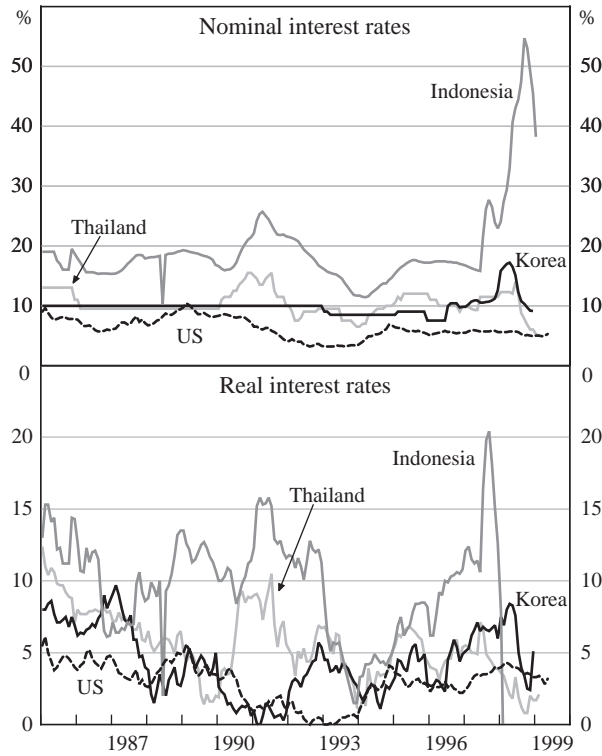
Sources: *Balance of Payments Statistics*, IMF, various issues.

Were these increased flows a result of the semi-fixed exchange rates, combined with high interest rates? These were certainly high-profit, high-return countries<sup>8</sup> which should have attracted big capital flows. The problem with this explanation is one of timing. The increased capital inflows were not associated with any *change* in either the exchange rate or interest rate fundamentals. The quasi-fixed exchange rate had been in place for a decade or more, and the higher interest rates even longer (Figure 2).

An alternative explanation was that the flows were largely driven by developments on the *supply* side (see de Brouwer (this volume)): the growth of mutual funds; vigorous competition among financial institutions to encourage and facilitate flows; and interest rate/exchange rate changes in the capital-supplying countries (particularly the ‘yen carry’). This change on the supply side is reflected in a significant reduction in risk margins required by investors – risk premia on emerging market bonds, in general, were driven down from nearly 8 per cent in 1991 to 4<sup>1</sup>/<sub>2</sub> per cent in the first half of 1997 (based on J.P. Morgan Emerging Market Bond Index). To a large degree, the crisis countries were on the receiving end of a large increase in overall international capital flows to emerging markets. Furman and Stiglitz (1998, Figure 5) show net long-term private capital flows to all developing countries (as a per cent of GDP) rising threefold in the first half of the 1990s, about the same increase as for the Asian countries.

8. Radelet and Sachs (1998), quoting OECD data, show returns falling between the 1980s and 1990s, but still well above worldwide returns.

**Figure 2: Nominal and Real Interest Rates<sup>(a)</sup>**  
Per cent

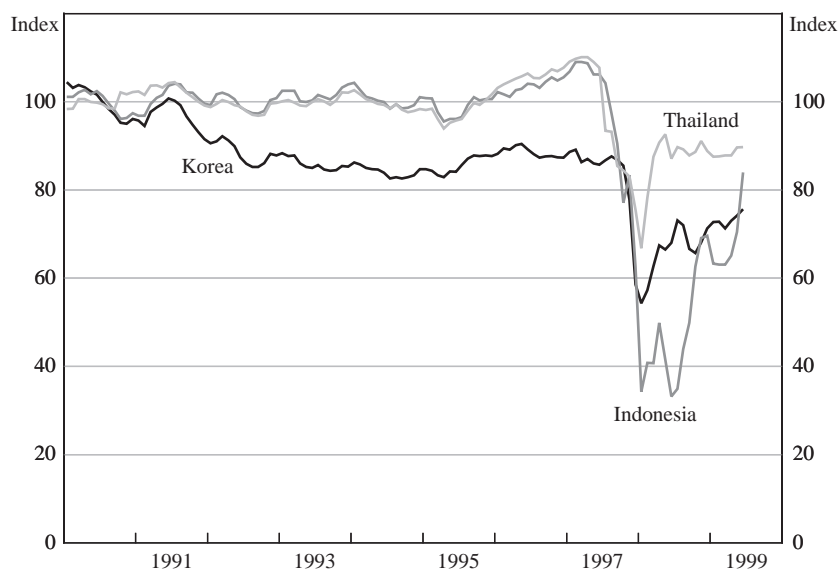


Notes: (a) Six-month deposit rates. Real interest rates are calculated using past 12 months' consumer price inflation.

But there are two blades to Marshall's scissors: even if the foreign supply-side forces were the dominant factor in encouraging the big increase in capital inflow, we might expect to see an interaction between the interest rates and the exchange rates that would have further encouraged the inflow. In the classic self-reinforcing process, the increased capital inflow cannot be absorbed (through a bigger current account deficit) without a rise in the real exchange rate, so instead the capital inflow boosts foreign exchange reserves and thence domestic liquidity. Either this expands credit and drives up prices (appreciating the real exchange rate) or the authorities attempt to maintain monetary discipline by sterilising the capital inflow. This pushes up interest rates even further, which attracts more capital.

These mechanisms did *not* seem to be operating strongly in the crisis countries. While it is true that the current account deficit did not rise as quickly as the capital inflow (and hence foreign exchange reserves rose significantly), this did not seem to lead to an abnormal expansion in domestic liquidity and credit, driving up prices. Whereas credit grew much faster than nominal GDP in the early 1990s in Thailand and Indonesia, credit growth *slowed* in 1995 and 1996 (see Goldstein and

**Figure 3: Real Effective Exchange Rates – J.P. Morgan**  
1990 = 100



Hawkins (1998, Table 7)). Even more notably, real exchange rates did not rise much (see Figure 3).<sup>9, 10</sup>

This does not imply that semi-fixed rates had no effect on capital flows. Certainly, many borrowers turned to foreign-exchange-denominated loans because they were close to 10 per cent per annum cheaper than domestic borrowing – comparing nominal lending rates and making no allowance for possible exchange rate changes. Given the conditions at the time, this was rational enough. There were, if anything, reasons to think that the exchange rate might *appreciate* rather than depreciate, reducing the domestic-currency value of the borrower's obligation. After all, the authorities were working hard to hold the exchange rate down and reserves were rising – so if policy changed, the initial effect was likely to be an appreciation. For those borrowers who read their economic texts, there was also the Balassa-Samuelson effect, which suggested that these currencies would appreciate in a trend sense over time.<sup>11</sup>

9. For a couple of years before the crisis, there was some rise in real effective exchange rates in Thailand and Indonesia, but this was largely a result of the appreciation of the US dollar against the yen.

10. Some equilibrating price adjustment occurred in asset prices: property prices rose (notably in Bangkok), which would have reduced the return on these assets. It is interesting to note that equity prices did *not* rise in the period of maximum inflow – they had peaked earlier.

11. Most foreign-currency borrowers would have been aware of exchange rate risk. For Indonesia and Thailand, the most common denomination of loans was yen (see Goldstein and Hawkins (1998, Table 11)), and borrowers in countries fixed to the US dollar would have experienced the roller-coaster ride of the yen/US dollar rate in the first half of the 1990s.



But this just highlights the quandary that the authorities were in, in the face of the intrinsically higher interest rates (in turn a result of the high productivity growth as these countries' productive structure shifted towards the technological frontier). Could the authorities, by some careful choice of exchange rate regime or manipulation of the rate itself, create an expectation of gradual depreciation (to offset the higher interest rates) – along the lines of the portfolio balance model – without triggering a sharper change in exchange rate expectations? We will return to this question in the conclusion.

### 2.1.2 *The trigger*

One classic catalyst for crises of this type, elsewhere, has been an overvalued exchange rate. In Mexico in 1994, the real exchange rate was some 30 per cent higher than it had been when the exchange rate regime was put in place in 1988. More generally in Latin America, fixed exchange rates have been used as a strategy for anchoring expectations while inflation was brought under control. Even if this was a successful method of reducing inflation, it left a legacy of a substantially overvalued exchange rate. It should be emphasised that this was *not* the case in the Asian crisis countries. Furman and Stiglitz (1998) show various measures of competitiveness, and the worst case of overvaluation is Thailand which, on one measure, is overvalued by a modest 11 per cent (see Table 2). The standard J.P.Morgan index also suggests that overvaluations were mild<sup>12</sup> – in fact, rather less than would be expected, given the volume of capital inflow. The post-crisis near-reversion of real exchange rates in Korea and Thailand would also suggest that overvaluation was not a critical factor.

But the issue with fixed rates – even one which is not significantly overvalued – is always the problem of *exit*. Once the semi-fixed rates were abandoned, this may well have been the trigger for markets to focus on more fundamental vulnerabilities.<sup>13</sup> Once this anchor of policy collapsed, all other elements of policy were under question and the vulnerabilities which, until then, markets had simply noted – with the hope that they would be addressed and fixed in due course – suddenly became pressing, and confidence-sapping.

### 2.1.3 *The unfolding crisis*

Once the trigger of the crisis occurred, considerations of the pre-crisis fundamentals became irrelevant – the exchange rate was driven by the market's expectation of how the crisis would evolve. To the extent that theory can offer guidance, it is the various generations of crisis theories – Krugman (1979), Obstfeld (1996) (surveyed by

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12. This is not undisputed (see Warr (1999)).

13. Among which were the (probably cyclical) slowing in Thai exports in 1996, and the decline in the terms of trade for electronic-goods exporters.

**Table 2: Measures of Real Exchange Rate Misalignment for Selected Countries**  
Percentage from equilibrium value

Country	Methodology			
	PPP-1 <sup>(a)</sup> (Jan–June 1997)	PPP-2 <sup>(b)</sup> (May 1997)	Per capita GDP, adjusted <sup>(c)</sup> (1996)	Monetary model <sup>(d)</sup> (May 1997)
Indonesia	6	–5	–16	0
Korea	–5	9	1	–12
Malaysia	12	8	–41	2
Philippines	37	19	–16	–24
Thailand	11	7	–18	2
Taiwan	–2	–3	—	8
Singapore	20	–6	–18	35
Argentina	65	—	34	—
Brazil	33	—	33	—
Mexico	3	—	–18	—
South Africa	–4	—	–17	—
United States	4	—	–30	—

Notes: (a) Percentage change between real exchange rate average over 1989–91 and average over January to June 1997.

(b) Overvaluation of the real exchange rate in May 1997 relative to Chinn's estimate of the PPP exchange rate over 1975–96.

(c) Percentage difference between actual real exchange rate in 1996 and the predicted rate for that year based on the fitted values from the regression of the real exchange rate on per capita GDP measured in PPP dollars. The actual real exchange rate is the ratio of the PPP rate to the dollar exchange rate in 1996, as calculated by the World Bank.

(d) Overvaluation of real exchange rate in May 1997 based on Chinn's sticky price monetary model of the exchange rate.

PPP-1 and adjusted per capita GDP are Furman and Stiglitz's calculations based on the PPP series in World Bank (1998) and a multilateral trade-weighted real exchange rate from unpublished World Bank staff estimates using IMF data. PPP-2 and the monetary model are estimated by Chinn (1998).

Source: Reproduced from Furman and Stiglitz (1998, Table 2)

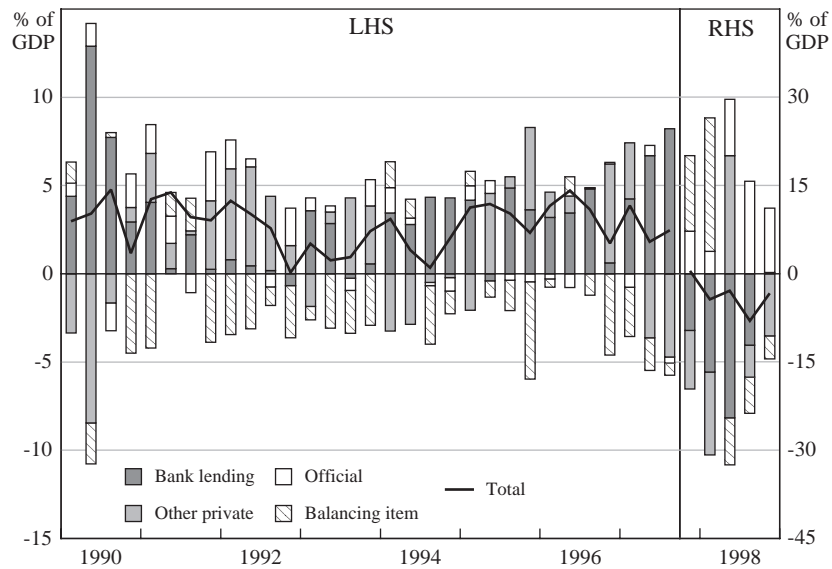
Dooley and Walsh (this volume)) – that are relevant. Market participants now focused on three separate concerns:

- That inflation would validate a much lower nominal exchange rate. Even if the initial real exchange rate was re-established in due course, this could be done either by higher inflation or by a reversion of the nominal exchange rate, and the market was, in effect, punting on the former. In these circumstances, there is no clear anchor for the nominal exchange rate.

- That the generally good macro policy record of these countries would not be maintained.
- Most serious of all for lenders, that the creditworthiness of their debtors would be fatally compromised either by the fall in the exchange rate or the on-coming recession in economic activity – credit risk replaced exchange rate risk.

As the crisis broke, the capital reversal was analogous to a bank run, where investors have little reason to remain, and every incentive to go. Investors made an on/off ‘binary’ decision to cut their losses and get out ahead of the others. Special mention is often made that *domestic* players were first to flee these currencies.<sup>14</sup> But the capital account data show one dominant group of foreign investors which seems to have taken flight at the earliest opportunity – foreign banks who had lent to domestic banks. Understandably so: they had no reason to stay, and the government guarantees provided the liquidity to facilitate their capital withdrawal. Bank-to-bank capital fled, before the possibility of controls or default could become a reality (Figure 4).<sup>15</sup> Higher domestic-currency interest rates provided no encouragement for the foreign-currency-denominated flows to stay. In fact, the exchange rate fall was a self-reinforcing unstable process: by reducing prospective

**Figure 4a: Indonesian Capital Account**

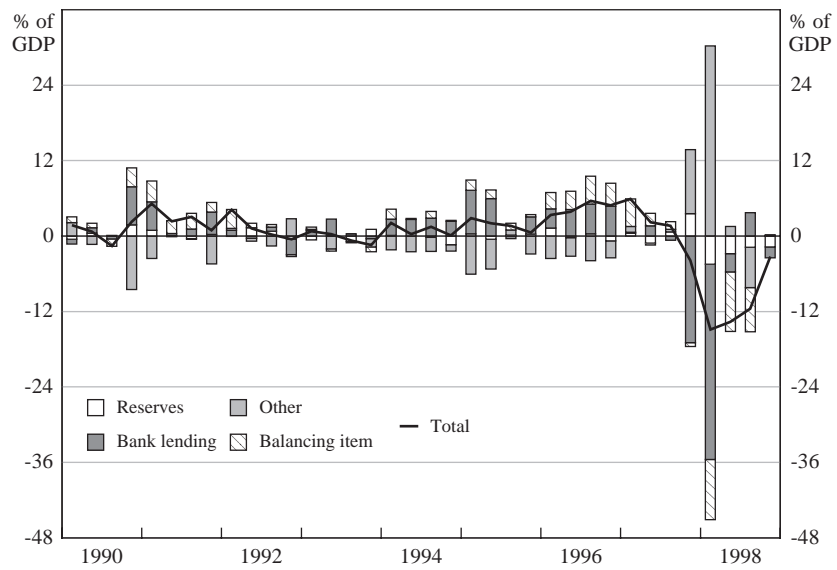


14. This argument is often used to support the claim that capital flows did *not* make these economies more vulnerable, and that outflows were just as likely to be initiated by domestic players who had no foreign borrowings. This may be so (although data seem scarce to justify a firm view): certainly, many unhedged borrowers (who *had* participated in the inflows) sought to cover their exposure by buying foreign exchange.

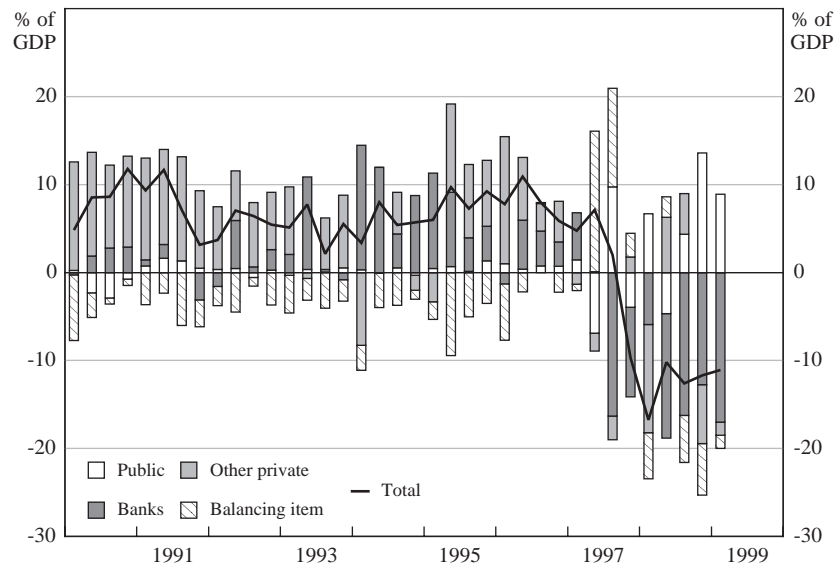
15. This capital had come into the crisis countries at a rate of around US\$50 billion per year before the crisis, and nearly US\$75 billion (far bigger than the rescue packages) left in the nine months after the crisis.

output and increasing the likelihood of bankruptcies among domestic companies, it increased credit risk and encouraged even greater outflow. In Indonesia, various non-economic events triggered further sharp falls in the exchange rate. With the notable exception of Soros in Indonesia late in 1997, there were few Friedmanite stabilising speculators with their eyes on the fundamentals.

**Figure 4b: Korean Capital Account**



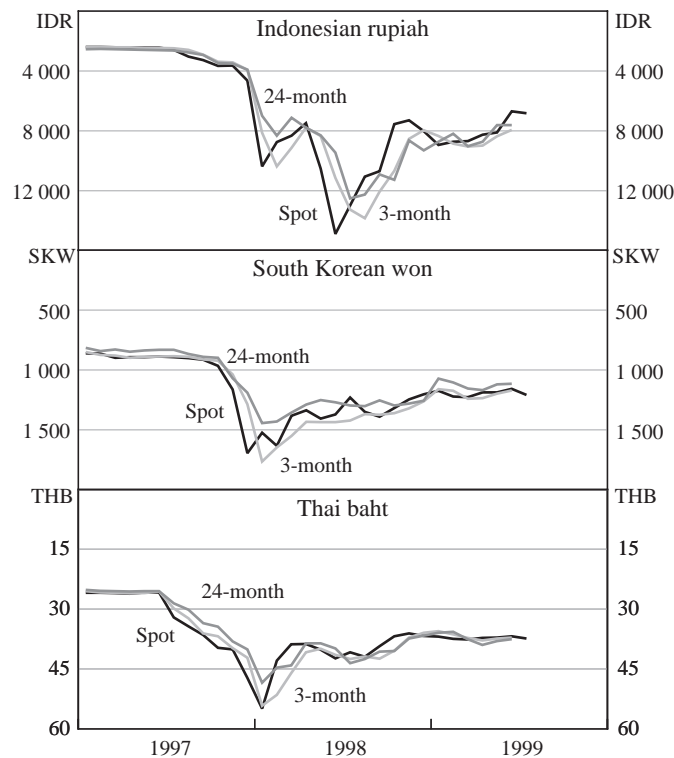
**Figure 4c: Thai Capital Account**



What role did the exchange rate have in the face of these huge and insistent outflows? With all the emphasis on what the exchange rate might do in the very short term (and with few looking at the medium term), the mechanism of the conventional model (a depreciation creates the expectation of a later appreciation) was not in operation. These outflows were brought into balance with available foreign exchange, not by the arrival of stabilising speculators, but by a combination of factors:

- The fall in the exchange rate limited the amount which residents could afford to send overseas.
- Tighter liquidity (in Thailand and Korea)<sup>16</sup> also restrained residents' ability to join the exodus.
- Most importantly, the fall in output and lower exchange rate produced a current account surplus. In all cases, this occurred with dramatic speed: each country moved from large deficit to surplus in a quarter or two following the crisis. The

**Figure 5: Asian Currencies per US Dollar**  
Spot rate and contemporaneous 3- and 24-month horizon forecasts<sup>(a)</sup>



Note: (a) Inverted scale.

Source: Forecasts from Consensus Forecasts

16. In Indonesia, Bank Indonesia's support for ailing banks provided liquidity.

average turnaround in the current accounts of the three countries in the year following the crisis was about 12 per cent of GDP.

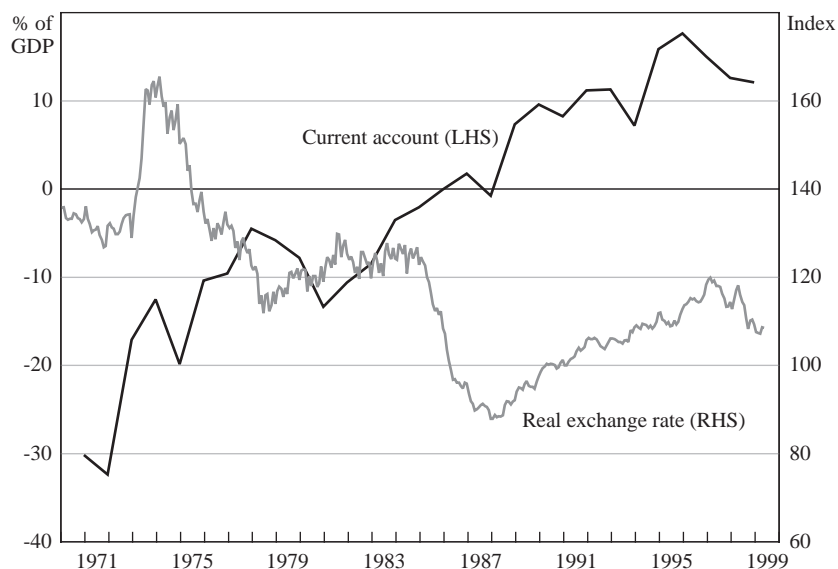
We have argued here that the unanchored nature of expectations is a key factor in understanding exchange rate behaviour. We have some survey data on this, shown in Figure 5. We cannot take this as representative of all market players, but as the exchange rate moved, respondents expected it to remain more-or-less where it now was, neither extrapolating the recent movement nor expecting the rate to revert any time soon. Maybe the sample is over-representative of economists who have accepted the Meese-Rogoff (1983) verdict that today's rate is the best estimate of tomorrow's.

## 2.2 Singapore

If the crises in these three countries have an air of inevitability about them, once the massive capital flows began, Singapore provides a counter-example in the successful absorption of huge foreign inflows in the twenty years after the mid 1960s. Despite the size of these transfers of foreign inflows, and the extended period over which they occurred, the process appears to have been fairly smooth; certainly devoid of any reversals of the kind we have seen in the 1997/98 Asian crisis.

Figure 6 shows Singapore's current account balance and the J.P. Morgan measure of the real effective exchange rate since 1970. Over this period, Singapore moved from a current account deficit of 30 per cent of GDP to a surplus of over 10 per cent.

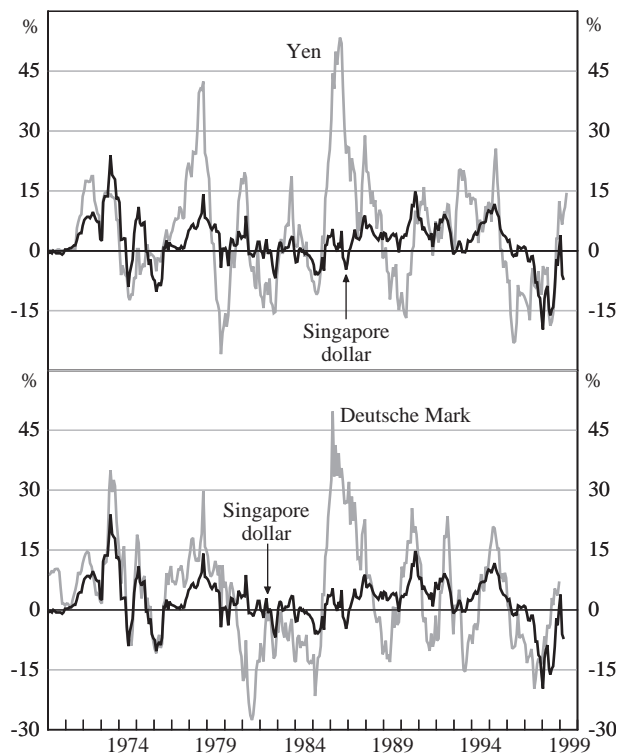
**Figure 6: Singaporean Real Effective Exchange Rate (J.P. Morgan) and Current Account**



It was not, however, necessary for the real exchange rate to move by much to accommodate this significant sustained shift in the external accounts.<sup>17</sup> This is presumably a consequence of the large component of direct investment (where the decision to invest usually results in both capital flow and goods flow) and of Singapore's high degree of openness, so that small changes in the exchange rate produce large changes in exports and imports. But this does not invalidate Singapore as a relevant example – many developing countries are also very open (though usually less so than Singapore).

It is also noteworthy how little volatility was displayed by the Singaporean exchange rate over this period. With the exception of the couple of years surrounding the first OPEC oil crisis, and a short period in the mid 1980s, the real exchange rate

**Figure 7: US Dollar per Yen, Deutsche Mark and Singapore Dollar**  
Year-ended percentage change



17. We examined the relationship between annual averages of the real exchange rate and the current account balance, 1970–1998. The correlation is quite clear and significant, in a direction that supports the standard story of the relationship between capital flows and the real exchange rate, but the *size* of the exchange rate response is small. To put numbers on this, a 5 per cent of GDP fall in the current account balance (a big movement in the external accounts for most countries, especially if it is sustained) was associated with an average real appreciation of only about 3½ per cent.

changed only very gradually over time (Figure 6). The bilateral Singapore dollar/US dollar exchange rate over the same 30 years displays a similar lack of volatility. On this basis, the Singapore dollar displays year-to-year volatility that is less than one-half of the volatility of the exchange rates of the G3 economies against each other (Figure 7).

This lack of volatility appears, to a considerable extent, to result from deliberate government policy. The exchange rate is flexible, but it is an important domestic objective to keep its trade-weighted value relatively stable, because Singapore is so open to trade. This relative stability is achieved using monetary policy, intervention in the foreign exchange market, and restrictions on foreigners' capacity to borrow Singapore dollars, which seem to have reduced the extent of speculation in the currency.

### 2.3 Latin America

In common with other regions, Latin America has seen a significant shift over time to more flexible exchange rate arrangements. Over the period 1974–81, over three-quarters of Latin American currencies were fixed to other currencies, and almost none were floating; by 1989–94, the proportion of fixed rates had fallen to about one-third, while those with either a free or 'dirty' float had risen to over 40 per cent (Freiden, Ghezzi and Stein 1998).

The experience of Latin American countries with flexible exchange rates may be of more relevance to other developing countries with similar financial and economic structures than the experience of more developed economies like Singapore or, for that matter, the commodity-exporting, floating-rate industrial countries – Australia, Canada and New Zealand.

Exchange rate flexibility has not, however, delivered the benefits to Latin American countries that might have been expected. Countries with more flexible exchange rate arrangements have performed worse than those with less flexible arrangements across a range of dimensions (Hausmann *et al.* 1999).

One of the main expected benefits of exchange rate flexibility is in cushioning the domestic economy from the effects of external shocks, including volatility in capital flows. In the aftermath of the Asian crisis, however, those Latin countries with more flexible exchange rate arrangements found it possible to use this flexibility only very sparingly. Rather than allowing their exchange rates to cushion the shock, they judged it appropriate to raise interest rates aggressively to defend their exchange rates.<sup>18</sup> Domestic interest rates were raised by less in those countries with less exchange rate flexibility.

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18. It is understandable that countries with very bad inflation histories could not allow their exchange rates to fall by much, for fear of reigniting runaway inflationary expectations. But even Chile, with a reasonable (and progressively improving) inflation performance over the past 20 years, and sound public finances, judged it appropriate to raise interest rates aggressively to limit the movement in its exchange rate. As a consequence, Chile was plunged into a severe recession, its first since 1982/83.



It might also be expected that countries with more flexible exchange rates would have more domestic monetary independence than those with fixed rates – indeed, this proposition seems almost axiomatic. Again, however, the Latin American experience has not supported it. Domestic interest rates in Latin countries with more flexible exchange rate arrangements have moved *more* – although not statistically significantly more – in response to changes in foreign (US) interest rates than in those Latin countries with less exchange rate flexibility.<sup>19</sup> The uncertainty associated with exchange rate flexibility in these countries appears to exacerbate swings in the risk premium demanded by investors to hold domestic-currency-denominated assets, which in turn reduces their capacity for independent monetary actions.

It also appears that Latin countries with more flexible exchange rates have experienced higher real interest rates, on average, and less financial deepening, than those with less exchange rate flexibility. The Latin experience with exchange rate flexibility has thus been very much less positive than those of small open industrial economies like Singapore, or Australia, Canada and New Zealand.

### 3. Conclusion

The fact that the greater exchange rate instability may be associated with the increasing openness of economies might suggest that the old discussion about the ‘impossible triumvirate’ (fixed exchange rate, independent monetary policy and open capital markets) may be relevant. As these countries became more integrated (and thus open to capital flows) their fixed exchange rate regimes became inappropriate. The belief was that the ‘trilemma’ disappears if flexibility is allowed in the exchange rate. The current problem, however, is that even allowing the exchange rate to move, the overshooting may be substantially greater than anything envisaged in the models. ‘What is less obvious is that floating rates, independent monetary policy, and freedom of capital movements may also be incompatible, at least for countries with small and poorly developed domestic capital markets’ (Cooper 1999, p. 19).<sup>20</sup>

Would a floating exchange rate have saved the Asian countries from crisis? We have noted how this works in the textbook world – in the face of capital inflows, the exchange rate rises until it induces the expectation of a depreciation, and this discourages excessive inflows. But in the real world, expectations are often extrapolative. As the exchange rate rises, it is expected to rise further. Presumably,

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19. Frankel (1999) reports a similar result.

20. A similar sentiment is expressed by Krugman (1999, p. 111): ‘The common view among economists that floating rates are the best, if imperfect, solution to the international monetary trilemma was based on the experience of countries like Canada, Britain, and the United States. And sure enough, floating exchange rates do work pretty well for First World countries, because markets are prepared to give those countries the benefit of the doubt. But since 1994 one Third World country after another – Mexico, Thailand, Indonesia, Korea, and, most recently, Brazil – has discovered that it cannot expect the same treatment. Again and again, attempts to engage in moderate devaluations have led to a drastic collapse in confidence. And so now markets believe that devaluations in such countries are terrible things; and because markets believe this, they are’.

floating well in advance of the crisis would have initially *increased* the current account deficit as the nominal and real exchange rate appreciated. We cannot say that this would have implied, for example, a 13 per cent of GDP current account deficit for Thailand (i.e. equal to the capital inflow which occurred in 1995), but the current account deficit would have been larger, earlier, than actually occurred. This, in turn, might have precipitated the crisis earlier and, with hindsight, we might judge that to be a good thing. But it is hardly a recommendation for orderly policy-making.

Would a floating rate have solved the problem of unhedged foreign-currency borrowing? If a floating rate *had* prompted borrowers to worry about depreciation, this would have discouraged them from foreign-currency borrowing. As well, to the extent that the hedge counterparty protected its own exposure, hedging would have led to an offsetting capital outflow. So, for both reasons, the net capital inflow would have been smaller, which would have been a good thing. We have, however, argued that – even with a float – many borrowers would have taken a punt on depreciation, and remained unhedged. Hedging costs are roughly equal to the domestic/foreign interest differential, which was very high, and a depreciation of the size experienced was far outside any historical experience. Regardless of exchange rate regime, and no matter how sophisticated the financial engineering, big capital flows imply many players (either domestic or foreign) are exposed to exchange rate risk. This risk can be shifted to players more capable of withstanding the shocks, but it is much more difficult to remove the incentive they have to reverse their position when a crisis is judged to be imminent.

More exchange rate flexibility seems to be called for in these countries, but it seems unlikely that a freely floating rate would have achieved and maintained the path envisaged in the textbooks, where an expectation of gradual depreciation balances the intrinsically higher interest rates which these countries had (and will have again). The central issue is the unanchored nature of exchange rate expectations. As the rate moves, market participants do not look to the fundamentals to assess where the rate is in relation to these, because they know from past experience that these are a poor guide to movements over the time period relevant to them.<sup>21</sup> This explains why there are so few Friedmanite speculators (and very few in economies where the exchange rate fundamentals are not well-defined). So it is a chicken-and-egg problem – the exchange rate can depart substantially from its fundamentals because there are few stabilising speculators, and there are few because the rate departs from its fundamentals in ways that will make risk-aware speculators nervous.

So the dilemma for policy in these emerging economies is that a commitment to a fixed rate will anchor expectations effectively, provided the shock is not too great. If it is great enough to overwhelm the fixed rate, then the rate is without anchor, and will almost certainly overshoot, probably greatly. This unleashes the sort of self-reinforcing destabilising forces seen in Asia in 1997. A pure, free float provides

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21. This point is not new. Sir Isaac Newton, having lost £20 000 on the South Sea bubble, remarked: 'I can calculate the motions of heavenly bodies, but not the madness of people'.

no firm anchor for exchange rate expectations, at least until a reasonably long history is established.

The debate is clearly unresolved. But it would seem premature to argue that a pure, freely floating exchange rate would be appropriate for emerging market economies with small, poorly developed domestic capital markets, and fundamentals that are not well understood by international capital markets. What exchange rate regime these countries should choose seems much less clear-cut. Singapore provides one possible model, combining flexibility in the exchange rate, with restrictions on borrowing the domestic currency, and an active commitment to use monetary policy and foreign-exchange intervention to help limit movements in its trade-weighted value.

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# Explaining Global Market Turmoil: A Fresh Perspective on its Origins and Nature

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Horace 'Woody' Brock

## 1. Today's Triple Vacuum – Today's Problem at the Broadest Level

At the broadest level, the global market pandemonium experienced during the summer of 1998 stems from a political, institutional and conceptual vacuum. On the political level, with the recent defeat of Chancellor Kohl in Germany, there has rarely been a period of such weak leadership virtually everywhere on earth. Indeed, it is hard to think of a single leader of any nation who is truly 'in charge' either ideologically or politically.

At the institutional level, so great is the void that there are increasing calls for a 'new global financial architecture'. And whatever one's ideology might be concerning 'bailouts' in general, and the role of the IMF in particular, one thing has become clear in the wake of the Russian and Brazilian crises: the funds available to help troubled nations are as inadequate as the theories that determine their use.

This leads us to the third and arguably most important vacuum – the conceptual vacuum. Virtually every orthodox theory of international economics and finance is in disarray. Nowhere is this situation more true than in the area of foreign exchange, where events in recent years have made a mockery of almost all theories of exchange rate determination. The same is true of the valuation of stocks and bonds in emerging markets. At a deeper level, confusion as to why this is true is now so widespread that virtually any explanation is taken seriously. One half-baked op-ed page diagnosis follows the next with daily regularity.

In the absence of any compelling logic, the issue of the world's financial architecture has become increasingly politicised. Central to such politicisation are disputes over the proper nature, scope and implementation of 'bailouts' – a noun whose usage pickles any serious discussion as effectively as formaldehyde pickles a mouse.

In my talk, I will offer my own diagnosis of what has gone awry in the behaviour of global markets. In addition, I will discuss what can and should be done to improve matters based on this diagnosis.

## 2. What's Not Responsible for Today's Turmoil – Conventional Explanations

It is all too tempting to seize upon the more obvious deficiencies of the status quo as the source of what is wrong. It is thus not surprising that we read daily of such bromides as:

- If only Asians did not suffer from crony capitalism, then...

- If only markets in emerging nations possessed transparency, then...;
- If only the disincentives of moral hazards were eliminated, then...;
- If only societies enjoyed the discipline of a gold standard, then...;
- If only more nations adopted currency boards, then...;
- If only investors were rational and took the long view, then...;
- If only speculators were not so greedy, then...;
- If only hedge funds were outlawed, then...;
- If only life were fair, and rich nations did more for the poor, then...

Each of these 'if only' conditions possesses a certain validity, although some (e.g. the last three) amount to wishful thinking at best. The problem is that none of the stipulated conditions addresses the root problem of today's crises, namely asset market overshoot – particularly currency market overshoot. Thus, while increased transparency and reduced cronyism would improve the efficiency of capital and product markets, they would not reduce excess asset price volatility *per se*.

The empirical vindication of the new research from Mordecai Kurz at Stanford University puts this matter in a wholly new perspective. For we can now state the following result as a theorem:

Even if there is no crony capitalism and full transparency, and even if all agents were perfectly rational (in the sense of maximizing expected risk-adjusted returns), then asset markets will still exhibit price volatility between 300% and 800% greater than that predicted by classical finance theory.

Historically, asset markets have always exhibited overshoot, and people accepted this as natural, if unfortunate. Absent the idealisations of modern efficient markets theory, they saw no need to invoke currently trendy theories of moral hazards or irrationality or non-transparency in order to explain episodes ranging from the Dutch tulip bubble to the Crash of 1929. Such episodes were simply manifestations of 'herd behaviour' or 'market psychology'.

As fate would have it, advanced economic theory itself now demonstrates that pathological behaviour by the market as a whole is not in fact a manifestation of moral turpitude or irrationality on the part of individuals. Rather, it is a manifestation of their ignorance. For in attempting to maximise expected risk-adjusted returns, investors make mistakes. And when they realise that they make mistakes, they then sell or buy, thus impacting on asset prices.

When lots of people make the same mistakes at the same time (so-called 'correlated mistakes'), bouts of price overshoot result, via mechanisms we have discussed in past reports. In the process, trend-following behaviour becomes rational, further exacerbating overshoot. This is part of what we have learned during the past five years from the new research program at Stanford.

**The challenge – explaining the increase in volatility today:** Our task in the next section is to demonstrate why overshoot behaviour has increased in recent years. Could it simply be that today's investors are more irrational, more greedy, more corrupt, or simply (as in Kurz's theory) more wrong? No. For human nature never

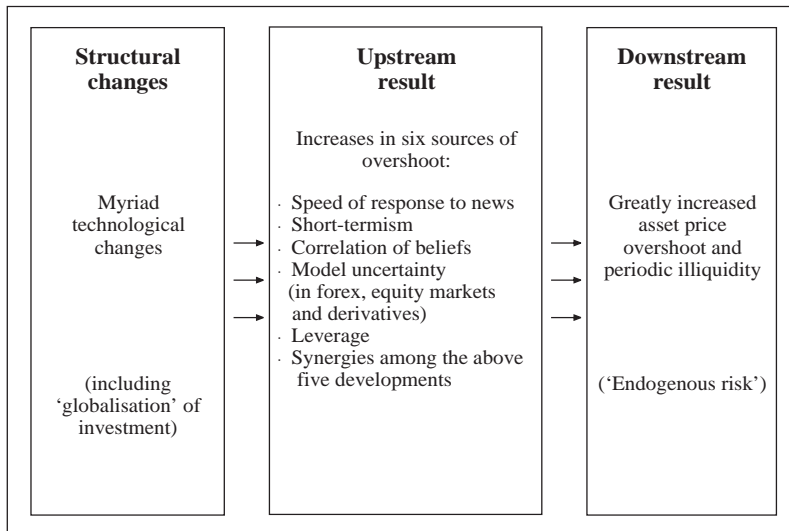
changes, and people have always exhibited these properties to one extent or another. Something else must be going on deeper down; a genuine structural change. And indeed it is: the arrival of the computer and related technological changes. Before turning to this, it will help to introduce a simple taxonomy of ‘risks’. Then, we can better understand which component risks have been affected by which kinds of technological change.

### 3. The True Source of Today’s Increased Volatility – Technology

Figure 1 will serve as a guide to our discussion of how technological change is directly and indirectly the culprit responsible for increased market pandemonium. On the left is the ‘driver’ of the analysis: a host of technological changes ranging from the invention of the theory of derivatives and the computerisation of their pricing and trading on the one hand, to computer trading systems, Bloomberg, First Call, and other data delivery services on the other. It is easy to forget to what extent technology alone has made today’s ‘global investing’ possible.

In the middle of Figure 1 appears a list of six sources of market overshoot. In each case, the impact of technology has been to increase the magnitude of the particular source of overshoot, e.g. the extent of belief correlation among investors. Then on the far right is the downstream impact of all this in which we are interested, namely

**Figure 1: Today’s Global Financial Crisis**  
The deeper origins: technology



Note: This causal chain does not presuppose any ‘non-transparency’, moral hazards, crony-capitalism, irrationality, or asymmetric information. This result can now be demonstrated from first principles in advanced microeconomic theory.



the increase in endogenous risk. Note here the appearance of the term 'periodic illiquidity'. This refers to the fact that markets such as US corporate bond markets, which by any conventional standard are 'deep' and thus 'liquid', may sometimes seem to be illiquid.<sup>1</sup>

**A currency market subtext:** If there is a subtext to the following remarks, it concerns the way in which global foreign exchange markets have become at once the most important, yet most misbehaved, of all financial markets. In our view, understanding currency overshoot must be the starting point of any thoughtful analysis of what has gone wrong.

The first two of the following five developments may seem trivial, yet they are very important because of the synergies they engender with the four that follow.

### 3.1 Technology-based increases in speed of response

In the past, news about fundamentals (e.g. a firm's earnings) reached different investors at different times. Moreover, both the ability and the incentive of these investors to sell (buy) on the news were hindered by factors ranging from geography to sky-high transaction costs. As is well known, technology changed all that. There are now no barriers in space or time to transacting on the spot. Moreover, transaction costs have been driven down to near zero.

Consider why this matters. Suppose that some adverse developments occurred in a given market in the distant past. Suppose also that people did not learn this at the same time, and/or did not wish to sell at the same point in time, and/or did not have the ability to do so. Then the impact of the news on price would have been much smaller than it would be in today's world where everyone learns and reacts at once.

### 3.2 Technology-based increases in short-termism

Consider our ability to measure managers' absolute and relative performance much more rapidly and frequently than before (even with 8 000 mutual funds), to disseminate this information to interested investors more rapidly and frequently than before, and to mark securities to market each day. These developments have contributed significantly to today's much-criticised 'short-termism' in asset management.

With these simpler points out of the way, we now turn to the three most important developments.

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1. When there is a correlated mistake and a resulting panic, an accelerating number of investors will start revising downwards their expectations of returns. This creates a situation where markets seem to be illiquid, even though there is considerable depth in the underlying market as conventionally measured. Almost any trade will clear, even though the bid-ask spread is 'unacceptably' large in the very short run. In a genuinely illiquid market, e.g. that of a closely held company, many trades will not clear at all, and this is true even absent a panic. We make this distinction because the term 'illiquidity' is routinely abused to describe situations where people don't receive the price they think they 'should' receive, and would have received a day or even a minute earlier. Calling this illiquidity confuses two different issues.

### 3.3 Technology-based increases in ‘belief correlation’

Suppose earnings growth of a stock you own drops unexpectedly by 10 per cent. As we have shown in previous reports, such a development will have a three-to-four times larger impact on price today than it would have had three decades ago. Why?

- First, our age-of-Oprah electronic media have created ‘A-Team’ analysts, hedge fund superstars, and economic commentators who achieve celebrity status and strongly influence expectations. As a result, there now exists a much more concrete expectation about which investors can be ‘disappointed’. If, as in the past, prior expectations were diffuse – or in some cases, nonexistent – then the impact of any news on price would be much smaller: it would neither please nor displease investors as much.
- Second, technology has seen to it that investors of all stripes now know what top-rated analysts expect earnings to be. This is guaranteed by the proliferation of information delivery systems such as First Call.
- Third, the electronic ritualisation of earnings announcements implies that today’s investors know exactly when all-important earnings announcements will occur and where (on the screens of news services). No such ‘earnings ritual’ existed before the 1980s.

**Main result:** Our main result follows from the synergies among the above three points about belief correlation on the one hand, and developments 3.1 and 3.2 above on the other hand: given managers’ incentive to ‘perform’ better in the short run (and clients’ expectation that they do so); given the fact that everyone will receive the news at the same time (and everyone knows this is true for everyone else too); given the fact that expectations are more correlated, so that if investor  $i$  is disappointed, it is more likely that investor  $j$  will be as well; and given that everyone is now able to sell simultaneously; then the result is a much greater impact on price than used to be the case, assuming that the news was somewhat unexpected. In such an environment, observed price volatility over time will clearly be significantly higher than it used to be, given the same quotient of news.

**Relevance to broader asset classes:** The simple example we have just presented using corporate earnings news can be extended to virtually all asset classes. In fixed income, consider the ‘lurch’ of global markets when the Greenspan Fed tightens/eases unexpectedly. (Dr Greenspan is a prime example of a celebrity whose announcements and actions serve to correlate expectations.) The Chairman’s 25 basis point tightening in the winter of 1994 ended up precipitating not only pandemonium in global bond markets, but brought the housing industry to a standstill by year’s end.

In the currency markets, there are countless examples of consensus expectations having been disappointed about matters ranging from external reserves and trade deficits on the one hand (recall Thailand and Indonesia in summer 1997) to budget deficits and IMF support on the other, and where currencies collapsed/soared as a consequence. In the case of emerging market nations, it is all too easy for A-Team analysts or hedge fund stars to act as belief correlators. Their putative expertise

substitutes for the ignorance most of us profess about such markets. We need to believe that someone understands the incomprehensible!

**Caveat:** To understand currency markets it is not enough to take increased belief correlation alone into account. For as we shall see, it is the synergy among correlation and the next two developments that causes currencies to go completely off the track.

### 3.4 Technology-based increases in ‘model uncertainty’ – currencies, emerging markets and derivative securities as case studies

If there is one principal culprit most responsible for today’s turmoil, it is probably model uncertainty. This concept is both abstract and unfamiliar, and its implications for asset price behaviour are not widely understood. For this reason, let us start off with some simple analytical preliminaries. Contrast the following two asset pricing equations:

$$\Delta P = F(\Delta X_1, \Delta X_2, \dots, \Delta X_n, e) \text{ with } F(\bullet) \text{ fixed and known} \quad (1)$$

Here, the change in an asset’s price,  $\Delta P$ , depends upon the vector of  $n$  ‘driver variables’  $\Delta X_1, \dots, \Delta X_n$ , and upon white noise  $e$ . Think of any such driver variable  $\Delta X_i$  as denoting the change in consensus expectations about the  $i$ th fundamental variable  $X_i$ . In the ‘efficient markets’ world governed by this model, everyone is assumed to know perfectly the impact on price,  $\Delta P$ , of changes in consensus expectations about the future values of  $X_i$ . That is, they know perfectly the function  $F(\bullet)$ .

$$\Delta P = F^*(\Delta X_1, \Delta X_2, \dots, \Delta X_n, e) \text{ with } F^*(\bullet) \text{ not fixed and known} \quad (2)$$

In this second case, investors do not, and indeed cannot, know the map  $F^*(\bullet)$ . This is because the economic environment is time-varying (non-stationary) due to largely unpredictable structural changes. Hence, even if some clairvoyant revealed to investors the change in consensus expectations due to future news about fundamentals (i.e. the specific values of  $\Delta X_1, \Delta X_2, \dots, \Delta X_n$ ), they would still not know the impact on price.

**Two-step argument:** We now wish to make the following two-step argument. First, the greater the extent of model uncertainty, the greater the resulting market chaos. Second, different asset classes can be ‘ranked’ according to their amount of model uncertainty. When this is done, currencies, emerging markets and derivatives rank highest. This, in large measure, explains their problematic behaviour.

- **Step 1 – more model uncertainty implies more chaos:** In classical economics and finance, we learn the following points, each of which can be proved as a theorem: there is no overshoot; markets are ‘efficient’ in that prices move strictly in proportion to news about fundamentals, and in doing so signal an optimal (‘efficient’) allocation of resources throughout the economy; and there is no serial correlation of returns, implying that it would be irrational for any investor to act ‘technically’ because the expected return from doing so would be zero.

The axiom underlying all these celebrated results is nothing less than the assumption of model certainty on the part of all economic agents. In short, Equation 1 above is assumed to apply. In technical parlance, all agents are assumed to hold rational expectations of the weak form.<sup>2</sup> When the conditions for this assumption to hold are not met, as in Equation 2 and in reality, the implications for individual behaviour and hence for aggregate market behaviour are radical. Consider the behaviour of an individual attempting to make investment decisions. This investor knows he lacks full knowledge of  $F(\bullet)$ , and knows that others are in the same boat. Accordingly, he will be uncertain how to proceed even just after news about  $X_i$  is announced. He will wait and see what others do.

It turns out that confusion and ‘hesitancy’ of this kind can generate serial correlation (‘trends’), which our investor will detect in the data. But if this is true, then it becomes rational to adopt technical behaviour. For if serial correlation exists, the expected returns from surfing the trend can be greater than zero. As more and more people detect this, and respond rationally, their actions make the case for technical behaviour even stronger, since the amount of serial correlation detectable in the data will increase. Still others in turn will be lured into this game. Note that there is no presumption or indeed hint of irrationality here. To sum up, model uncertainty is a crucially important source of endogenous risk in asset market behaviour.

- **Step 2 – how different asset classes rank:** Consider now in Figure 2 a ranking of the amount of model uncertainty corresponding to the different asset classes.<sup>3</sup> Bonds and bills enjoy a high level of model certainty for one very simple reason: the pricing theory underlying each is intelligible to investors, is appealing, is thus applied in practice, and thus becomes self-reinforcing.

For instance, everyone knows that a government 10-year bond is a piece of paper whose only risk is inflation risk. Accordingly, even your labrador retriever can be trained to know that when inflation expectations are worse than expected, bond prices will drop. It may not know the magnitude of such price reactions, but it certainly knows the direction. Thank God for small blessings!

With equities, the underlying pricing logic gets more complex. Here you have to trade-off the impact of changes in expectations about multiple variables – e.g. earnings growth, interest rates and corporate share-repurchase policy. How can an investor be really sure about the ‘weights’ attached to the different sources of volatility? Thus there is more model uncertainty, and correspondingly more endogenous risk.

**The special case of currency market chaos:** Currencies are perched way out towards maximal model uncertainty in the figure. Why might this be the case?

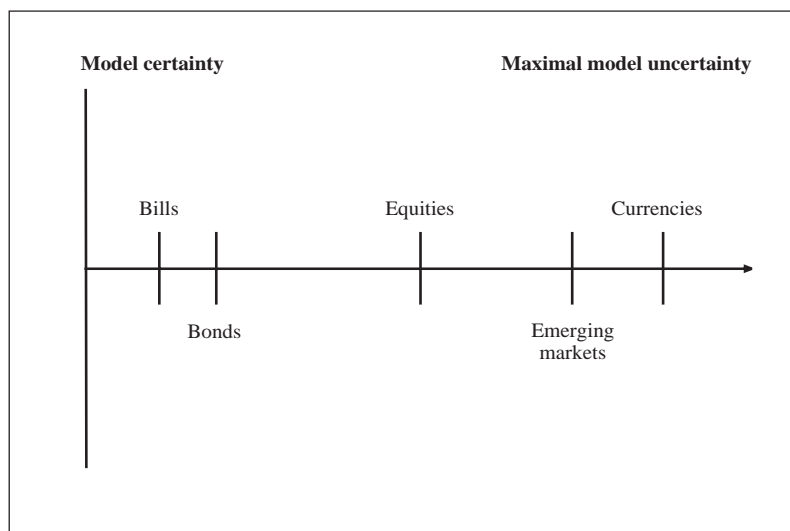
- First, the number of variables driving currency markets is double that in any other market. These include trade deficits, cumulated current account deficits, inflation

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2. For these results to hold true, a further assumption must hold true: the stochastic process governing the  $X_i$  variables must be fixed and known to all agents.

3. We treat currencies as an asset class below even though, strictly speaking, they are not. What matters is that currency values are relative prices, and our analysis therefore applies without any problems.

**Figure 2: Asset Classes**  
Ranked by extent of pricing model uncertainty



differentials, interest rate differentials, safe-haven differentials, non-monetary policy differentials, etc. Matters are complicated even more by the ever-changing 'game' that gets played between speculators on the one hand and governments on the other. Knowing the map  $F(\bullet)$  would imply knowledge of the rules of this game on top of everything else!

- Second, at a more theoretical level, textbooks present what seems to be a confusing array of conflicting valuation theories, and adds to practitioners' conceptual agnosticism. (In point of fact, a good 'synthesis' now exists as to how currencies ideally should be valued in today's world of complex trade and capital flows. These theories command respect by the few who understand them.)
- Third, at a purely empirical level, real-world data reject all such fundamentals-based pricing models, and favour 'technical' models above and beyond all others. These capture currencies' well-known propensity to 'trend'. According to the logic set forth above, this in turn implies that we should observe a large amount of technically driven trading strategies in forex markets.

To support this conclusion, we have only to turn to the well-known 1990 study by Jeffrey Frankel and Kenneth Froot that we have discussed in the past. They found that, whereas over 80 per cent of forex traders described themselves as 'fundamentalist' in 1978, only 15 per cent still described themselves that way in 1989. Too many had learned the hard way: even if you were right about the 'news', you still got fired. The result is a market in which trends dominate. Moreover, unlike any other market, the trend can be the reverse of what it 'should' be, and no-one cares. Such is the magnitude of conceptual agnosticism! Recall in this regard the rally of the

yen/US dollar in the period 1994–96. The yen soared from 143 to 79 during a period when the Japanese economy essentially collapsed.

**Special cases of emerging markets and derivatives:** Other than in the foreign exchange markets, the greatest meltdowns and surprises have occurred in the emerging markets and in the derivatives markets. Why? Once again, a principal reason lies in pricing model uncertainty. To see this, contrast the relative performance of the Japanese and US equity markets in recent years on the one hand, with that of the Russian and Brazilian markets in the period after the 1998 Russian meltdown.

In the latter case, investors revealed themselves completely confused by the nature of the Russian economy, and by the behaviour of the Russian Government. Their reaction? ‘Well, Brazil may be next. Sell one, sell ‘em all!’ Ignorance leads to a herd-like reaction – precisely the opposite of the US-Japan example. Here, investors believe they understand the ways in which Japan isn’t the US and vice versa. Just because you sell one doesn’t mean you sell the other. Indeed, exactly the opposite was the case. Here investors revealed confidence in their knowledge of the distinctions between two economies, and they acted on it: they sold Japan and bought the US.

Finally, in the case of derivatives, matters are definitionally so complex that, when trouble comes, model uncertainty is maximised and pandemonium ensues. So complex is the underlying structure of counterparty contracts that no-one can know ‘the extent’ of exposure. Worse, everyone knows this is the case and that makes matters still more problematic!

**Increases in model uncertainty:** The contention in Figure 1 is not simply that the six factors in the middle box impact volatility (which they do), but rather that technology has increased their levels and thus increased asset market volatility downstream. How does this tenet apply in the case of model uncertainty?

In the case of stocks and bonds, it is not altogether clear that the model uncertainty quotient itself has risen. To the extent that volatility in these particular asset classes has increased, this is explained by developments in the other variables we are considering, in particular belief correlation and leverage (discussed below). There, the impact of technology is quite straightforward. In currencies, however, there is not the slightest doubt that model uncertainty has exploded. This is because life was very simple during the Bretton Woods era when exchange rates were largely fixed.

But why did Bretton Woods break up? Was this simply a reflection of a stumbling America that could no longer support gold-convertibility at US\$35 an ounce? No. The closing of the gold window was merely a symptom of deeper developments. What happened was that technology was making it possible for the impact on currencies of global capital flows to outweigh that of trade financing. Today’s world of fungible assets, ‘global portfolio investment’, and hot money was dawning. Ever since, we have been living in a free-for-all environment of fluctuating ideologies, fluctuating regimes, as well as overshoots and undershoots of a kind once unthinkable. In this environment, currency values have been the swing values.

### 3.5 Technology-based increases in leverage – a three-step paradox

Two very different kinds of technological change underlie the increase in leverage that in recent months has compelled a string of 'proprietary trading' institutions to contemplate liquidation. These were conceptual advances on the one hand, and engineering advances in computer science on the other. To appreciate both, it will be helpful to recall some important economic history.

**Step 1 – lessons of the Great Crash:** The Great Crash of 1929 and the onset of the Great Depression of the 1930s spawned three particularly notable legislative reforms in the US, which would be copied elsewhere in subsequent years: the Securities and Exchange Commission was established; the Deposit Insurance Act was enacted; and margin accounts for equity investors were reduced from 95 per cent to 50 per cent. In the third case, it was widely agreed that raising the cash required to 50 per cent 'helped investors save themselves from each other'.

**Step 2 – advent of the theory of derivatives:** Prior to 1953, the notion of multi-market 'supply/demand balance' had never been modelled in the presence of uncertainty about the future. Another significant gap in economic theory was the failure to understand the role of financial markets. But this second problem was intimately connected to the first problem: it was difficult to contemplate a need for securities markets if all future prices were known with certainty. Both these problems were solved simultaneously in Kenneth Arrow's landmark 1953 paper, 'The Role of Securities in the Optimal Allocation of Risk Bearing'.

This paper showed that Adam Smith's intuition about the existence of an 'invisible hand' which optimally allocated resources would hold true in the presence of uncertainty – but only if traditional commodity and labour markets were supplemented by securities markets. The kind of securities required were quite abstract ('state-dependent contracts'), and are now essentially known as derivatives. Investors were assumed to be risk averse, and individual investors would accumulate a bundle of these contracts, which made it possible for them to optimally hedge their risks. Arrow then proved that if everyone did this, overall risk itself was optimally allocated across all agents, and all resources would end up optimally allocated via the equilibrium prices of commodities and securities.

**Step 3 – utilising derivatives to increase leverage and risk:** Arrow has told the author that back in 1953, he never envisaged today's computer power, much less the derivatives pricing models that computers would render operational in everyday life. In other words, he never foresaw the ability of hedge funds and the like to utilise derivatives in creating leveraged positions even greater than those existing prior to 1931. In short, technological change made it de facto possible to veto the deleveraging legislation passed into law in the early 1930s. The irony is that this was done via the very instruments intended to permit a partitioning and spreading of risk by risk-averse individuals!

While people in the investment business have always had a suspicion of the staggering 'towers of leverage' to which derivatives-based trading positions could

give rise, the whole world learned just how far this could be taken in the aftermath of the Long-Term Capital Management debacle late this past summer.

#### **4. Synergies Among Developments 3.1 – 3.5**

In concluding this discussion of the sources and nature of excess volatility, it is essential to stress the synergy effects that amplify the increased endogenous risk attributed to the five technology-based developments discussed above. To make this point more forcefully, there is no better place to start than with leverage.

Suppose that there had been no increase in belief correlation. Indeed, suppose that there were no endogenous risk at all in the markets, and that markets were classically efficient as in the textbooks. Then ‘more leverage’ would in fact have no adverse consequences at all. For, absent mistakes, leverage is harmless. Of course, since it is impossible to reap any excess returns in such environments, leverage wouldn’t help either. No pain, no gain!

All in all, it is its synergy with the other developments that makes a unit of leverage more risky today than it would otherwise be. By analogy, it is the collective synergy among all five of the developments we have reviewed that matters most in understanding recent market turmoil. They are mutually reinforcing in generating asset market overshoot.



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# Discussion

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## 1. Ricardo Hausmann

For some time now, I have been hearing of a mythical place where quite impossible things seem to happen. It is a country the size of a continent, but with a small and very open economy that allows its currency to fluctuate to the tune of its quite erratic terms of trade. It can do so without kindling fears of inflation or wreaking havoc on bond prices. It is a country where short-term interest rates are set with little regard to the exchange rate. Although residents know that the currency will depreciate if the terms of trade deteriorate, they do not run away from domestic assets in order to diversify their already high-income risks. In fact, it has been said that this country has even convinced foreigners to buy bonds denominated in that unstable domestic currency to the point that most of its external debt is *de facto* denominated in the country's own currency!

Obviously such a country cannot exist. And yet, here I am, at the invitation of none other than the monetary authority of that mythical country, trying to see whether Australia's disregard for our most cherished Latin American economic hunches also applies to its treatment of the laws of physics.

Seen from the experience of Latin America, Australia's macroeconomic performance seems very odd indeed. And it probably will appear equally odd to east Asians, but for different reasons. That is why I find it so auspicious to have a discussion about capital flow volatility and the recent financial crises in Sydney.

I have been asked to comment on three papers. Michael Dooley presents a survey of theories of currency crises. He tries to make an honest presentation of the different models, even though we all know where his heart lies. Woody Brock presents us with the implications of the theory of rational beliefs for the recent performance of financial markets. Stephen Grenville and David Gruen present us with a thoughtful piece on the lessons from the recent crises that dispel some major misconceptions that have unfortunately gained wide acceptance. In organising my comments I will be unable to do justice to all three papers, so let me concentrate on some points that may enhance the debate.

The economics profession has a pretty bad track record at deriving lessons from the sequence of crises that have hit the developing world in the last 20 years. It may be useful to mention what those lessons were before we embark on a new attempt at alleged wisdom. We supposedly learned from the Latin American debt crisis of the early 1980s that borrowing to finance fiscal deficits is bad because the government does not invest the resources in productive activities that can generate a stream of new income to pay for the increased debt service. That was a lesson used by Nigel Lawson to explain why there were no reasons to worry about the current account deficit and asset price inflation in Great Britain in the late 1980s: it was driven by private, not public, deficits.

Then we supposedly learned from the Mexican Tequila crisis that borrowing to finance private consumption is bad (Bruno 1996; Summers 1996). In fact, the capital inflows boom of the early years in Mexico coincided with a significant decline in the savings rate, down from close to 20 per cent to only 14 per cent. That is why the east Asian countries did not get into trouble in 1994–95. It was because borrowing was directed to investment, not consumption.<sup>1</sup>

So then comes a crisis in the region of the world that had exhibited the highest rates of domestic savings in the world: the ‘miracle’ east Asian economies. So what are we going to say this time? If borrowing to finance government spending is bad, and if borrowing to finance private consumption is bad, and borrowing to finance private investment is bad, then we may as well conclude that borrowing is bad. So before we get too carried away with crony capitalism and corporate governance as our new culprits let us take in a good dose of scepticism.

It is with this spirit that we should try to sort out the different models offered by Michael Dooley. In doing so we must remember that internal consistency is no proof of empirical relevance. Many a beautiful theory has been killed by an ugly fact. First generation models based on a fiscal deficit that will eventually be financed through higher inflation obviously do not fit the relevant facts. Many crises have not been related to fiscal imbalances. Most interestingly, the east Asian crisis does not seem to have been followed by any significant acceleration of inflation.

The most attractive model presented by Michael Dooley is also his favourite. It is based on moral hazard. Investors do not really care about what is done with their money. They know there is bailout money around, so they do not need to care. On the day they realise there is no more bailout money to protect them, they flee, thereby exhausting government reserves and any other extraordinary financing the government may have had available. The promise of the model is that it makes a serious attempt at explaining the timing of crises: they occur when the guarantee money is equal to the capital flow.

Moral hazard is the dominant belief in policy circles. It is behind the emphasis on better supervision and regulation of domestic banks and the backlash against international bailouts. It is also behind the belief that floating limits the perception that there is an implicit exchange rate guarantee.

But is moral hazard empirically relevant? Does moral hazard seem to explain the salient facts? I think not. It seems to me that one of the troubling facts to be explained is why capital flows are so small. In spite of all the uproar, capital flows to Latin America have averaged less than 5 per cent of GDP in the 1990s. That means

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1. Gavin, Hausmann and Talvi (1997) showed that the difference between Latin American and east Asian savings rates was explained by the difference in past growth. In fact, in the early 1970s Latin America had average savings rates higher than east Asia. It was the east Asian boom and the Latin American debt crisis that made the two regions diverge. Moreover, they showed that the effect of transitory changes in capital flows on savings was the same in both regions. A transitory increase in capital flows goes about half to consumption and half to investment in both regions.

they have averaged less than 2 per cent of the capital stock per year. With a capital-labour ratio almost 300 per cent higher in the United States, and with a much higher rate of labour force growth, capital flows are bound to equalise capital-labour ratios over the course of several centuries. And this is hard to understand from the point of view of our standard Heckscher-Ohlin-Samuelson theories. In fact, capital flows have been much smaller than under the gold standard, when electronic wire transfers, airline travel and the internet did not exist. These flows are small by the standards of Australian history. They barely reach the recent Australian experience.

Why are these facts a problem? Because moral hazard would explain why there is so much capital flowing across countries. It is a distortion that implies that since the risks involved in international capital flows are implicitly guaranteed, the volume the market allocates exceeds the socially optimal amount. But why is it so small by historical and theoretical standards? It must be that the world is bumping against another distortion more important than moral hazard that would explain why capital flows are so small. This major distortion, whatever it may be, may explain why capital flows are small, and there may be, in addition, some moral hazard. But that distortion is not in Michael Dooley's story.

In addition, moral hazard has strong predictions in terms of the composition of capital flows. It predicts they would tend to take the form most likely to be bailed out, such as loans to governments and banks. Moreover, since exchange rate commitments are less credible for longer horizons, it would predict that capital flows would be skewed towards shorter maturities. However, Eichengreen and Hausmann (1999) have demonstrated that BIS reporting banks do not show any of these symptoms in their lending to emerging markets.

What could that distortion be? Inability to commit to repay is a good candidate. If a lender distrusts a borrower's willingness to repay, he will only lend at an interest rate that will cover him for the risk of non-payment. But this obviously increases the incentives not to repay and causes an adverse selection problem: only those that are not planning to repay would be willing to borrow at those rates. This distortion affects both domestic and international lending. At the international level it is often called sovereign risk. It would explain why capital flows are small and why interest rates are high, which is closer to the actual stylised facts of capital flows to emerging markets.

My preferred story is based on a fundamental incompleteness of the financial market, related to sovereign risk, which I call *original sin*.<sup>2</sup> It is a situation in which the domestic currency cannot be used for international lending and it cannot be used even domestically for long-term lending. This incompleteness may be a form of sovereign risk in the sense that foreign creditors are unwilling to lend in a unit that the borrower can manipulate. To cover the risk of opportunistic devaluations, lenders may require an interest rate spread that increases the incentives to devalue and causes adverse selection. Hence, the market may disappear, be very small or be characterised by rationing.

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2. See Hausmann (1999), Eichengreen and Hausmann (1999).

The point is that if this incompleteness exists, the financial system that can be built on it will be fragile and crisis-prone. All investments in this economy will either have to be financed in dollars or they will be financed with short-term loans. This will cause two types of mismatches: a currency mismatch, if a firm that generates pesos borrows in dollars or; a maturity mismatch, if the long-term project is financed with short-term loans.

These two mismatches interact, making the life of central bankers in countries suffering from original sin quite uncomfortable. If they react to pressure on the exchange rate by letting the currency depreciate, those with currency mismatches are likely to get into trouble. If instead they defend the currency by selling reserves, contracting liquidity and letting interest rates rise, it will make it hard for those with maturity mismatches to roll over their debts.

In this environment, central banks are permanently in fear of either banking or currency crises. In fact, when they get into trouble they often get both at the same time. When the demand for domestic deposits declines they cannot save both the currency and the stock of domestic credit.

It is often argued that borrowing in dollars without hedging the currency risk is an indication of moral hazard. People do not pay for the hedge because they feel protected by a fixed or pre-determined exchange rate. However, this argument assumes that people can hedge, but decide not to. It is like assuming that during the Great Depression people could have found work, but they decided not to take the market wage.

But if a country cannot borrow in its own currency, it cannot hedge the exposure of its foreign debt. To do so, foreigners would have to take a long position in pesos, and that is equivalent to assuming that the country can borrow abroad in pesos. In fact, if hedging were feasible one would not observe international bankers lending in dollars and expecting their corporate borrowers to do the hedging. They would lend in pesos and do the hedging themselves. After all, they are in the business of offering financial services and have been reorganising to be able to offer all services in a single shop. But we do not observe foreign borrowing in local currency in any emerging market.

Original sin can explain why the Thai central bank was reluctant to let the currency move and why the banking system collapsed after the depreciation. It can explain why Indonesia and Korea got in trouble when there was a sudden decline in capital flows. Original sin is what makes Australia different from emerging markets. Being able to borrow abroad in its own currency means that the powerful balance-sheet effects that dominate the transmission mechanism of devaluation in emerging markets is absent. In fact, by borrowing abroad in Australian dollars and letting the exchange rate move with the terms of trade, Australian bonds have equity-like characteristics. They yield higher returns in good times than in bad times, making them stabilising.

Why can Australia borrow abroad in its own currency while the emerging world cannot? That is a question for which we do not have good answers. But my preliminary belief is that foreigners will buy a small portion of plain vanilla loans

broadly held by domestic savers. If the median voter holds the domestic debt, governments will not opportunistically manage the exchange rate to reduce its debt service, because it would be expropriating the median voter. But if the public debt is in the hands of foreigners and a few rich nationals, the temptation to erode the real value of the debt will be much greater. In anticipation, lenders would require a large enough premium to make the market disappear.

In synthesis, I believe that moral hazard is unlikely to be the dominant story in east Asia or in emerging markets in general and the profession had better start looking at other explanations. It is important to get our stories straight because Latin America has already significantly upgraded its banking supervision and regulation and lengthened the maturity of its foreign debt. Moreover, with the exception of Argentina, it has moved towards floating rates. But this has not allowed it to avoid a terrible contraction in 1999 driven by a destabilising collapse in capital inflows in 1998 and 1999 just when it would have needed to finance the temporary decline in its terms of trade, as Australia is doing. Hence, the moral hazard agenda has not saved Latin America and is unlikely to save the world.

## **Rational beliefs**

Woody Brock's paper is an interesting and refreshing approach to explaining some of the characteristics of financial markets. It is based on Mordecai Kurz's theory of rational beliefs. Any economist who has ever written down a rational expectations model must have felt the uncomfortable feeling that he was assuming people have always behaved according to the model that he just made up. Rational beliefs take seriously the idea that people do not really know which model describes the world. They have model uncertainty not just information uncertainty. Woody argues that today there is more rapid technological change and more rapid dissemination of information. This leads to more price volatility as people are less certain about what the underlying model is and are bombarded with similar information at the same time, causing a higher correlation of beliefs, and hence more price volatility.

While I find the approach very attractive, let me comment on some still unanswered points. First, why are capital flows smaller than a century ago? Would the new information technologies not predict more, rather than less, capital flows?

Second, there is much more information about developed country events than about developing countries. CNNfn, Bloomberg and Reuters cover developed markets in much more detail, causing more belief correlation. Why then is price volatility in emerging markets about 10 times larger than in developed markets? Woody would attribute it to greater model uncertainty, but that is not a testable statement.

Finally, belief correlation would explain high price volatility but with few trades. Everybody is on the same side of the market at the same time so prices move a lot but few transactions are made. Does that square with the facts?

## Theories and facts

The increasing theoretical prowess in economics makes us increasingly able to make internally consistent theories. But we need to subject them to the facts about the world to see if they are empirically relevant. It is in this sense refreshing to see Stephen Grenville's and David Gruen's paper, a work that establishes so many stylised facts that it forces a rethinking of theories and policies.

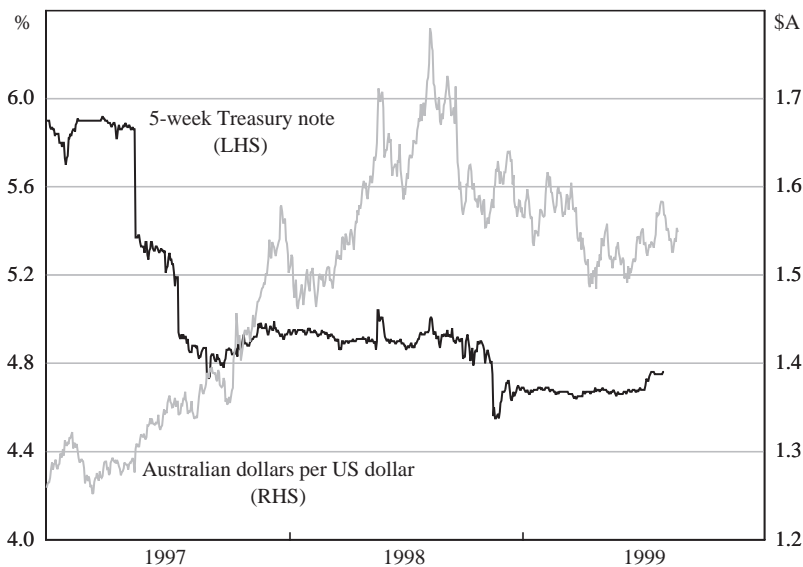
Let me not repeat their findings, but instead stress some of the points they make. Let us think for a moment about Thailand. Here is a country that actively attempted to limit capital inflows. It opted to intervene in the exchange rate market in order to limit currency appreciation and it sterilised the purchase of international reserves in order to limit the expansion of domestic credit. Foreign savings equivalent to 9 per cent of GDP were insufficient to bring interest rates in line with foreign rates, generating an incentive for further capital inflows. One very wrongheaded conclusion of this experience, which unfortunately too many highly respected analysts have made, is that Thailand shows that large current account deficits and real appreciation are the cause of crises. Were it not for the government's prudent actions, the currency would have appreciated even more and the current account deficit would have widened further. In fact, a floating exchange rate would have generated even larger current account deficits while the authorities would have been left with fewer instruments to prevent the massive inflows. The sudden turnaround in capital inflows would have generated the same economic policy dilemmas that the government actually faced. A massive depreciation would have bankrupted those with foreign liabilities while the required tightening of domestic monetary conditions would have plunged the domestic financial system into serious trouble.

What caused the reversal? Is it the exhaustion of guarantees as in Michael Dooley's model? I doubt it. I think that Woody Brock's model uncertainty is probably closer to the mark. But whatever caused the reversal, the fireworks are probably related to original sin rather than to moral hazard. And this is unlikely to be addressed through floating exchange rates.

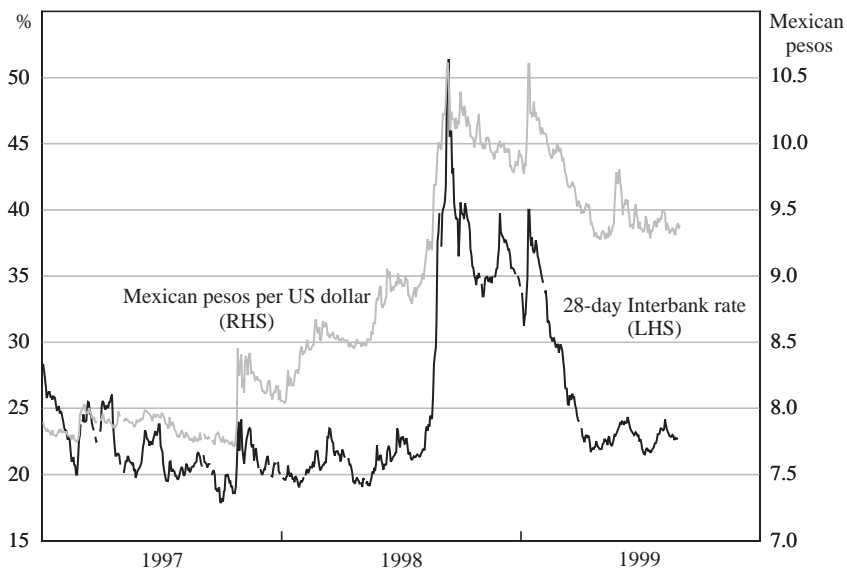
In this sense it is informative to look at the differences in the behaviour of two floating rate countries: one with original sin (Mexico) and one without (Australia). In Australia, the exchange rate and the interest rate seem to follow completely independent paths (see Figure 1). When the terms of trade declined, the currency started to depreciate and the authorities did not feel obligated to tighten monetary conditions. Instead, they lowered interest rates on several occasions in order to compensate for the contractionary effects of the decline in commodity prices. Here, floating obviously provides an additional degree of freedom that permits a countercyclical monetary policy.

The Mexican experience could not possibly be more contrasting (Figure 2). Here, the exchange rate and the interest rate move in the same direction instantaneously. Pressure on the exchange rate translates into a drastic reaction of interest rates, making the correlation between these two variables very strong and highly pro-cyclical: good external conditions translate into a stronger currency and lower interest rates while a bad external condition weakens the currency and raises interest rates

**Figure 1: Australia**



**Figure 2: Mexico**





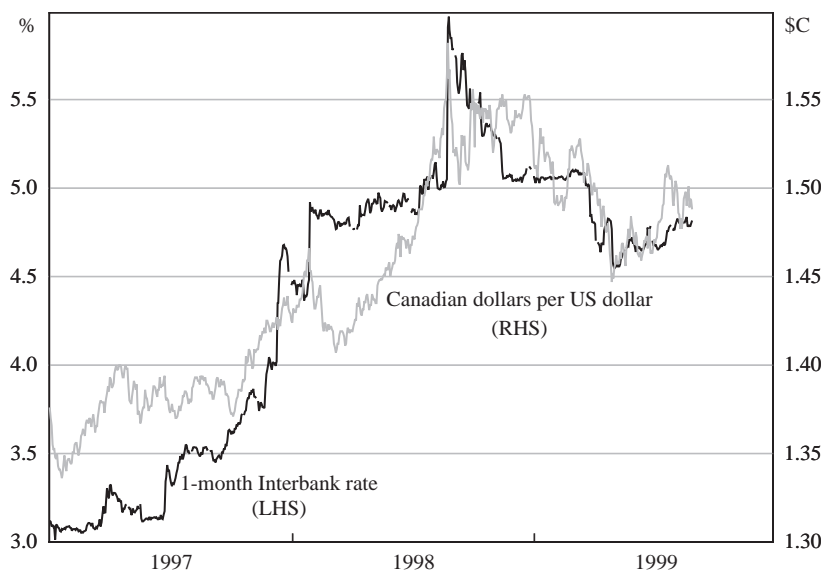
dramatically. Under these conditions, a depreciation is bound to be highly contractionary since it is accompanied by a rise in interest rates and a negative balance-sheet effect.

The Mexican reaction to the Russian crisis is a good example. As pressure mounted on the exchange rate, interest rates moved from less than 25 per cent to more than 45 per cent and stayed over 35 per cent until February 1999. In spite of this massively contractionary policy, the central bank missed its inflation target of 12 per cent by 6 percentage points. Such a massively contractionary and pro-cyclical reaction, with such an incredibly volatile domestic interest rate is probably what emerging markets with floating regimes are bound to experience.

That is why Grenville and Gruen are right to caution against excessive enthusiasm for floating regimes for emerging markets. Coming from authors that are so familiar with Australia's positive experience, it is a recommendation to be taken seriously. Without Australia's asset and liability structure and without its low exchange rate passthrough, the experience could be more like Mexico than like Australia. In fact, Canada's experience is more akin to Mexico's (see Figure 3) in terms of the high and pro-cyclical correlation between exchange rates and interest rates, even though interest rates move an order of magnitude less.

The economic profession's track record in learning from crises is quite dismal. The current consensus based on attacking moral hazard and promoting floating exchange rates is likely to be one more case of getting it wrong.

**Figure 3: Canada**



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## 2. General Discussion

Most of the discussion of the papers in this session concerned the extent to which foreign investors in east Asia had been rational and far-sighted.

Several participants agreed that the concept of correlated rational beliefs described by Brock is helpful in understanding aspects of investor behaviour during the east Asian crisis. For example, the collapse of the Thai baht in mid 1997, and the realisation that there was a huge overhang of unhedged foreign borrowing in the Thai economy, convinced foreign investors that there were vulnerabilities in this, and perhaps neighbouring, economies of which they had not previously taken sufficient notice.

Some participants argued that this could be thought of as the arrival of new information. Others agreed with Brock that it was fruitful to think instead in terms of investors' having learnt something new about how the world worked; that is, that the events led them to analyse the behaviour of these economies in terms of a different model.

There was similar argument about the overshooting of the rupiah exchange rate in Indonesia. Some participants claimed that this overshooting could be explained

by standard theories linking exchange rate depreciation with inflation and the observed sharp increase in growth of the monetary base. Others responded that the rapid money-base growth arose from a huge increase in demand for currency as funds were withdrawn from the banking system. They therefore reasoned that it did not signal rapid future inflation, and should not cause the currency to collapse. They argued instead that the outcome was a consequence of a market panic in an environment of profound uncertainty about the future.

Another way of explaining the volatility of asset and foreign exchange markets in east Asia is in terms of multiple equilibria. Dooley's and Walsh's paper had shown that this concept can explain why capital poured into east Asia and then fled rapidly, despite relatively little change in economic fundamentals. Even rational investors with a good sense of economic 'fundamentals' may be sensitive to the behaviour of other investors. Markets may therefore lurch between an equilibrium where foreign investors are happy to hold the assets of a country to one in which everyone wants to sell. Some participants argued that government guarantees could be a source of this instability. Other participants drew an analogy with bank runs, in which evidence that some investors are withdrawing funds leads others to do so, culminating in a liquidity crisis in a bank that is otherwise financially sound.

Finally, there was discussion about whether capital flows had been excessive prior to the crisis. Capital-labour ratios are much higher in developed than in developing economies, and international capital flows have narrowed these differences much more slowly than mainstream economic theory would predict. In other words, actual international capital flows are quite meagre by theoretical standards. This casts a shadow over the conventional belief that foreigners had genuinely 'over-invested' in east Asia prior to the crisis. Some participants countered that capital ought to flow to regions offering the highest returns, not necessarily from rich to poor countries. Judged by this metric, capital flows to east Asia may indeed have been excessive during the mid 1990s.

# The Impact of Hedge Funds on Financial Markets: Lessons from the Experience of Australia

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Bob Rankin

## 1. Introduction

Recent discussions on the impact of hedge funds on financial markets have mainly focused on the prudential risks they pose to lenders and counterparties, or, in extremis, the risks they pose to financial system stability (see Reserve Bank of Australia (1999a) for an overview of these issues). In contrast, the effects of hedge funds on particular market prices and on the integrity of those markets has received little attention to date.

The present paper examines the behaviour of the market for the Australian dollar during 1998, when hedge funds were active in the market. It concludes that the activities of hedge funds came to dominate the market during the middle of the year, affecting the dynamics of price discovery for the period while this dominance continued. This occurred despite the fact that the Australian dollar is floating, so that there was no fixed exchange rate to attack as there was in Hong Kong or, many years earlier, in the UK in 1992.

The possibility that market participants can engage in ‘herding’ behaviour is now well recognised in the academic literature. This behaviour can result from a number of factors, including the pattern of information acquisition in markets (where traders with short horizons will focus on trying to learn what other traders know rather than on trying to learn new information) and the tendency of traders in many markets to try to emulate the results of other traders (chasing common benchmark returns). The literature also demonstrates that markets which display herd behaviour may also feature overshooting of prices – that is, prices can move away from ‘correct’ values for short periods of time (I am here referring of course to ‘model time’ rather than real time).

The academic literature also recognises the potential for there to be circumstances in which a speculative attack in a market may be self-fulfilling. The mechanism for this is that there may be multiple equilibria in the market; the initial level of price in the market may be sustainable in the absence of a speculative attack, but such an attack may drive the price to a different equilibrium level with no automatic tendency for the price to return to where it was even after the speculators have left the market. (This might not matter much if multiple equilibria tend to be closely bunched together, but there is no strong reason to believe that they would be.) Again, it seems likely that the risk of such an event would be increased by the presence of position-takers who are large enough to move the market and who might expect to profit by precipitating a speculative attack.

Combined with the possible existence of multiple equilibria, herd behaviour can lead to price destabilisation over significant periods.

The existence of herd behaviour suggests that it can be rational to bet on an existing trend movement in markets, and undermines the traditional view that profitable speculation must be stabilising. That view was based on the assumption that profitable speculation must involve buying when the price is low and selling when the price is high. But, in markets characterised by herd behaviour, selling when the price is already low can be profitable if it induces others to follow and thereby cause the price to fall further.

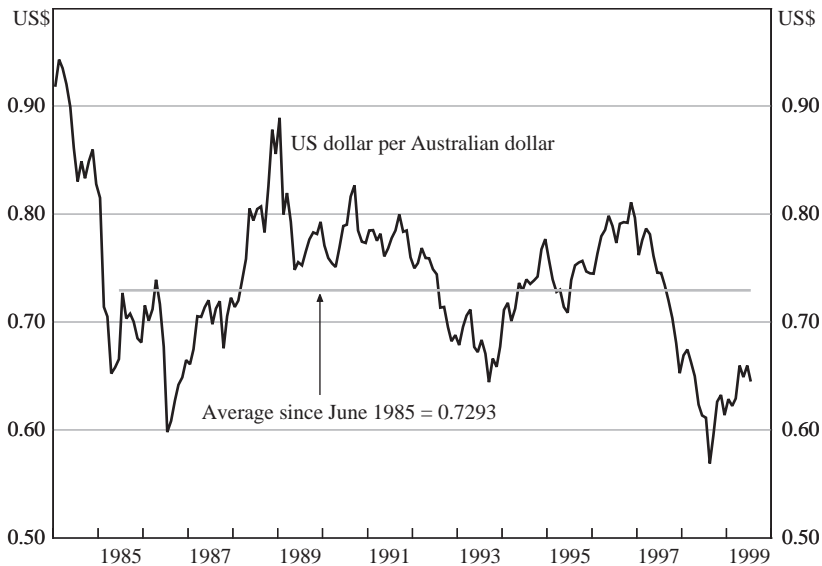
The problem may be particularly acute where there are players large enough to exert a noticeable influence on the market. There is less in the academic literature about the possible effects on markets of the presence of large dominant traders, although some models of currency attacks focus on such issues. Of course, this is not wholly independent of the above issues: we might expect smaller traders to focus their information gathering on learning what the large traders are doing, so that the presence of large traders would increase the prospects for herd behaviour.

Hedge funds have found themselves in a strong position to exploit such trading strategies following their success in the UK devaluation of 1992. The publicity generated by that event gave them enormous standing in financial markets and many traders adopted strategies which mimicked those of the hedge funds. In the foreign exchange market, in particular, banks and investment banks systematically keep their better clients informed of the hedge funds' daily trading strategies. Combined with the willingness of some hedge funds to use leverage to build very large positions, this status places hedge funds in the position of market leaders, with the ability to influence the behaviour of others in markets.

## **2. The Experience of Australia**

First, it is useful to describe the background to the Australian dollar market. The Australian dollar was floated in 1983, and has since then fluctuated with demand and supply in the market. For a small, open economy which is subject to real external shocks in the form of shifts in the terms of trade, a floating exchange rate should help to insulate the domestic economy from the effects of those shocks. The Reserve Bank generally does not intervene in the foreign exchange market when the currency moves up or down, allowing it to perform its function as an insulator. However, the Bank does intervene when there is a reason to believe that the exchange rate is overshooting – that is, moving more than can be justified on underlying economic grounds. Typically, this is unlikely to occur until the exchange rate has moved a considerable way in either direction. The result of this approach has been that in recent years the Australian dollar has fluctuated in a wide cyclical band around a mean of about US73 cents; movements from peak to trough have been around 30 per cent or so. The cyclical pattern closely follows the cycle in commodity prices.

**Figure 1: Australian Dollar**  
Monthly



When the Asian financial crisis erupted in mid 1997, the Australian dollar was already falling from its peak but was still around its mean level. With widespread expectations that the crisis would lead to slower growth in Asia and further weakness in commodity prices, as well as a direct worsening of Australia's trade position because of the high proportion of trade that was with Asia, it seemed appropriate that there be further depreciation of the currency. The Bank intervened only a little in 1997 and early 1998 as the currency fell, during short-lived episodes of extreme uncertainty which caused liquidity to dry up (such as the period in January 1998 when the Indonesian rupiah fell to its trough of 18 600 against the US dollar and there was a fear of widespread market failures in the region). The Reserve Bank's assessment throughout this period was that the Australian dollar market mechanisms were operating normally and its interventions were small.

One key aspect of the normal functioning of the market was that exporters began to buy Australian dollars once the exchange rate had fallen below US70 cents, in order to hedge future export receipts against a recovery in the rate. This helped to stabilise the exchange rate at around US65 cents, down over 10 per cent from its mean level, between December 1997 and March 1998. The large global macro hedge funds, which had begun to accumulate short positions during this period, accelerated their selling from March and built up an aggregate short position – that is, a position where they had sold Australian dollars which had been borrowed – which we estimate to have reached about \$A12 billion by May 1998. (One of the major problems in analysing the effects of hedge funds is that we have no hard data on their positions, although we believe our estimates – based on liaison with dealers – are accurate.)

The large sales by these hedge funds came only after the downward trend was well established and the currency had already fallen by a large amount. Since the funds would have anticipated these positions to become profitable, they must have believed that the trend would continue. The positions were established gradually over a long period – two quarters or so – and did not have any sudden impact on the exchange rate. Indeed, the exchange rate remained fairly orderly through this period.

The hedge funds, having established these large short positions, took a much more aggressive selling stance as the exchange rate approached its post-float lows around US60 cents, a time when the market was naturally quite sensitive. They began by signalling to other market players that they were about to attack the Australian dollar and that the Reserve Bank would be unable to stand in their way because of the volume of funds they had at their disposal, a move which heightened uncertainty and deterred potential buyers from remaining in the market. Once the hedge funds began selling, a key feature of their strategy was to concentrate sales into periods of thin trading (such as lunchtime in the Sydney market and the shoulder periods between Sydney and London trading). One consequence was that exporters, who had been keen buyers of Australian dollars at higher levels, not only stopped buying, but began to sell in the expectation that the exchange rate would fall further – a classic example of herd-like behaviour.

It was at this stage that the Reserve Bank intervened on a considerable scale, buying about \$A2.6 billion in early June over the three days or so that the aggressive selling continued. The Bank ceased intervening once it was clear that the aggressive selling had also ceased, by which time the exchange rate had fallen from about US60 cents to about US58 cents. This was short of the target level which one of the hedge funds had set itself (it boasted to the Bank that it was not going to square its position above US54 cents), but the Bank's intervention had exhausted their willingness to add to their already large short positions.

The initial short positions established in the first half of 1998 were strongly in profit for a substantial period and thus there was ample opportunity for the hedge funds to take their profits between June and September, but it seems that only limited profit-taking occurred, as hedge funds held on in the expectation of further falls. In fact, the Australian dollar did fall as far as US55.3 cents in August, but events then moved very quickly against the funds. In late September and early October, the near-collapse of the hedge fund Long-Term Capital Management caused banks to cut back on their funding to hedge funds in general. Deprived of the credit used to fund their short positions, hedge funds were forced to cover those positions by buying in the market. This deleveraging produced a sharp rise in the exchange rate back to around US65 cents, roughly where it had been before the hedge funds' selling started six months earlier.

## 2.1 The lessons

There are two aspects of this experience which need to be examined carefully.

First, in the June 1998 episode, the hedge funds acted with the apparent intention to then force a change in the price. They were not merely transacting to take advantage of expected events, but were doing so in a way which seemed intended to try to influence the course of events, posing a risk to market integrity. Information provided by authorities in Hong Kong and South Africa suggests that hedge funds behaved in similar, and similarly destabilising, ways in those markets at different times during 1998.

Second, and perhaps more important, the behaviour of the hedge funds in June affected the dynamics of the market throughout the remaining period in which they held their large short positions. This is most clearly seen following the Russian default in August. The fear that Russia would dump commodities led to a sharp fall in commodity prices, and in currencies traditionally linked to commodities such as the Australian dollar. This created what appeared to other market participants to be another window of opportunity for the large hedge funds to take the market on, as they had done in June, and these other participants pulled back from their normal activities while they waited to see what the hedge funds and other traders would do.

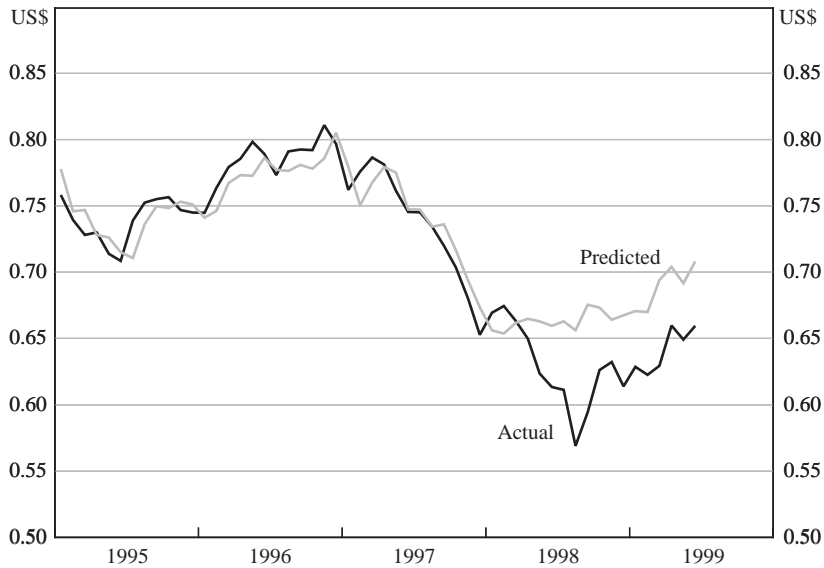
The academic literature on herding suggests that this might be rational behaviour, but the result was a fall in liquidity at a time when it was most needed. The market took on a 'one-way' characteristic: traders were prepared to sell (on the assumption that others would sell if they did anything at all) but were not prepared to buy until they saw others buying and the market stabilise. Exporters, who might have been natural buyers at such low levels of the exchange rate, had been hurt by their earlier attempts to 'pick the bottom' at US65 cents and also waited to see what others would do. The Australian dollar began to fall even against other weak currencies affected by the pessimism about commodity prices. The Reserve Bank responded by intervening in the market, buying Australian dollars to ensure that there remained a two-way market.

In the event, the hedge funds did little and, once this became clear to other traders, they returned to more normal behaviour quickly. Nevertheless, the overhang of concentrated short positions held by the hedge funds continued to weigh on the market until the deleveraging occurred in October.

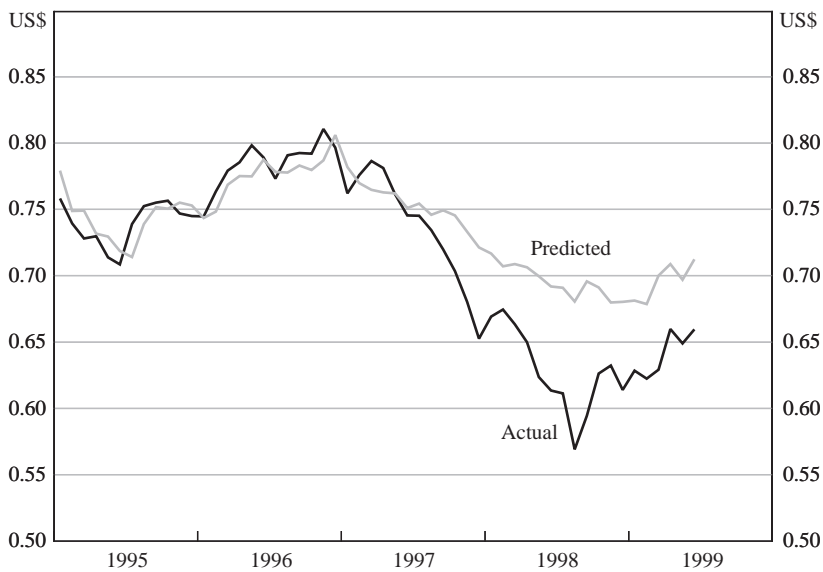
More generally, there was a temporary breakdown in the structure of the market which coincided with the presence of the large hedge fund positions. During this period, the exchange rate fell below the level which was implied by the traditional explanatory variables – commodity prices and interest rate differentials – where it remained until the large positions were removed.



**Figure 2: Australian Dollar Model Performance**  
 Estimated to December 1997



**Figure 3: Australian Dollar Model Performance**  
 Estimated to December 1996



This can be seen in the performance of a simple unrestricted error-correction model of the exchange rate when it is used to forecast the changes in the rate over 1998. Equations relating the Australian dollar/US dollar exchange rate (which is the bilateral rate which accounts for the vast bulk of trading in the market and on which traders focus in their decision-making) to commodity prices (represented by the Westpac commodity futures index, which is commonly used by traders as a measure of commodity prices) and the 3-month interest rate differential were estimated on data up to end 1996 or end 1997. When used to forecast out of sample, these models show:<sup>1</sup>

- the forecast rate falls sharply in late 1997 as the Asian crisis bites on commodity prices, and the actual rate falls even faster – the two then move towards convergence in early 1998;
- in mid 1998, the forecast rate falls a little further but the actual again moves down sharply; and
- the two again move towards convergence after September 1998.

These results appear to be suggestive of an impact of the presence of hedge funds on the determination of the exchange rate. Of course, the 1998 period was one of considerable disturbance in markets, and there are several possible reasons why the model might break down at that time. One possible reason is that Australia was regarded as likely to be directly affected by the Asian crisis, leading to a change in the determinants of the exchange rate to more Asian-related variables. This might have occurred to some extent, but if so we would have expected the model errors to continue through to early 1999, since it was only then that perceptions of Asian recovery began to take hold. The period of poor performance of the model matches much more closely the period of activity of the hedge funds in our market. From early 1998 to September, the forecast errors build to their peak over exactly the period in which the large hedge funds built and held their dominant short positions, and the errors then subside at the same time as the hedge funds squared up in the deleveraging forced upon them after the near-collapse of LTCM.

### **3. Are Hedge Funds Different from Other Large Players?**

Some claim that hedge funds are being made scapegoats for recent instability, and that in fact their activities are no different to those of other market participants such as commercial banks or investment banks, which can also take large highly geared positions in different markets at times.

This argument does not take into account the very different business approaches of the various types of institutions. The great bulk of commercial and investment bank balance sheets are devoted to supporting client businesses rather than position-taking. To the extent that they do engage in position-taking, it tends to be at a disaggregated level, by individual dealers. In contrast, hedge funds' positions are

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1. See Appendix A for details of the equations.

concentrated and centrally controlled. One consequence of this is that individual positions of banks tend to be less strongly held, and therefore less likely to have effects on markets. Also, banks are mindful of their wide-ranging relationships with governments and businesses in individual countries, and therefore less inclined to pursue trading strategies which could disrupt a country's markets and harm the bank's reputation. Hedge funds, in contrast, have no ongoing relationships with most of the countries in which they trade and hence can be purely opportunistic. These differences are to a large extent built into the cultures of the different institutions.

It follows from the above that it is not valid to conclude that, because hedge funds' assets are much smaller than those of banks (or even mutual funds, pension funds and life offices), their impact on markets is less. For one thing, the extensive use by hedge funds of off-balance sheet instruments gives them more leverage and hence influence than their asset size would suggest. Perhaps more importantly, it is *changes* in positions that influence market prices, and in this respect hedge funds are much more active than banks (whose main business is not position-taking) or mutual funds, pension funds or life offices (whose positions in markets are constrained by the benchmarks they follow).

#### 4. Conclusion

If it is accepted that some hedge funds can affect the dynamics of markets, what can be done to limit their effects? Prescriptions of policies for dealing with issues posed by hedge funds have focused on improving transparency, disclosure, and counterparty risk management.<sup>2</sup> Though primarily aimed at addressing prudential and system stability concerns, these measures would also impact on the behaviour of market participants in a way which is likely to reduce incidence of herding and hence address also the issues raised in this paper.

More generally, it has been proposed by some commentators that small countries can minimise the chances of a speculative attack by developing deep and liquid markets, and that countries should concentrate on avoiding policies which might encourage hedge funds (or indeed any other speculators) to build large positions. I will conclude with some remarks about these 'conclusions'.

On the first, while there are many good reasons for a country to develop deep and liquid markets, the evidence does not support the conclusion that they reduce the risk of speculative attack. In fact, the opposite seems to be the case. Before the crisis, Thailand and Hong Kong had by far the most liquid foreign exchange markets in Asia (except Japan); relative to GDP, turnover was well up with developed country standards. Similarly, the Hong Kong stock market was the most liquid market in non-Japan Asia, and the Australian dollar is the seventh most actively traded currency in the world. Yet it was these markets, rather than other less liquid markets in the region, that were attacked. Market liquidity is one of the characteristics favoured by speculators, because it gives scope to establish and later reverse sizeable positions. In this respect, the activities of hedge funds are more of an issue for

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2. A summary of these prescriptions is contained in Appendix B.

medium-sized economies with active markets than small economies with illiquid markets. The real issue facing small countries is not the liquidity of their markets but the potential to be overwhelmed by the funds flows originating from the large economies. When a very small number of market participants can quickly establish a position in a currency that is a large percentage of the country's GDP, as was the case in Thailand and Hong Kong, the potential for market disruption is very high.

Turning to the second 'conclusion', it has been suggested that the activities of hedge funds can be encouraged by the interventions of the authorities in markets. This seems to be derived from the concept of a speculative attack on a fixed exchange rate, where speculators buy from the central bank as it stands in the market. It is true that in some cases hedge fund positions have been established through transactions against central banks; the short positions in sterling in 1992 are an example. However, the Australian experience of 1998 shows that hedge funds can build very large positions even when the central bank does not stand on the other side of the market; the bulk of the short positions in Australian dollars were established during times when the Reserve Bank was not in the market. One of the most important lessons to learn from the experience of 1998 is that hedge funds cannot be ignored as a major factor affecting floating exchange rates (and other floating financial prices) as well as fixed ones.

## Appendix A: Exchange Rate Model

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**Dependent variable: DAUD**

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Estimated period	Nov 1988 – Dec 1996		Nov 1988 – Dec 1997	
	Coefficient	t-stat	Coefficient	t-stat
Constant	-0.22	-1.41	-0.12	-0.83
DWCFI	0.27	4.35	0.29	4.73
ID	0.0007	0.67	0.0015	1.67
AUD(-1)	-0.17	-3.05	-0.15	-2.69
WCFI(-1)	0.04	1.14	0.02	0.53
R-bar squared	0.20		0.21	

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Notes: WCFI is the level of the Westpac commodity futures index (log).  
 ID is the differential in interest rates on 3-month bank bills/bankers acceptances (in levels).  
 AUD is the Australian dollar/US dollar bilateral exchange rate (log).  
 D in front of a variable indicates that it is in first differences.  
 Data are monthly. The estimation period was determined by availability of the WCFI,  
 which is available from November 1988 onwards.

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## Appendix B: Studies on Highly Leveraged Institutions

The Basel Committee on Banking Supervision set up the Working Group on *Banks' Exposures with Highly Leveraged Institutions*, which has released two reports – one on banks' exposures and one on recommended changes to banks' practices (the Brockmeijer reports). The latter recommended that banks establish clear policies and procedures for dealing with HLIs, use information about HLIs' risk characteristics (e.g. leverage, concentration and risk management) when they assess credit, and develop more accurate measures of exposure to derivatives.

The Committee on the Global Financial System set up two working groups on disclosure:

- The Working Group on Transparency Regarding Individual Positions (the Fisher Report, completed March 1999) has recommended individual reporting by financial institutions to clients and lenders about their risk profile, including data on the size of risks by reporting institution and the distribution/concentration of risk by risk type (credit risk and market risk) and market group (type of product and geographical region). A template was suggested and it was agreed to establish a Multi-disciplinary Working Group on Enhanced Disclosure, incorporating representatives from other bodies (Basel Committee on Banking Supervision, the International Association of Insurance Supervisors, and the International Organisation of Securities Commissions) as well as the Committee on the Global Financial System to refine the template and establish a pilot study.
- The Working Group on Transparency Regarding Aggregate Positions (the Patat Report, completed June 1999) recommended the collection of more frequent data on market turnover and the positions of major financial participants, initially focused on the foreign exchange market. It recommended that positions and concentrations be published in aggregate form, with the focus on type of institution and not individual firm, and that BIS data be expanded to include off-balance sheet funding by banks, non-bank lending and possibly more detail on the currency and maturity profile of loans.

*The President's Working Group on Hedge Funds, Leverage, and the Lessons of LTCM*, published April 1999, is the US Government response to the LTCM episode. It recommended more frequent and meaningful information be provided by hedge funds, greater public disclosure by financial institutions, and improvement in risk management and regulation.

The Counterparty Risk Management Policy Group (CRMPG) report on *Improving Counterparty Risk Management Practices*, published June 1999, is the market's response to the LTCM episode. It lists critical information required for counterparty dealings with hedge funds, recommends integrating the assessment of leverage, liquidity and market risk, and examines improved ongoing processes for risk management and documentation.

The Working Group on Highly Leveraged Institutions (HLIs) was established by the Financial Stability Forum in April this year after the G7 summit in Köln. Its terms of reference included assessing the implications of HLIs for financial stability in

developed and developing economies, drawing together and assessing the work already done in the various groups that exist, and examining the policy responses. Chaired by Howard Davies of the UK Financial Services Authority, it has met three times and is currently preparing a status report for the Forum Meeting on 15 September in London.

The final report of the Working Group is due before the 2000 Spring Meeting of the Forum. It is expected to address issues such as risk management practices by firms, disclosure and transparency, the impact of HLIs on market dynamics in medium and small economies, and the arguments for and against direct regulation of hedge funds.

As part of its work, the Working Group has established a Study Group to report to it on the impact of HLIs on market dynamics in medium and small economies. The Study Group's terms of reference include assessing whether HLIs employed excessively aggressive tactics in markets of these economies, whether these tactics raised issues about market integrity, whether these tactics represent a systematic source of volatility, and the conditions that might make an economy more vulnerable to manipulation. The study group has visited Hong Kong SAR, Australia and New Zealand, a subset of economies in which HLIs were active in 1998. It will complete its final report by December this year.

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# Capital Flows, Hedge Funds and Market Failure: A Hong Kong Perspective

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Joseph CK Yam

## 1. Introduction

This paper examines some of the problems created by international capital flows in the light of the recent global financial turbulence. It also outlines a number of possible approaches, requiring international co-operation, towards resolving, or at least limiting, these problems. Section 2 of this paper examines the rapid growth and destabilising effects of unregulated and unmonitored 'synthetic' flows arising largely from derivatives transactions in over-the-counter (OTC) markets. Section 3 discusses the role of highly leveraged institutions (HLIs) in this process and sets out two scenarios in which the taking of large positions by HLIs could threaten the integrity and stability of financial markets. As an illustration of one of these scenarios, Section 4 outlines the mechanics of the speculative attack on Hong Kong in 1998. Section 5 summarises the concerns about the volatility and concentration of capital flows, the manipulative tactics adopted by some HLIs, and the lack of transparency in OTC markets. Finally, Section 6 discusses three broad approaches in addressing the potential risks posed by HLIs: enhanced transparency, indirect regulation and direct regulation.

## 2. Capital Flows

The case that free trade in goods and services is conducive to economic growth has been well established. According to the academic argument of comparative advantage, free trade promotes a more efficient utilisation of factor endowments. There are also ample empirical studies suggesting a strong correlation between trade liberalisation and economic growth. Many people have thus taken it for granted that capital flows, like trade flows, will invariably facilitate long-term economic development. This presumption, however, has been questioned recently in light of the experience of some emerging market economies. Bhagwati (1998), for example, expresses doubts about the assumption that free capital is as virtuous as free trade and argues that the claims for enormous benefits from free capital mobility are not persuasive.

There are undoubtedly many benefits associated with free flows of international capital. Traditionally, capital flows take the form of commercial bank lending, foreign direct investment, or equity portfolio investment. Over the past few decades, capital flows have facilitated the efficient utilisation of capital, provided liquidity in financial markets and promoted long-term development in both home and host economies.

Advances in information technology and the increased openness of domestic financial markets in recent years have allowed capital to flow in and out of an economy in huge amounts within a very short space of time. Rapid increases in the quantity and volatility of capital flows have led to new problems and challenges for the emerging market economies. To cope with these volatile capital flows, there can be no substitute for sound macroeconomic policies, a strong financial system, and a robust regulatory framework.

The latest global financial turbulence has, however, highlighted the changing nature of capital flows. With the massive growth in OTC derivatives markets, especially in the foreign exchange market, significant 'synthetic' capital inflows or outflows can be created as a result of large position-taking by the big players. For example, a player can take up a huge short position against the currency of a country (the target currency) through a forward sale of the target currency against the US dollar. The transaction is typically done with an international bank. The international bank will normally unload its position through the sale of the target currency in the spot market and fund the sale through a swap transaction (borrowing the target currency against the US dollar to settle the spot deal). The economic consequence of this series of transactions will be equivalent to a very significant capital outflow, thereby causing sharp volatility of the exchange rate and/or interest rate of the target currency. Yet the originator of the deal (i.e. the position-taker) has never moved funds into the target currency in the first place and has therefore no exposure to hedge. The concern here is not the purely speculative nature of this kind of play, but the magnitude of the transaction and the way in which it is conducted.

As the above example illustrates, this form of 'synthetic' flows typically arises from derivatives transactions that take place in OTC foreign exchange markets, which are subject to very little, if any, supervision. Forex derivatives have undeniably helped investors to unbundle and repackage their risks. They have helped to promote investments that have generated substantial benefits to developing economies. But the use of derivatives by those having no investment to hedge could generate huge synthetic capital outflows and frighten genuine local and foreign investors into disinvesting rapidly in concert, resulting in an overwhelming outflow, which eventually undermines the stability of the financial system.

The OTC foreign exchange transactions (including spot, outright forwards, and forex swaps)<sup>1</sup> have grown rapidly in recent years. While no accurate statistics are available, it is widely believed that the great majority of forex transactions are unrelated to genuine commercial trade or hedging purposes. The inadequate data on OTC markets make it difficult to understand the nature of capital flows, their movements or their impact on financial markets and the real economy. In light of the potential destabilising effects of capital flows on the emerging market economies, *it is timely to review the existing regulatory framework with a view to promoting the free flow of soundly based capital and the well-functioning of financial markets.*

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1. According to BIS Statistics, in April 1995 the global value of foreign exchange transactions taking place on an average day was US\$1.2 trillion. In April 1998, this figure increased to US\$1.5 trillion.

### 3. Highly Leveraged Institutions

The latest financial crisis has put the spotlight on the activities of HLIs, particularly the hedge funds. It has been suggested in some studies that HLIs can and do play a positive role in providing liquidity in the financial markets and in promoting greater price efficiency through the use of arbitrage and other trading techniques. Furthermore, owing to their specific risk-return profile, investment in HLIs offers an opportunity of portfolio diversification to high net worth and institutional investors.

On the other hand, it has also been observed that the very aggressive trading activities and techniques deployed by some HLIs could also threaten global market integrity and even financial system stability. This paper presents two scenarios to illustrate this point. The first scenario is a situation in which HLIs taking excessively large positions are overwhelmed by market forces. The second scenario refers to a situation in which open markets, in particular the smaller ones, are overwhelmed by HLIs taking very large positions, whether or not they are acting in concert.

#### 3.1 Scenario 1: HLIs taking very large positions overwhelmed by market forces

The near-collapse of Long-Term Capital Management (LTCM) has highlighted the systemic risk arising from very large individual market players being overwhelmed by market forces. LTCM held very large positions in both the cash and OTC derivatives markets, which were financed mainly by credit lines provided by commercial banks. Systemic risks posed by the case of LTCM on the financial markets and banking system were discussed in detail in the Basel Committee report on *Banks' Interactions with Highly Leveraged Institutions*, released in January 1999.

A single counterparty's exposure, as measured by the replacement value, net of collateral, is often small and manageable in normal market conditions. However, the more important concern is that such exposure could be magnified by 'stressed-market exposures'. This refers to the impact of rapid deleveraging of positions on markets associated with the default of an HLI of the size of LTCM, which could lead to very sharp volatility and a drying up of liquidity in and beyond those markets in which LTCM was involved. If the deleveraging of the large positions held by HLIs happens very rapidly in a disorderly manner against an already volatile environment, the process could have systemic effects even in large and mature markets, thereby threatening the global financial system. The concern for market dislocation became the main justification for the New York Fed's decision, in September 1998, to orchestrate the rescue of LTCM by a consortium of banks.

Learning from the LTCM experience, the international community is taking steps to prevent excessive leverage by HLIs. This is done primarily through indirect means by asking banks and other financial institutions to be more prudent in granting credit lines to HLIs. This approach could, to a certain extent, reduce the risks arising from HLIs taking excessively large positions in deep and liquid markets, as in the case of LTCM. But it may not, as explained in the second scenario, be adequate to address the problems that may arise in smaller open markets.

### 3.2 Scenario 2: smaller open market economies overwhelmed by HLIs taking very large positions

This scenario would be most likely to happen to smaller and open market economies, since the HLIs, even with more limited leverage resulting from more prudent lending by banks, could still corner these markets.

Under this scenario, a currency crisis is not necessarily the outcome of an underlying policy inconsistency of weak economic fundamentals. The 1999 World Bank report on *Global Development Finance* cited the Obstfeld model<sup>2</sup>, which explores the dynamics of a currency attack based on self-fulfilling expectations. According to the model, the existence of many small traders reduces the risk of self-fulfilling attacks because it is difficult to co-ordinate the activities of hundreds of traders. However, self-fulfilling attacks can occur if there are *large* traders who can co-ordinate their activities or serve as guides for the multitude of small traders. This is more liable to occur in smaller markets, where it is easier for just a few large players to engineer huge price movements.

Some have argued that the intense pressure on Asian currencies is less the consequence of speculation and more the result of a loss of investor confidence in an overvalued currency with very weak economic fundamentals. While some Asian economies exhibited various degrees of overheating and macroeconomic imbalances prior to the recent crisis, the overshooting of currency devaluation and the resulting devastation seem to be grossly out of proportion to the severity of their 'policy mistakes'. The lack of transparency and data on the OTC markets have made it very difficult to assess to what extent the overshooting and devastation was exacerbated by the activities of HLIs.

Some critics have cited the choice of exchange rate regime as a source of the problem. However, the Asian experience has confirmed that economies, such as Australia, with floating exchange rate regimes are not immune to massive speculative attacks.

It has also been argued that currency markets are infinite and therefore not conducive to being cornered or manipulated. This is at best partially true. First, there is an asymmetry between betting on depreciation and appreciation of a currency. When speculators exert a downward pressure on a target currency, and when improper means are used to foster a climate of undue pessimism, the consequence could be a sharp rise in the degree of risk aversion among other market participants

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2. In this highly stylised model, there are three players: a government selling reserves to defend its exchange rate and two holders of domestic currency. If neither trader has sufficient resources to exhaust the government's reserves whereas together they do, the exchange rate will be sustained if neither believes the other will attack, but will collapse if each believes the other will attack. Fundamentals – usually measured in the level of international reserves – are important here: if reserves are very low the currency would surely collapse, and if reserves are massive there would be no attack. But with intermediate levels of reserves, the way is open for expectations to play a critical role.

who would, at least temporarily, stay away from the market. Under extreme circumstances, the central bank could be left as the only major buyer of domestic currency in the market, and its ability to absorb the selling pressure would be constrained by the amount of foreign exchange reserves it possesses. The currency markets will thus have become finite and exposed to the possibility of manipulation. On the other hand, when the bet is on an appreciation, the central bank would have, in theory, an unlimited supply of domestic currency for sale to prevent its value from rising excessively. Even so, central banks are usually constrained in their ability to increase their domestic money supply without regard to the effect on their monetary policy target.

### 3.3 Highly leveraged institutions and scenario 2

The intellectual validity of the second scenario is still being debated in various international fora. It should be stressed that in principle there is nothing objectionable to any market participants, including the HLIs, taking a view on the market and positioning itself accordingly. Speculators in essence buy low/sell high, or sell high/buy low, thereby providing the much-needed liquidity to markets and helping to bring the value of the underlying assets to their equilibrium levels. The issue here is the way in which some HLIs, particularly certain hedge funds, conduct their trading activities, and the impact that these activities may have on the price discovery mechanism in financial markets.

The price discovery mechanism in a free and competitive market can only function if all market participants are price-takers and no single participant can move prices. The major differences between the trading strategy of certain hedge funds and that of other position-takers are:

- These hedge funds have *the leverage power to borrow large resources and the motive, intention and ability to move prices* through collusion and/or other manipulative practices.
- Only these hedge funds have the knowledge of the size of their very large positions and the timing of the build-up of such positions. Because they are the market leaders, they are able to persuade the commercial and investment banks, who are their major liquidity providers and who also run large proprietary positions, to follow their lead. In a number of ‘raids’ on smaller markets, they have proved their ability to launch self-fulfilling speculative attacks. They also have an *information advantage* over other market participants.

Hedge funds are not the only class of institutions that can take large short positions against any financial market. But unlike other players, hedge funds are usually not subject to any licensing, regulatory or reporting requirements. Commercial banks are subject to local licensing regimes and to clear guidelines on position-taking. Normally, other financial institutions are required to diversify their portfolios globally or against well-defined benchmarks. These constraints do not normally apply to hedge funds, which rarely, if ever, need to account for their actions or trading strategies to their shareholders or investors.

In other words, a hedge fund is potentially more destabilising than an investment bank of comparable leverage, as the hedge fund can bring to bear all its market power against a financial market. Furthermore, certain hedge funds, which have a proven track record of 30 per cent to 40 per cent return per annum, often put the reputation and charisma of their principals to good use in orchestrating copycat and herding behaviour.

#### **4. Hong Kong's Experience in 1998**

Another difficult issue being raised in the debate on the second scenario is whether there is evidence to support it. Hong Kong's experience with the hedge funds last year provides some substantiation. But it is difficult, if not impossible, to obtain direct or hard evidence of exactly what the hedge funds did last year, because they were, and still are, not subject to any regulatory requirements. The OTC markets in which hedge funds normally operate are equally opaque. Nonetheless, plenty of anecdotal evidence and market intelligence is available to enable the events in Hong Kong to be reconstructed.

The hedge funds launched their attack on Hong Kong after careful planning. First, the hedge funds pre-funded themselves by borrowing Hong Kong dollars, a move designed to insulate themselves from the sharp rise in Hong Kong dollar interest rates when the short-selling of Hong Kong dollars began. Most of this funding was obtained by swapping US dollars for Hong Kong dollars with international financial institutions that issued a very large volume of Hong Kong dollar debt. Second, the hedge funds built up short positions in the cash and futures equity markets. The gross open interest of Hang Seng Index Futures more than doubled, to 103 101 contracts (valued at US\$4.7 billion), in the five months to end August. Finally, they launched the attack in August by selling large amounts of Hong Kong dollars in the spot and forward markets, with a view to pushing interest rates sharply higher, thereby causing the stock and futures prices to collapse, or even the Hong Kong dollar peg to break.

The attack on Hong Kong was accompanied by numerous pessimistic reports on Hong Kong, on the Linked Exchange Rate System, and on China. Rumours proliferated about bank runs in Hong Kong, about the plans by the HKSAR Government to abandon the Link, and about an imminent devaluation of the renminbi. The strategy of the hedge funds was to generate undue pessimism and market panic so that they could close their short positions with huge profits.

In order to frustrate the cross-market play by the hedge funds and to protect Hong Kong's market integrity and financial stability, the HKSAR Government began a two-week operation on 14 August of intervening in the stock and futures markets. The outcome was that stability returned to the local financial markets following the unwinding of the hedge funds' positions in the stock and futures markets. The risk premium on the Hong Kong dollar, as measured by the interest rate premium over the US dollar for three-month money, fell from a high of 1 250 basis points in August to 45 basis points in December 1998, which was comparable to the pre-crisis level in July 1997.

## 5. Concerns Raised by Capital Flows, HLIs and OTC Markets

The Asian financial crisis has underscored how *volatile capital flows* could devastate our markets, our economies, and even our social and political stability. The main lesson is clear: Asian economies need to strengthen their financial markets, banking systems, and corporate sectors so as to make their markets less vulnerable to volatile capital flows. However, these measures alone are not enough to prevent the recurrence of other major financial crises in the future.

In particular, the *concentration risks* generated by the very large positions of some HLIs and concerns about *market manipulation* caused by their very aggressive trading strategies were highly destabilising and threatened to dislocate emerging market economies. Worse still, the *lack of transparency in the OTC markets*, where HLIs usually conduct their trading activities, has made monitoring and surveillance difficult, thereby raising the risk of price-ramping, collusion and other forms of misconduct by the large players.

Some believe that the emerging market economies should seek to develop and deepen their markets so that they can absorb external shocks and reduce the risk of being manipulated. This advice is well taken. But, given the relatively small size of the emerging market economies, there is a limit to how big their markets can become. Most of the Asian markets are tiny in relation to the size of global capital flows and will remain so for many years to come.

## 6. Possible Approaches

Globalisation and liberalisation are trends that should continue and will continue. The last crisis saw how rapidly and intensely contagion spread from one troubled spot to another, and then from one region to another. Given the increasing integration of financial markets, the speed and magnitude of contagion could be even more intense when the next crisis hits. The concerns raised about HLIs are therefore of paramount importance and need to be addressed urgently.

In theory, there can be three broad types of approaches in addressing the potential risks posed by HLIs:

- enhanced transparency;
- indirect regulation; and
- direct regulation.

These three approaches are discussed briefly below and their main points are summarised in the Appendix.

### 6.1 Enhanced transparency

The transparency approach is based on the premise that timely and reliable information relevant to decision-making by market participants will impose some discipline on the HLIs. The approach entails the setting up of a disclosure or

reporting framework to provide information that is necessary for proper risk assessment by counterparties, creditors, and investors.

Much useful work has already been done in various fora. Working groups have been formed by the BIS Committee on the Global Financial System (CGFS), the Basel Committee on Banking Supervision (Basel Committee), the International Organisation of Securities Commissions, the US President's Working Group on Financial Markets, and the Financial Stability Forum. These groups primarily aim at enhancing transparency, improving risk management practices, and reducing excessive leverage of HLIs.

In seeking to plug the gaps in disclosure and reporting by HLIs, several difficult issues will need to be resolved: these include who should report, what market segments should be covered and what data should be gathered. There is also a need to strike a delicate balance between avoiding undue reporting burdens and infringements of proprietary information on the one hand, and the benefits to the efficient functioning of markets that can result from enhanced disclosure on the other.

## 6.2 Indirect regulation

This approach involves the imposition of some form of discipline on the HLIs through indirect means. The Basel Committee has issued a useful report on *Banks' Interactions with Highly Leveraged Institutions*. The report recommends indirect regulation, in which banks should adopt more prudent policies on the assessment, measurement, and management of their exposure to HLIs.

Another possible tool of indirect regulation entails the development of a more risk-sensitive approach to capital adequacy and lending policies for the creditors and counterparties of HLIs. These policies could include the imposition of capital charges on lending to HLIs, raising margin and collateral requirements etc. This is a more difficult area and is still being considered by the Basel Committee.

## 6.3 Direct regulation

Direct regulation could involve the direct regulation of the hedge funds, OTC markets or large players or a combination of these. It has been argued that OTC markets should be exempt from regulation as trades are typically conducted among sophisticated investors. Others believe that the need to protect market integrity and financial stability justifies a regulatory framework similar to that adopted in organised exchanges. But direct regulation involves many difficult and complex issues: these include the choice of an appropriate supervisory authority, the sheer volume of the OTC markets, the large number and different types of players and migration to 'regulatory safe havens'.

Recognising the technical and political difficulties involved in devising an effective direct regulatory regime, some have suggested the introduction of a code of best practices for HLIs as a fallback. While the compliance of the code would have to be on a voluntary basis, consensus among the international and national regulatory authorities could put pressure on the HLIs to comply.



## Appendix: What Can Be Done to Address Concentration Risk and Market Manipulation

The table below analyses what can be done to address concerns about HLIs. A section then follows setting out the case for a global, rather than a national, solution towards reducing the destabilising potential of HLIs. It should be emphasised that the table serves as an analytical tool to facilitate discussion, rather than as a recommendation of what should be done.

### Concentration risk

#### *Indirect regulation through reduction of excessive leverage of HLIs*

<p>(i) How can excessive leverage of HLIs be reduced?</p>	<ul style="list-style-type: none"> <li>• Encourage better risk management by creditors and counterparties of HLIs. Creditors and counterparties would need relevant information from HLIs about their degree of leverage and concentrations in individual markets (see also Section 6.1, paragraph 3).</li> <li>• Incorporate in the Basel Capital Accord risk weighting which would ensure appropriate capital charge to better reflect the level of risk for exposures to HLIs.</li> <li>• Regulators to develop appropriate guidelines governing creditors' and counterparties' interactions with HLIs.</li> </ul>
<p>(ii) Is the reduction of excessive leverage of HLIs adequate to address concentration risk?</p>	<p>Reducing excessive leverage of HLIs could help prevent recurrence of an LTCM-type crisis. However, even with more limited leverage, HLIs can still pose systemic threats to small and medium-size markets.</p>

*Indirect regulation through enhanced transparency/disclosure*

<p>(i) What type of <i>information</i> would be helpful to understand and assess concentration risk?</p>	<ul style="list-style-type: none"> <li>• Size of individual markets.</li> <li>• Large positions of participants.</li> <li>• Large transactions.</li> </ul>
<p>(ii) What are the types of <i>recipients and users</i> of the information?</p>	<ul style="list-style-type: none"> <li>• Shareholders/investors of HLIs.</li> <li>• Counterparties.</li> <li>• Regulators.</li> <li>• International regulatory bodies/agencies.</li> <li>• Other investors in markets that HLIs trade in.</li> </ul>
<p>(iii) How could enhanced transparency help address the problem of <i>concentration risk</i>?</p>	<p>Depending on the extent of transparency implemented:</p> <ul style="list-style-type: none"> <li>• HLIs would be more cautious in building up very large positions since they need to consider the possibility of being squeezed if their positions are known to other market participants. The information advantage of HLIs can thus be reduced.</li> <li>• Lenders and counterparties could assess more accurately the true risks assumed by HLIs taking very large positions in individual markets.</li> <li>• Regulators could identify unusual trends and potential risks created by high market concentration of positions.</li> <li>• Other investors could be aware of which markets have higher concentration risks and hence larger volatility.</li> </ul>

### Direct regulation

(i) What to regulate and how?

- *Marketplace*: Regulatory regimes normally apply to an organised marketplace. This presupposes that transactions are carried out in organised markets where some discipline can be imposed on both transactions and participants. However, many financial products (e.g. currency) are traded on OTC markets, which do not have a marketplace.
- *Transactions*: In case of trading done on OTC markets, it is also possible to regulate transactions. For example, some national authorities have powers to require reporting of large forex transactions. Another example would be the regulatory regimes in some jurisdictions to regulate ‘margin forex trading’, primarily for the purpose of investor protection. (Such regimes could regulate capital adequacy, margin levels and currency mismatch limits of margin forex operators.)
- *Market participants*: Once the marketplace or transactions can be brought under a regulatory net, authorities could impose various requirements (e.g. leverage restrictions and capital requirements) on market participants.

Restrictions on market participants have the effect of a tax on them, so they may avoid regulation by moving transactions offshore. There is therefore a trade-off between the level of regulation and the possibility of regulatory arbitrage by domestic or international investors.

## Market manipulation

### *Statutory and non-statutory sanctions against manipulative practices*

<p>(i) Are existing statutory and non-statutory sanctions sufficient to address manipulative practices in financial markets?</p>	<p>In most organised exchanges and domestic jurisdictions, there exist statutory and non-statutory sanctions against collusive and market manipulation practices. These include the creation of false trading markets, building up of dominant market positions, announcement of false or misleading statements for the purposes of inducing purchases and sales of the targeted financial products. Although these rules may apply in domestic jurisdictions, there is currently no global consensus or legal framework to deal with market manipulation across markets, particularly for OTC markets.</p>
<p>(ii) If necessary, what additional measures could be considered?</p>	<p>Regulations applicable to on-exchange trading activities could be extended to cover OTC market activities, particularly where large positions are taken. This may require enactment of specific laws in various jurisdictions. However, there should be international agreement on the exchange of information, and enforcement co-operation between jurisdictions to ensure that there is a global framework to capture market manipulation activities on a cross-border basis.</p>

### *Code of best practices*

(i) Why do we need a Code of Best Practices?	If, for whatever reasons, statutory or non-statutory sanctions are not to be implemented, it might be useful to adopt a code of best practice to govern the conduct of HLIs and their counterparties.
(ii) Who should adopt the Code of Best Practices?	Major financial market players, including: <ul style="list-style-type: none"> <li>• unregulated HLIs;</li> <li>• regulated entities; and</li> <li>• unregulated affiliates of regulated entities.</li> </ul>
(iii) What are the key aspects of such codes?	<ul style="list-style-type: none"> <li>• Voluntary adoption of enhanced reporting and disclosure standards.</li> <li>• Internal mechanisms to prevent the creation of false markets, front-running and insider trading etc.</li> <li>• Strict rules to prevent research reports of financial firms being used to influence prices or market sentiments for the benefit of their proprietary positions, or portfolios where they have direct or indirect interests.</li> </ul>
(iv) What are the possible incentives for compliance with the Code?	<ul style="list-style-type: none"> <li>• Higher capital charges for regulated counterparties dealing with non-complying entities.</li> <li>• Regulated counterparties to impose higher margin requirements.</li> </ul>

## **Global versus national solutions**

Financial markets are global but regulatory regimes are national. There are several reasons why enhanced international co-operation is necessary to reduce the destabilising impact of HLIs' trading activities. First, an increase in reporting or regulatory burden on HLIs in one jurisdiction could drive business to offshore centres for taxation or regulatory/transparency arbitrage purposes. Incentives should therefore be considered to encourage offshore centres to comply with international regulatory and disclosure standards. At the minimum, offshore centres should not attempt to attract business through providing safe havens for money laundering, or disguising or hiding cross-border market abuses. Second, national authorities would not be able to provide aggregate market positions unless there is an information collection and sharing mechanism at the international level. Third, international enforcement and monitoring co-operation is necessary to ensure that cross-border market abuses and practices are not conducted offshore to bypass domestic sanctions.

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# *Discussion*

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## **1. General Discussion**

In discussion of the papers in this session, the extent to which hedge funds are unique was a dominant theme. Some participants felt that the problems of market manipulation and herding behaviour which are commonly associated with hedge funds are caused by other institutions as well, and they argued that proprietary desks – operations which hold open positions on an institution's own account – are similar in their behaviour. A number of financial institutions had copied the behaviour of hedge funds during periods of global currency instability in 1998. Firmer restrictions on the operations of hedge funds alone might therefore make only a modest contribution to limiting the extent of destabilising speculation.

This view was not universally shared. Some felt that hedge funds are particularly conducive to destabilising speculation because their exposures tend to be less diversified than those of other players, such as merchant banks. One participant reported market intelligence from a reputable source which confirmed that the destabilising short positions accumulated in the Australian dollar in the six months to June 1998 were predominantly held by large global macro hedge funds.

There was some disagreement about the extent to which market discipline had been imposed on hedge funds in east Asia and Australia during 1998. In the case of Hong Kong, some felt that the combination of short positions in the stock market and attacks on the currency board had lost hedge funds a great deal of money and that they had therefore been 'taught a lesson'. Others believed that the strategy pursued by hedge funds had met with initial success and that they would try something similar in future. Regarding the Australian market, some felt that short Australian dollar positions in 1998 held by hedge funds had failed to meet the expectations held for them, but may have been at least marginally profitable nevertheless. Others disagreed, believing that some of the hedge funds had made significant losses on their unsuccessful speculation.

Debate also focused on the contribution of transparency to foreign exchange market stabilisation. One argument was that disclosure of position-taking by hedge funds might actually destabilise markets, since small players may follow the lead of large players if the large players' positions are common knowledge. Realising that their lead will be followed, large players will have powerful incentives to speculate in, or against, a currency. Other participants disagreed. In the first place, investors are already able to reveal their positions when it suits them, and so they can encourage herding behaviour strategically. Compulsory disclosure of position-taking prevents this strategic behaviour. Second, if herding were to occur after the emergence of a trend in the market, compulsory disclosure would help to limit the development of that trend: market participants are unlikely to herd behind a player with a very large share of the market's open position. And finally, even if herding were a by-product of greater disclosure, its social costs would have to be



balanced against the benefits which arise when banks have to take greater account of their exposure to highly leveraged institutions.

Macroeconomic policy experiences were also discussed. One participant interpreted Hong Kong's experience to mean that countries which ran very predictable monetary policies raised their vulnerability to speculative attacks. When speculators took short positions in the stockmarket in 1998, they were relying on the Hong Kong Monetary Authority's defence of the currency board to produce a sharp rise in interest rates and a consequent fall in stock prices. Only by doing something very unexpected had the Hong Kong Monetary Authority been able to inflict heavy losses on these speculators.

# From the Washington Consensus to the New International Financial Architecture

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Eisuke Sakakibara

## 1. Introduction

It is my great pleasure to join this distinguished panel of experts and to deliver the Japanese view on private capital flow issues.

I feel somewhat relaxed and freer since I resigned from the position of Vice Minister of Finance for International Affairs about a month ago. At least now I don't have to worry about what I say about the yen/US dollar rate for the wire people who used to follow me all over the world. I would like to remind you that what I say today does not necessarily reflect the official views of the Japanese Government, although I still retain the position of Special Adviser to the Minister of Finance.

## 2. The Nature of the Crisis

Since the crisis erupted in Asia in 1997, I have consistently insisted that it was not an 'Asian' crisis, but a crisis of global capitalism. I think it is fair to say now that many have accepted this proposition and agree that the crises of 1997 and 1998 should be analysed as a continuation of the 'global' crisis that broke out in Mexico and Argentina in 1994 and 1995. Unlike the Mexican crisis of 1982, where external factors, such as a steep rise in the US interest rate and the sudden appreciation of the US dollar, played a major role in triggering the crisis, there were no apparent external causes of the 1994–95 crisis. International conditions, including the US market, were stable, and economic reforms in both Mexico and Argentina were well received by the international community. Some economists, notably Rudiger Dornbusch, argued that overvalued currencies were the direct cause, as in the case of the Asian crisis of 1997. Indeed, throughout the crisis from 1994 to 1998, overvaluation of real effective exchange rates was a factor that triggered the panic. Also, the short-term debts of Mexico and Argentina in 1994 exceeded the level of foreign reserves. In particular, Mexico's 1995 short-term official debt denominated in US dollars (tesobonos) of around \$28 billion, which was scheduled to be paid within several months, far exceeded the level of foreign reserves, which at that time was only \$6 billion. A similar situation existed between private short-term debts and the level of foreign reserves in Thailand, Indonesia, and South Korea in mid 1997. In Asian countries, it was private, short-term debts – not official debts such as tesobonos – which had accumulated.

Despite some signs of growing vulnerability, these crises from Mexico to South Korea were not predicted by market participants and analysts until certain events – political uncertainty, or bankruptcies of big corporations – triggered panic. Risk premia in loans remained low, and rating agencies, such as Standard & Poor's

and Moody's, maintained their relatively high rating of sovereign bonds until the onset of the crises. Many analysts and financiers, particularly at the outset of the crises, argued that the lack of proper disclosure and high-level transparency hampered the appropriate assessment of risks. However, objective evidence and data seem to indicate that the pertinent information, such as real effective exchange rates, short-term foreign debts in the private sector, current account balances, and balance sheets of banking sectors, was largely available. The problem was that this information was not appropriately incorporated into the risk assessment of the markets. Particularly when considering factors in the behaviour of non-bank financial intermediaries, such as hedge funds and pension funds, one is inclined to believe that the herd mentality has been more prevalent than rational and detailed calculation of emerging market risks. Moreover, so-called rational calculations *à la* LTCM turned out to be misleading in that their models assumed a stable equilibrium.

Thus, looking more objectively at the details of these crises, one is led to believe that they are testaments to the inherent instability of liberalised international capital markets where sudden reversals of market confidence cause periodic panics of differing magnitudes and durations. Also, it is interesting to note that both the Mexican and South Korean crises occurred immediately after these countries joined the OECD and began to conform to the code of capital liberalisation of the organisation. Indeed, after the substantial liberalisation of the capital accounts of five Asian countries – South Korea, Indonesia, Malaysia, Thailand, and the Philippines – around 1993, approximately US\$220 billion in private capital flowed into the region during the 3-year period from 1994 to 1996. The reversal of flows in 1997 due to the sudden shift in confidence amounted to roughly US\$100 billion. No country or region can tolerate a sudden shift in market sentiment from euphoria to panic that causes a huge reversal of private capital flows.

### **3. Washington Consensus**

In April 1990, John Williamson defined what he called the 'Washington consensus' in relation to conditionalities attached to Latin American countries at the time of the debt crisis of the 1980s. The consensus has served since then as guiding principles among G7 countries and international financial institutions in managing the global economy of the 1990s. Williamson identified and discussed the consensus on 10 policy instruments, but here, it suffices to say that the basis for the consensus essentially boils down to free markets and sound money. Latin American countries in the 1980s and earlier experienced hyperinflation a number of times, and it was absolutely necessary for policy authorities to control inflation. As a theory of hyperinflation, monetarism seemed to be the most relevant macroeconomic framework. Thus, it was only natural that monetarist thinking occupied centre stage for policy discussions in the 1980s in Latin American countries. The IMF's financial programming, which is quite monetarist in its theoretical orientation and is the cornerstone of the IMF's thinking, originated from the Western Hemisphere Department as early as the 1960s, but it was no coincidence that this department dealt with the American continent, and mostly Latin American countries.

Another development which served as a vehicle for the proliferation of monetarist thinking was the unification of Europe and the unification of European currencies in particular. The convergence of inflation rates and interest rates among countries was the key to the unification of currencies. Thus, anti-inflationary policies through the reduction of fiscal deficits and through sound monetary policies became one of 10 core elements in European unification policies. The key country in this unification process, namely Germany, was a country, like many Latin American countries, with a legacy of hyperinflation.

So far so good. However, if monetarism is enshrined as a universal theory of macroeconomic policy management rather than as a framework to cope with hyperinflation or potential hyperinflation, the problem could arise again. A director of the International Monetary Fund visiting my office a few years ago jokingly told me about an experiment he conducted at the Fund. He crossed out the name of the country from one of the consultation papers and circulated the document among experts in his department asking them to guess the name of the country which happened to be a relatively small, developing country in Asia. No-one was able to guess the name of the country from the paper, which was full of Washington jargon such as money supply, domestic credit, budget deficits and debt-service ratios.

The blind application of universal models, be they neoclassical or monetarist, to emerging economies seems to have been the predominant practice by international institutions or other public and private creditors. To some extent, emerging economies themselves accepted such unilateral imposition of dogmatic formulas, fearing a negative reaction from the market if they rejected such prescriptions. In this sense, the Washington consensus was not only the consensus in Washington, but represented the official position of G7 and other IMF and World Bank member countries, creditors as well as debtors, and market participants. This perfect co-ordination, on the other hand, generated mutually reinforcing, excessively optimistic and then pessimistic expectations about the country in question.

The Asian crisis seems to be a good example of this Washington-generated excessive optimism-turned-into-panic. Asia, particularly South-East Asia, in some sense, was an area well suited for global *laissez-faire*-type financial and commercial transactions. South-East Asia had been resonating with Washington-led globalisation with their own traditional structure of global commercialism. Between the 8<sup>th</sup> and 18<sup>th</sup> centuries, Asia was the centre of world commercial activities among Islamic, Indian, and Chinese merchants and later with Venetian, Dutch, and English merchants. Thus, the human networks for global transactions, both financial and commercial, were there, and overseas Chinese and Indians speedily adapted to newly emerging global markets. However, after the Asian crisis, we came to recognise that this resonance of Asian tradition with the Washington consensus had some serious problems.

To the extent that markets believed the pay-offs for implementing the Washington consensus in Asia were high, Asia euphoria continued and resulted in huge inflows of capital from 1993 to 1996.

One major aspect of the combination of Asian commercialism and financial and telecommunication globalism was that it tended to skim over the surface of economic structures and weaken manufacturing bases. Projects tended to be concentrated in the services and real estate industries, such as the construction of financial centres, rather than in basic infrastructure or manufacturing. Thus, education and on-the-job training of workers and organisational improvements in corporations tended to lag behind. Thus, as has been pointed out by many, including Paul Krugman, labour productivity and efficiency gains were not noticeable even in export industries which were affected by the appreciation of the real effective exchange rate. One-time gains in competitiveness due to low wages quickly dissipated, and skyrocketing costs for business offices also resulted in loss in relative competitiveness.

Thus, it is fair to say that the Asian crisis was not necessarily generated by the unilateral imposition of the Washington consensus by institutions in Washington, but was a result of worldwide euphoria about the market mechanism, including that of Asian countries, which created the bubble and eventually bursting of the bubble in this region.

However, it may be a different matter to argue that crisis management by G7 countries and international institutions after July 1997 in Asia was, at least initially, seriously flawed. The world establishment still believed in the neoclassical paradigm with a monetarist orientation, and that may have caused fiscal and monetary policy prescriptions that were too tight at the outset and allowed international institutions to impose unrealistic structural reforms which were politically and socially difficult to implement in the short run. Since I was personally involved in the process and agreed, although reluctantly, in the end to what was recommended, I am in no position to criticise others for what happened.

However, it is quite clear now that the Washington consensus needs to be replaced by a new paradigm which has been called a new international architecture. A first step toward the new architecture was taken at the Köln Summit, but it remains to be seen whether it will develop into a new paradigm for the new century or degenerate into 'minor interior decorating'.

#### **4. Toward a New Financial Architecture**

Let me now review the key points in the Report of the G7 Finance Ministers on the International Financial Architecture which was published in Köln on 19 June in this context of shifting from the Washington consensus to a new paradigm for the 21<sup>st</sup> century. Indeed, the new paradigm is still very abstract and lacks implementation details. Since, as it is often said, 'the devil is in the detail', it is possible that national and international bureaucrats at the Fund and elsewhere may substantially water down the content of this report in the implementation process. However, if that were the case, another major crisis would probably erupt to accelerate the transition in the direction suggested by this report. In any event, let me now discuss the details of the Report.

On the creditors' side, the Finance Ministers' Report says that the G7 will 'encourage private firms to strengthen their own risk management practices' and that

‘national authorities should ensure banking institutions in their countries implement adequate risk management practices in accordance with’ the Basel Committee’s recommendations in its paper on Highly Leveraged Institutions published early this year. At the same time, the Report notes that the newly established Financial Stability Forum will study a number of issues related to HLIs, including instability possibly caused by HLIs in relatively small financial markets. Enhancing supervision in offshore centres is also encouraged in the Report.

Furthermore, in order to ensure that ‘private creditors know that they will bear the consequences of their investment decisions’, the Report identifies the principles that govern debtor/creditor relationships and the tools that may be used to promote appropriate private-sector involvement in the resolution of crises, including an effective use of the ‘lending into arrears’ policy of the IMF. Legal and technical questions involved in implementing these specific approaches will be considered by the IMF by the time of the Annual Meetings in September this year.

On the emerging economies’ side, the Report proposes concrete measures in four different areas: exchange rate regimes, capital flows, financial systems, and debt management.

First, on exchange rate regimes, the G7 notes that ‘the choice of exchange rate regime is critical for emerging economies to achieve economic development’. It says, ‘We agree that the most appropriate regime for any given economy may differ, depending on particular economic circumstances’. For instance, ‘some emerging economies have sought to achieve exchange rate stability by adopting peg regimes against a single currency or a basket of currencies, often in the same region, of countries with which they have the closest trade and investment links’.

Adopting an appropriate regime is important since it allows overseas investors to properly judge the exchange risks they are taking. For the regime to reflect changing exchange risks, it must be continuously reviewed, so that it can be finetuned as ‘economic circumstances vary over time’. In this context, the IMF should play a more active role ‘to enhance the attention it gives to exchange rate sustainability in the context of its surveillance activities’. If a country intervenes heavily to defend an unsustainable exchange rate level, large-scale official financing should not be provided.

A simple hypothesis, the so-called ‘two corner approach’ has sometimes been suggested in international circles, including by officials. This school of thought assumes that only a completely free-floating regime or a currency board is viable. The Report does not share this view. Although it says that ‘countries choosing fixed rates must be willing...to subordinate other policy goals to that of fixing the exchange rate’ and that ‘arrangements institutionalising that policy can be useful to sustain a credible commitment to fixed rates’, the common understanding among the G7 countries is that the ‘arrangements’ referred to here are not limited to a currency board, but include various measures.

On capital flows, the Report recommends that ‘capital account liberalisation should be carried out in a careful and well-sequenced manner, accompanied by a sound and well-regulated financial sector and by a consistent macroeconomic policy

framework'. It goes on to explain the G7 consensus on controls on capital flows. It says: 'The use of controls on capital inflows may be justified for a transitional period as countries strengthen the institutional and regulatory environment in their domestic financial systems... More comprehensive controls on inflows have been employed by some countries as a means to shield themselves from market pressures. Such steps may carry costs and should not in any case be used as a substitute for reform... controls on capital outflows can carry even greater long-term costs... although they may be necessary in certain exceptional circumstances'.

It has sometimes been suggested by the press and others that Japan is advocating more controls on capital flows while other G7 countries are arguing for free capital movements. This is simply not true. If one carefully reads Finance Minister Miyazawa's speech of last December, it is clear that Japan's position from the outset was that maintaining market-friendly controls that would prevent turbulent capital inflows should be justified when a country wants to keep capital inflows at a manageable level according to the stage of development of its financial sector, and that there might be some cases that would justify the reintroduction of controls on capital outflows as an exception, for example, in order to avoid a bailout by IMF loans. As the Report shows, this stance is shared by all G7 countries.

As for financial systems, the Report calls for close co-ordination between the IMF and the World Bank when they give advice to emerging economies in the area of financial sector reform. It also welcomes commitments by the emerging economies of Asia and Latin America to take necessary steps towards the implementation of the Basel Core Principles for effective banking supervision.

In addition, the G7 thinks that best practices in debt management should be promoted, so that countries avoid too much reliance on short-term borrowing, particularly in foreign currencies. I expect that these principles will be discussed by the IMF Board in the near future.

It is now clear that the IMF was unable to meet the challenges posed by this 21<sup>st</sup> century-style crisis in several Asian countries. The biggest mistake was that the IMF prescribed for the countries 'medication' that had been effective for the old-style current account crises.

I have on several occasions discussed in detail what was inappropriate in the IMF programs for Thailand, South Korea, and Indonesia. I shall therefore not repeat my arguments today. Should you be interested, some of my speeches and the Minister's speeches can be found on the Ministry of Finance homepage on the Internet.

Of course, I firmly believe that the IMF should be at the heart of the international financial system. This is not to say, however, that the IMF can stay as it is now. In this connection, the G7 Report says: 'building upon the experience of IMF-supported programs in the financial crisis, the IMF should explore ways to further improve IMF surveillance and programs so that they better reflect the changes in the world economy, in particular potentially abrupt large-scale cross-border capital movements'.

The decision-making procedures of the IMF must be improved, too, so that Board members are better briefed by IMF staff and more closely consulted, as appropriate. The Report notes this point as well.

Incidentally, there are two new proposals in the Report concerning the governing structure of the IMF. First, it is proposed that the Interim Committee be given permanent standing and renamed the International Financial and Monetary Committee. Second, it is suggested that an informal mechanism for dialogue among systemically important countries be established within the framework of the Bretton Woods institutional system. I expect that the G7 and other countries will jointly consider these proposals with a view to reaching an agreement in the near future.

The operation of the IMF will also be improved by increased transparency, especially through enhanced disclosure of its Board documents and better internal and external evaluation efforts. The G7 Report supports this point, too.

## **5. Conclusion**

Indeed, what was accomplished in Köln was a first step, probably a modest first step. However, we need to recognise the importance of the fact that the G7 countries, including the United States, have agreed on the text of the Report. Needless to say, the G7 and non-G7 countries have to continue to work hard among themselves and at the IMF and World Bank Boards, so that our proposals can be implemented as quickly and as fully as possible.

Let me conclude by saying a few words about Japan's contribution to this important endeavour. I do not mean to sound self-congratulatory or boastful, but I think that Japan has led the discussions on the Architecture for the past two years or so. Many of Japan's proposals and arguments have been supported, criticised, and mulled over, and now eventually have found their way into the G7 Report. Of course, it is a team effort with other G7 and non-G7 countries, and not a zero-sum game where only the first advocate is rewarded. Nevertheless, I simply would like to emphasise that Japan will continue to strive to make these kind of intellectual contributions to resolve pressing issues in the world economy. I am sure you will see more of such contributions in the years to come.



## **Reference**

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# *Discussion*

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## **1. General Discussion**

Discussion centred on the implications of Sakakibara's paper for the choice of exchange rate regime and the role of the IMF.

It is often argued that the most successful exchange rate regimes are either freely floating or rigidly fixed. Yet not everyone accepted that the polarisation of regimes was desirable.

The inevitability of the polarisation of exchange rate regimes was also disputed. Intermediate regimes continue to flourish around the world, suggesting that flexibility in the mode of exchange rate management remains an option for economies which are functioning well and which have currencies that are not subject to extreme speculative pressure.

Preventative measures for currency crises were also discussed. Some felt that earlier exchange rate floating in east Asia may have relieved subsequent pressure on foreign exchange markets, while others felt that exchange rates could have been devalued and defended more vigorously at a lower rate.

The effectiveness of standstill arrangements – the suspension, or restructuring, of foreign debt repayments – was also discussed. One participant argued that standstills impose severe economic distortions. Another participant suggested that South Korea's experience casts doubt on the efficacy of standstills, citing BIS data that identified large capital outflows from South Korea in the first quarter of 1998, despite the introduction of a voluntary standstill at the end of 1997.

Be that as it may, official controls on capital movements might still be useful. As one participant observed, no economic regulation is invalidated simply because it is subject to imperfect compliance. Rather, the costs associated with evasion need to be weighed against the social benefit of the regulations which, in the case of a standstill on the repayment of foreign debt, may be a reduction in the extent of economic dislocation in the crisis country.

Institutional development was seen by some as central to the prevention of crises. It was argued that monetary authorities need to improve their communication with financial markets. More broadly, one speaker identified governance problems as a contributory factor in the east Asian crisis.

On a different tack, some participants supported Singaporean-style regulations which aim to limit potentially destabilising speculation from offshore markets.

Discussion about the IMF revolved around the political aspects of the Fund's approach to crisis management and containment. One participant argued that conditionality in IMF lending was too closely aligned with the interests of the United States and that it adhered too inflexibly to US economic orthodoxy. Indonesia was cited as a country that had suffered from this approach to crisis management. Other participants said that they were encouraged by what they saw as the IMF's increased sensitivity to the social and political ramifications of its rescue packages.

# From Asian Miracle to Asian Crisis: Why Vulnerability, Why Collapse?

Jenny Corbett, Gregor Irwin and David Vines\*

## 1. Introduction

The east Asian financial crisis has been truly remarkable: suddenly the ‘Asian miracle’ became the ‘Asian crisis’.

Existing models of *currency* crisis were powerless to explain what happened. This was not a ‘first generation’ currency crisis brought about by excess budget deficits, as in Krugman (1979). Nor was the crisis caused by a conflict between the austerity needed to defend a fixed exchange and the expansion needed to remove high unemployment, as in Britain’s forced exit from the ERM in 1992 (Eichengreen and Wyplosz 1993). To understand whatever happened to Asia, a new ‘third generation’ analysis has been needed, one which puts crisis in the financial system at centre-stage.

In the immediate aftermath of the crisis, debate raged about whether this third-generation crisis was a problem of panic and collapse, resulting from a shift from a ‘good’ equilibrium to a ‘bad’ one (Radelet and Sachs 1998), or, instead, a problem resulting from a worsening of fundamentals (Krugman 1998a). Krugman has generously conceded defeat:<sup>1</sup> ‘I was wrong’ (Krugman 1999a, p. 1). But a panic-and-collapse account of the Asian crisis needs to be underpinned by a story which

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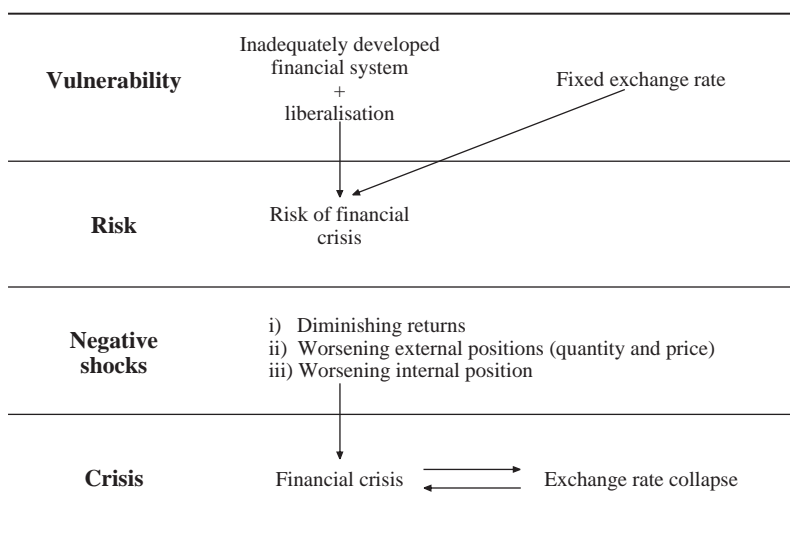
\* We acknowledge helpful comments from participants at the conference, and from those at a conference on *International Capital Mobility and Domestic Economic Stability*, held in Canberra on 13–16 July 1999. Earlier versions of some of the material in this paper appeared in Corbett and Vines (1999a; 1999b) and in Irwin and Vines (1999). We are grateful for comments from participants at the Warwick conference on *International Capital Markets and International Financial Crises* held on 24 and 25 July 1998; from those present at a seminar in the Department of Economics, RSPAS, Australian National University in September 1998, in particular Ross McLeod, Ross Garnaut, Bhanupong Nidhiprabha, and Peter Warr; and from Richard Agenor, Barry Eichengreen, and Marcus Miller. We would also like to acknowledge helpful conversations in Washington with Charles Adams, Stan Fischer, Timothy Lane and Paul Masson (IMF), Amar Bhattacharya and Joe Stiglitz (World Bank), and Caroline Atkinson (US Treasury). We have also been influenced by Nick Crafts (1998) and Paul Krugman (1999a). We are grateful too for help from two students of ours at Oxford University: Gordon Menzies and Hwe Loo Tan.

1. It is interesting that Michael Dooley was once an implacable opponent of multiple-equilibrium reasoning; one can read the paper which he wrote with Carl Walsh for this volume as a stimulating, and equally generous, recantation. Dooley’s previous views are well summed up as follows. ‘The absence of clear thinking on [the Asian crisis], and the failure to develop fundamentals-based models which illuminate it, ha[s] led to the growth of a plethora of multiple equilibrium models, of which there are too many, none of which are properly testable, not least because they do not ‘model’ the data. A return to fundamentals-based models really is advisable, partly in order to re-check whether any model exists which will actually fit the data. The modelling challenge now is to try to construct a new generation of ‘first generation’ fundamentals-based models which will meet this test. Multiple equilibrium models may be mathematically interesting. However they are almost certainly unnecessary’ (Global Economic Institutions 1998, p. 14).

explains both why the economies were *vulnerable* to a bad equilibrium and why that equilibrium was *so bad*. This paper sketches our own candidate for such a story.<sup>2</sup>

The broad argument advanced here takes forward ideas put forward in Corbett and Vines (1999a; 1999b), in Irwin and Vines (1999), and in forthcoming work with Peter Warr (Vines and Warr 1999). It is still work-in-progress. In essence the idea is that the Asian vulnerability to crisis was the *consequence* of the Asian miracle. We believe that it was the consequence of insufficient institutional development in the region during the ‘miracle’ boom period – an almost inevitable outcome of the flawed process of financial liberalisation which the miracle involved.<sup>3</sup> Two key flaws were, we believe, important. The first was the continuation, into the era of liberalisation, of a financial system containing implicit guarantees. The second kind was the continuation, into the era of liberalisation, of a pegged exchange rate regime. The argument proceeds in two stages, and is illustrated in Figure 1.

**Figure 1**



- We argue that vulnerability was created by liberalisation in the presence of a bank-based financial regime. In such systems there were implicit promises of a government bailout of the financial sector in the event of bad out-turns. Vulnerability meant that negative shocks were capable of precipitating a financial crisis, by creating obligations for the government to bailout the financial sector which were too large for the government to meet. This financial crisis precipitated a collapse of investment. The consequence of this was – in a way to be explained below – a large currency devaluation.

2. Dooley and Walsh (this volume) provide a fascinating picture of the ‘expanding universe’ of such stories; Krugman (1999a) provides a very particular version of one such story which we will use as a key piece of our own account.

3. We owe this argument, in such a stark form, to Peter Warr. See Warr (1999).

- We argue that vulnerability was *also* created by liberalisation in the presence of a pegged exchange rate regime. This regime led to an overhang of unhedged foreign-currency borrowing, because of the implicit promise that the exchange rate would not be devalued. As a result countries were exposed to the risk of a financial crisis whose key aspects were a large fall in investment, a collapse in the exchange rate, a large increase in the value of the overhang of unhedged foreign borrowing, and thus, through this additional route, bailout obligations for governments which they could not meet.

The layout of the paper is as follows. Section 2 clarifies the term ‘vulnerability’, and then sets out in detail the two stages of the argument summarised above. Section 3 summarises the negative shocks experienced by the region. Section 4 uses the material of Sections 2 and 3 to give a stylised account of the crisis. Section 5 briefly examines macroeconomic policy in the region, describing why policy both before and during the crisis increased vulnerability. A conclusion places the analysis in historical perspective.

## 2. Asian Vulnerabilities

The concept of ‘vulnerability’ is central to what follows. Dornbusch makes the meaning of this term vividly, if imprecisely, clear when he says ‘[v]ulnerability means that if something goes wrong, then suddenly a lot goes wrong’ (Dornbusch 1997, p. 21). In general terms the idea is bound up with non-linearity: a state of affairs is vulnerable when, even if there are only small changes in fundamentals, there can be a big shift to some sort of bad outcome.

There are many ways of making this general idea specific, as Dooley and Walsh (this volume) make clear.<sup>4</sup> In the next section we adopt a multiple-equilibrium interpretation. Seminal multiple-equilibrium analyses are to be found in Diamond and Dybvig (1983) and Obstfeld (1986; 1991; 1994; 1995). These papers analyse, respectively, bank runs and exchange rate crises,<sup>5</sup> and use very different kinds of analysis to analyse these two different problems. But they share the generic idea that one can locate vulnerability in multiple equilibria. Both papers present the following

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4. The vulnerability issue has been examined in an important pair of papers by Morris and Shin (1998; 1999). In the Morris and Shin models, strategic interactions between speculators can give rise to ‘break-points’: on one side of a particular level of the ‘fundamentals’ a system is safe, but immediately beyond this level the system spectacularly collapses. The essential insight in their model comes from a strategic complementarity between speculators: the expected profitability to one speculator from selling depends positively on the number of other speculators who are also selling. The onset of a crisis happens when the fundamentals evolve to the point where a ‘break’ happens. Morris and Shin are critical of the multiple-equilibrium analysis of vulnerability which we use; they argue (and they are right) that there is no good theory of why and when flips happen from one equilibrium to the other. They instead want to model vulnerability using their break-point ideas. Our problem with the Morris and Shin approach – with which we have much sympathy – is that so far it has been applied only in a model with very sparsely specified economic features. Including an endogenous risk premium – which is at the centre of our treatment – within the strategic interactions of their model at present looks as if it would be ferociously difficult. But if this could be done, then the resulting analysis could be very useful.
  5. See also Davies and Vines (1998) for the simplest possible multiple-equilibrium currency crisis model.

similar kind of ‘problem’. If participants in some shared activity (being bank depositors, or holders of a currency) expect a good outcome (no bank run, no currency crisis) then they may do things which bring this good outcome about. But if they expect a bad outcome (bank run, currency collapse) then they may do things which bring that bad outcome about. In these generically similar accounts, vulnerability consists of the possibility that the economy may flip from the good equilibrium to the bad one without *any* change in fundamentals. In what follows we are going to use the term vulnerability rather precisely to describe this possibility.

Effectively what we are going to describe for the Asian crisis countries is the following vulnerability: the possibility of a bad equilibrium in which there is a ‘bank-run’ on the country of which currency crisis is a constituent part.

## 2.1 Vulnerability in the financial system due to under-regulating and over-guaranteeing

Vulnerability was created in Asia by liberalisation of both trade and finance in the presence of an unreformed financial system.

The previous financial system in Asia was designed for the channelling of domestic savings into particular forms of investment and growth, largely through the banking system. Domestic credit was channelled to particular privileged domestic sectors and firms, in the pursuit of various types (and degrees) of export-promoting industrial policy.<sup>6</sup> It appears that much of the investment was covered by guarantees, either implicit or explicit. The process of credit allocation appears to have involved extension of bank loans, often under state direction, the collateral for which often appears to have been little more than expected revenue growth, or even just the name of the borrower. Many firms were thus very highly geared; they, and the banks which lent to them, were thus highly exposed to the effects to a revenue downturn; in aggregate the whole of the financial system was thus exposed. In countries experiencing very rapid growth the possibility of such a downturn was probably seriously underestimated. But also – importantly here – it appears that both the firms, and the financial system which lent to them, were implicitly guaranteed against such bad outcomes, as a quid pro quo for participating in this system of industrial policy.

Liberalisation had two effects on this financial system.

First, it increased the risk-adjusted return on capital, and led to an investment boom.<sup>7</sup> Pre-liberalisation economies can be characterised as capital-scarce, low-wage economies in which the risk-adjusted productivity of capital is initially low, even although capital is scarce. As a result, investment and returns to investment are low. But opening and reforming can change this. The process of trade liberalisation can lead to an increase in the rate of return on capital – even though the economy specialises in exports of labour intensive manufactures – as a result of achieving economies of scale in production for world markets, and as a result of technology transfer into the liberalising economy. Inflows of foreign investment in search of such high returns can then lead to stimulus to domestic investment, if foreign and

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6. Both Stiglitz (1996) and Rodrik (1999) discuss the ways in which such systems worked in Asia, and caution against forgetting just how well they worked.

7. See the similar discussions of this issue in Portes and Vines (1997), Dooley (1999) and Grenville and Gruen (this volume).

domestic capital are substitutes in the production function (see Vines and Warr (1999) for evidence on this). In addition, reform involves putting in place sound macroeconomic policies. These provide a guarantee of stability (or at least they are supposed to provide one, but see below) and this reduces the risk premium on investment.<sup>8</sup>

Second, liberalisation meant that this higher risk, lower-return, investment could be financed from abroad.

## 2.2 The risk of financial crisis

The key mistake, which led to the vulnerability of the financial system, appears to be that the old-style financial system continued into the new era of liberalisation. Accounts of what happened in the region suggest that financial intermediaries systematically downplayed the risks associated in the expansion of their balance sheets in the investment-led boom; they also suggest that implicit guarantees of the old-style financial system continued to be extended to much of the foreign-financed investment. This had the implication that the stock of implicit guarantees to the financial system rose markedly.<sup>9</sup>

8. McKibbin (1994) estimated the implicit reduction in the risk premium when Mexico joined NAFTA and showed that it was large enough to cause a significant boom.

9. There was much criticism at the RBA conference, questioning whether this characterisation of extensive guarantees is an accurate one. In response to this questioning we quote extensively from Krugman's anecdotal – but analytically precise – account of what we have in mind. (Krugman 1999b, pp. 85–89). Krugman considers 'a typical transaction [in which] a Japanese bank makes a loan to a Thai "finance company" for onlending for investment in Thailand. [As many such] loans [were intermediated by ... finance companies] the result was a massive expansion of credit, which fuelled a wave of ... investment...

What exactly were these finance companies? They were not, as it happens, ordinary banks: by and large they had few if any depositors. Nor were they like Western investment banks, repositories of specialized information that could help direct funds to their most profitable uses. So what was their reason for existence? What did they bring to the table? The answer, basically, was political connections – often, indeed, the owner of the finance company was a relative of some government official. And so the claim that the decisions about how much to borrow and invest represented private-sector judgements, not to be second-guessed, ring more than a bit hollow. True, loans to finance companies were not subject to the kind of formal guarantees that backed deposits in the US savings and loans. But foreign banks that lent money to the minister's nephew's finance company can be forgiven for believing that they had a little extra protection, that the minister would find a way to rescue the company if its investments did not work out as planned. And the foreign lenders would have been right: in roughly nine out of ten cases, foreign lenders to finance companies did indeed get bailed out by the Thai government when the time came.

Now look at the position from the point of view of the minister's nephew, the owner of the finance company. Basically he was in a position to borrow money at low rates, no questions asked. What could be more natural than to lend money at a high rate of interest to his friend the real estate developer, whose speculative new office tower might just make a killing – but then might not. If all went well, fine: both men would make a lot of money. If things did not turn out as hoped, well not so terrible: the minister would find a way to save the finance company. Heads the nephew wins, tails the taxpayer loses.

One way or another, similar games were being played in all the countries that would soon be caught up in the crisis. In Indonesia, middlemen played less of a role: there the typical dubious transaction was a direct loan from a foreign bank to a company directly controlled by one of the president's cronies... In Korea the big borrowers were banks effectively controlled by chaebol, the huge conglomerates that effectively dominated the nation's economy and – until very recently – its politics.'

This is the world which Krugman first analysed for the world in his by-now-famous early account of the Asian crisis (Krugman 1998a). He suggested that we think of a representative Asian country as having a downward-sloping demand curve for capital, and facing a given world interest rate, and that we model Asian ‘crony capitalism’ as implicit government guarantees<sup>10</sup> which ensure bailouts for investments that make losses. In the absence of such guarantees, risk neutral investors would add to the capital stock to the point where the expected value of the marginal product of capital had fallen to the given world interest rate. But in the presence of guarantees, investors would over-invest, to the point where the marginal product of capital *in the best state of the world* had fallen to the world interest rate.<sup>11</sup> The reason for this is that unexploited profit opportunities would remain if investment was not pushed this far: in a bad state of the world investors would stand to lose nothing (because of the bailout provision), but in a good state investors would make profits in excess of their interest obligations.

The trouble with Krugman’s story is that it is not necessarily a story of crisis: if taxpayers can be persuaded to go on paying for the bailouts then such a set-up can go on repeating itself. It certainly does not provide the basis of a story of panic and collapse. Michael Dooley’s prescient paper, presented originally in late 1993, provides the missing link.<sup>12</sup> Dooley argued that the Asian miracle, was, in effect, organised theft; and that it might well end in a crisis. He suggested that Asian governments had essentially set themselves up to pay out on the kind of guarantees which Krugman was to later describe (although he did not specify the downward-sloping demand for capital as Krugman would). But – in the crucial addition – he suggested that the amount available for such payouts was limited. Adjustment costs would mean that investors could not steal the money immediately. But in the end – he thought – they would set up enough projects with negative expected returns to walk away with the state’s capacity to pay out rewards. When that happened, there would be a crisis.

In a companion paper to this one, Irwin and Vines (1999), henceforth IV, show that when Dooley’s insight is added to Krugman’s analysis, the result can be the kind of multiple-equilibrium outcome which Radelet and Sachs focused on. Here we set out the argument of that paper informally.<sup>13</sup>

To get the essential idea across, IV set the story up as a series of static, one-shot games played over time. We model stochastic shocks in the environment, like

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10. In what follows we will normally omit the word ‘implicit’ in front of the word ‘guarantee’ but it is nevertheless to be normally understood as implied, in the manner of the previous footnote.

11. For our purposes we actually need to say less than this, merely that continuation of this form of financial system created guarantees which, if optimistic expectations were not fulfilled, would need to be honoured. It is often quite difficult to disentangle moral hazard from over-optimism.

12. This is forthcoming as Dooley (1999). It is discussed briefly at the end of the Dooley and Walsh paper for this conference.

13. The exposition which follows contains an exposition of a version of our model which we have not yet fully written out formally. We need to assume some informational asymmetry such that there is some possibility that the government will always pay out on its guarantees.



Krugman implicitly suggested that we need to. We do this because we think that the arrival of a negative external shock is an essential part of the story of the Asian crisis.<sup>14</sup> There are Krugman-style investors – financial intermediaries – who raise funds by borrowing from abroad. There is an unregulated financial system in which financial intermediaries can walk away from projects at no cost to themselves, if things go bad. There is a government which guarantees the loans that financial intermediaries receive from abroad.

In IV, we first clarify the way in which Pangloss outcomes depend *both* on an unregulated financial system – which leads to the ability of financial intermediaries to walk away from losses when things go wrong – *and* on the provision by the government of guarantees to lenders to cover the risk of financial intermediaries walking away. Obviously, if the government always fully honoured then they could prevent the interest rate charged by foreign lenders from rising, even although there is a risk of non-repayment. But we can also explore the consequences of the government having a limited capacity (or willingness, see below) to pay up on its guarantees if things go bad. Our lenders – foreign banks – have rational expectations, and so they build a risk premium into the price at which they are to lend to the country. They do this because, as Dooley suggests, there is a probability that the government will not be able or willing to bail them out.

We analyse the evolution of a crisis-prone ‘Asian’ economy as follows. Initially there are no guarantees, and lending by foreign banks is risky. This is because there is the possibility of productivity shocks to the economy which impact on the ability of financial intermediaries to repay their loans and the interest due; this is the only risk which we explicitly identify. As a result, the interest rate which they charge is high and the initial level of the capital stock is low. One day the government sets up shop offering to bailout people whose investments go wrong and to guarantee repayments to foreign banks. This means that at the given world interest rate there are now investment opportunities with positive expected profits, after allowing for the payment of guarantees. As a result capital gradually accumulates, moving towards the ‘Pangloss’ equilibrium, at which point the marginal product in the best state of the world would be equal to the world interest rate.

It is possible that this Pangloss equilibrium is the long-run equilibrium of the system: if the government was able – and willing – to afford all of the losses which would be incurred in bad states, and this is the case which we consider.<sup>15</sup> In our paper we characterise this long-run ‘Krugman equilibrium’ of the system and other parameters, and we show that it is unique.

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14. By doing this we answer in the affirmative the question posed by Kletzer (1999) in his comment on the Dooley paper. Kletzer called for formalisation of the paper in order to see if the Dooley story requires, for completeness, to be located in a stochastic world. We think that it does.

15. Alternatively if this implicit fiscal obligation were to become too large relative to the willingness-to-bailout, then rational foreign banks would build a premium into the interest rate which they demanded over and above the world interest rate; as a result the long-run equilibrium of the capital stock would be less high.

We are also able to explore the vulnerability of such an economy; i.e. to show that there is the possibility of a bad equilibrium as well as a good equilibrium. We make the realistic assumption that there is a ‘short run’ in this model, a period in which the stock of capital is fixed, due to adjustment costs, and we show that it is within this short run that this vulnerability applies. To fix ideas, first consider the good equilibrium at any level of the capital stock ‘on the way’ to the Krugman long run. Suppose that there is no risk of default and that the equilibrium interest rate is equal to the world rate. Let there be a productivity shock to the economy. Then, because we are in the good equilibrium, the government can afford to pay the guarantees, even if the shock is a bad one. This is why the interest rate can be in equilibrium at the low world level. It is possible that this good equilibrium is the only equilibrium, even in the short run. This will be the case if (i) the government is highly credible; and (ii) capital has not accumulated too far towards the Pangloss equilibrium, so that the stock of capital in this short run is still small, and so that the stock of outstanding guarantees is ‘not too large’.<sup>16</sup>

We then show that, if these two conditions do not hold, then there is also the possibility of another bad, crisis, equilibrium. If foreign banks believe that there is a range of productivity shocks sufficiently bad that the government might renege on its guarantees if such bad shocks materialise, then they will raise the interest rate (to an extent dependent, of course, on the probability of these bad shocks). But by doing so they increase the cost to the government of meeting its guarantees. It might be the case that if they do this there is a range of shocks sufficiently bad that the government has no choice but to renege on its promises. This validates the fear of the foreign banks, meaning that the crisis is an equilibrium.

In this set-up there is clearly, in the short run, a bad equilibrium analogous to the bad equilibrium in the bank-run models discussed at the beginning of this section. With low interest rates no productivity shock can be bad enough to cause the government to renege on its guarantees. But with sufficiently high interest rates it might become impossible for the government to pay up, thus validating the risk premium which is the reason for the high interest rates. In this model the crisis-equilibrium possibility results from the endogeneity of the risk premium on loans to the country. This risk premium enters non-linearly into the model, in such a way as to give the possibility of multiple equilibria, in exactly the same way that expectations of exchange rate collapse enter into the multiple-equilibrium currency crisis models.<sup>17</sup>

We can now give a stylised dynamic account of the evolution of a crisis-prone economy. Initially there are no guarantees; lending by foreign banks is risky; the

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16. These statements are true in the version of our model which we have not yet fully written up, in which there is some possibility that the government will always pay out on its guarantees.

17. Interestingly, this multiple-equilibrium feature of the model is a feature of the short run, but not of the long run. In the long run, high interest rates mean that much less capital is invested in the country, and this effect is strong enough to mean that the costs of paying out on the guarantees in the high interest case would be no higher than in the low interest rate case, thus removing the problem. But the realistic assumption that there is a ‘short run’ – in which risk premia can be instantly adjusted, but in which the capital stock is effectively predetermined – means that the model is one which is vulnerable to a multiple-equilibrium problem.

interest rate is high to cover the risk of non-repayment; and the level of the capital stock is low. After the introduction of the guarantee, the interest rate will fall to the world rate and the capital stock, and the level of debt, will begin to rise. Initially, if the government is at all credible, the stock of guarantees will be too low for the possibility of multiple equilibria to arise, and the economy will not be vulnerable to crisis. But, after a while, capital may accumulate enough for this.<sup>18</sup> Thereafter the evolution of the economy becomes contingent. If the economy remains at the good equilibrium each period then the debt stock will gradually increase and the economy will converge to the Pangloss-over-investment equilibrium. But at any point in time it can flip to the collapse equilibrium, which will create a financial crisis, whose key features are set out below. In this model, we cannot say whether the economy will, at any point in time, remain at a good equilibrium or flip to the collapse equilibrium. But the probability of such a flip can plausibly be asserted to be non-zero at any point in time, if such a flip has not already happened.

In this model, a financial crisis is not inevitable if the credibility of the government is great enough. If, however, the government is not credible enough, then crisis becomes inevitable, although the timing of crisis is unpredictable. Immediately following the introduction of the bailout policy the interest rate falls to the world rate, borrowing starts to rise, driven by Pangloss over-investment. If the good equilibrium continues to be selected then the debt stock will continue to rise towards the long-run equilibrium level. Both during this transition, and at the long-run equilibrium itself, multiple equilibria exist, with the possibility of a switch to the collapse equilibrium. Even though at any point in time the good equilibrium may be the most likely, we can never rule out the possibility of a switch to the collapse equilibrium.<sup>19</sup> The crisis is inevitable because, even if the probability of crisis at any particular time is low, a crisis must occur eventually with probability equal to one.

### 2.3 Understanding financial crisis

We can now clarify what we mean by a financial crisis in this model. A crisis occurs when the government is forced to renege on its commitment to bailout financial intermediaries. We may legitimately call this a ‘crisis’ for the following reason. The high-capital, high-debt, level of the economy has been driven by a reduction in the interest rate, as foreign banks expect a lower default rate on interest payments, given the government guarantee. But if the government ever reneges, one can argue that no such guarantees will in the future be credible. The consequence of this is that, following the renegeing, the equilibrium capital stock falls to a lower level. The consequence of this will be a collapse in investment.

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18. Where this point comes depends, of course, on the credibility of the government.

19. The good equilibrium will be more likely than the collapse equilibrium if we assume that discrete jumps in the interest rate are less likely than its continuation at the same level.

## 2.4 Vulnerability in the financial system due to the pegged exchange rate regime

Additional vulnerability was, we believe, created in the Asian financial system by liberalisation in the presence of a monetary policy regime based on pegged exchange rates. The important thing for the argument being advanced here is that it left the economy with a large outstanding stock of unhedged foreign debt.

It is easy to see why private investors should have failed to hedge; they were continually being reassured that the exchange rate quasi-peg was a core part of the macroeconomic strategy.<sup>20</sup> The effect of this failure to hedge should be obvious in the context of the story of crisis which has been told in the previous section. If for some reason the currency were to depreciate in the bad, crisis, equilibrium then this would raise the domestic-currency value of the stock of outstanding government guarantees to the financial system. That would make the meeting of those guarantees more onerous. The risk of the depreciation which would come if there were a crisis would thus increase the likelihood that the government would, in fact be forced to renege. The fact that the currency depreciates in the bad equilibrium thus make that bad equilibrium outcome more likely. It thus raises the vulnerability of the economy to financial crisis.

## 2.5 Interaction between currency depreciation and financial crisis

Why, and how much, does the currency depreciate in the bad crisis equilibrium?

We have described the crisis as an outcome in which investment collapses. This leads to a severe fall in aggregate demand. It seems natural to assume that the (real) exchange rate falls enough to restore aggregate demand into equality with aggregate supply, by promoting a sufficient increase in net exports to replace the collapsed investment. This is the assumption that Krugman (1999a) makes to close his model, and it is the assumption that Ozkan and Sutherland (1993; 1994; 1995) make in a series of papers. It is also what the Mundell-Fleming and Dornbusch models would suggest as the outcome of a 'neutral' monetary policy. Because there is a large fall (a 'collapse') in investment, this will lead to a large fall (a 'collapse') in the real exchange rate. Thus this assumption, taken in conjunction with the rest of the model, enables us to understand the very large currency depreciations which happened in the crisis countries.<sup>21</sup>

The effect of this depreciation, in the crisis outcome, is to modify the model described in the previous section in a crucial way. In that previous model, if the

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20. See Section 5 below.

21. This assumption clearly oversimplifies, and does not enable us to fully understand either the exchange rate fall that actually happened, or the fall in output which happened because time was required for net exports to replace investment. We will take up modifications of it in Section 5 below.

accumulated stock of guarantees is sufficiently small, or if the government is sufficiently credible, then no bad, crisis, equilibrium might exist. The economy is then not vulnerable – it is ‘safe from crisis’. But if all participants know that the currency will collapse if there was to be a bad outcome then this will make the cost of meeting outstanding guarantees that much larger (because it would increase the domestic-currency cost of these guarantees). That in itself might make the government unable to meet the cost of the guarantees. That is, it might mean that an economy which would have been safe is no longer safe.

This, it seems to us, is to get to the core of the interaction of currency and financial crisis in Asia.

Notice an implication of the assumption that we have made about the behaviour of the real exchange rate. By making this assumption, we have effectively removed monetary and exchange rate policy from the strategic choice-set of the government; it is not, we suppose, possible for the government to continue to hold the line with the fixed exchange rate. This is to oversimplify.<sup>22</sup> It certainly does not describe what happened in Hong Kong. Formally, it may be the case that holding the line on the exchange rate – although costly – might make it possible to prevent financial crisis.<sup>23</sup> But what we are assuming here, for simplicity, is that this is not a realistic possibility. Thus the only strategic choice for the government in our analysis is whether to pay up on its guarantees.

### 3. Negative Shocks

The financial crisis model just surveyed gives an important role to negative external shocks. We now provide a general review of such shocks for the Asian economies.

#### 3.1 Diminishing returns to investment

Well before the signs of crisis in the east Asian economies there had been a debate about their productivity growth record and whether there had been ‘too much’ investment. Krugman (1994) likened their capital-intensive growth to that of the Soviet Union.<sup>24</sup> He pointed out that ‘if growth in East Asia has been primarily investment driven’ then it was likely that ‘capital piling up there is beginning to yield

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22. We are thus abstracting from what is the focus of attention in second-generation currency crisis models.

23. It might also be the case that there is no half-way house. Once a financial crisis has broken, there may be no realistic alternative but to let the (real) exchange rate go. An understanding by investors of this fact may be the extra rod that breaks the camel’s back. This does *not* mean letting the nominal exchange rate fall without limit. See below.

24. In this he was quoting the work of Young (1995).

diminishing returns'.<sup>25</sup> Notice that such falls in the rate of return will not explain crisis, since response to them could have been smooth and gradual. But they do constitute a negative shock, albeit a slow-acting one.

### 3.2 Worsening external position

Current account deficits had increased in all the countries except Singapore, but the degree of problem varied. Thailand was the only country with a really large deficit (–8 per cent of GDP). Malaysia, at –6 per cent of GDP, had reversed a worsening trend. However it is impossible to read much from *ex post* current account deficits because it is not possible to determine whether these were the consequence of benign inward foreign direct investment, or high domestic absorption, or a negative external shock. In the face of this lack of conclusiveness about causality it is important to look for more direct signs of external weakness.

One explanation of this story notes that competitiveness, measured by real exchange rates, worsened in most countries. There are a number of possible reasons for this. It may have been a result of changes in nominal exchange rates, and in particular an appreciation of the dollar – to which most of these countries' currencies were pegged – relative to the yen. Or it may have been due to a fall in dollar export prices. Or it may actually have been due to rises in domestic costs and prices of the kinds discussed above. Also the evidence is itself inconclusive. Thus for many countries the amounts appear to have been small. The only countries where competitiveness appeared to have declined by more than 10 per cent from 1990 were Indonesia, the Philippines, and Hong Kong. In Singapore, Malaysia and Thailand the declines appear to have been close to 10 per cent. Korea and Taiwan appear to have had virtually no decline.<sup>26</sup> However these figures – which use relative prices in computing the real exchange rate – appear to miss the rise in domestic costs described above for Thailand (and there is a suspicion that they may do so for other countries too).<sup>27</sup>

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25. That interpretation is challenged by (among others) Radelet and Sachs (1997). 'Good economic policies and a favourable economic structure raise the returns to capital and thereby stimulate rapid investments in capital. Without [these] ... the returns to capital would be much less, so that capital accumulation would be much lower, and overall growth would be much slower as a result.' However they agree that, 'If ... most ... growth is the result of capital accumulation ... growth will slow down as capital deepening takes place (that is, as the capital-labour ratio rises sharply in the economy) since capital deepening will be associated with a declining rate of return to new investments. This is in fact the case in East Asia: as capital accumulation has progressed, rates of return on capital have declined, suggesting that indeed both capital accumulation and growth will taper off in the future'. Radelet and Sachs (1997) cite OECD data that the 'rate of return on capital in Korea declined gradually from around 22 percent in the mid 1980s to about 14 percent in 1994. In Singapore, a comparable indicator – the rates of return on US foreign direct investment – fell from 27 percent in the late 1980s to 19 percent in the mid 1990s. In Hong Kong and Taipei, China rates of return fell from around 21 percent to 15 percent. While these declines do confirm the neoclassical prediction of declining returns to investment, and are consistent with the rapid accumulation of capital documented by Young ... the important point is that they are still well above the world-wide average returns on US foreign direct investment of 11 percent'.

26. These figures are taken from IMF (1997).

27. See Warr (1999).

Other versions of the story seek more specific explanations. One of these looks to the weakness of the market for electronic goods, perhaps due to large increases in supply from the countries under consideration. Another version of the negative shock story attributes it to market crowding as a result of increased exports from China. Here the idea is that, until the mid 1990s, China had internal difficulties (and perhaps also an overvalued exchange rate) which held back export expansion. The resolution of those difficulties (and the devaluation of the yuan in 1994) enabled China to increase exports of manufactures competitive with those produced in the Asian economies. This had effects equivalent to a negative productivity shock in the other Asian tigers, which faced falling quantity demand and/or a falling price for their exports. Yet another variety of this story notes the prolonged recession in Japan, and the shock caused by the devaluation of the yen. Japan acts not as an export competitor with these countries but as an import market, and so recession in Japan has acted as a significant export-market shock for these countries.

Perhaps most persuasively, it does appear that almost all countries in the region experienced significant declines in both export revenues and in export volumes in 1996. (IMF *World Economic Outlook*, October 1997, Figures 7 and 8.) This does appear to be significant evidence of a negative external shock in that year, although it does not discriminate between the origins of this shock.

#### **4. Financial Collapse Throughout Asia in 1997**

It appears that, for all of the Asian economies, the negative shocks which were described in the previous section led to problems for the financial system. The negative shocks reduced the value of the assets of the banking system, requiring government bailouts for the financial system. This clearly led to an onset of financial crisis in all countries, long before the summer of 1997. In both Thailand and Korea, the stock market had begun to fall by 1995 and by 1996 large swathes of the economy were in trouble.

It is our interpretation, that but for one feature of the circumstances, all the Asia-Pacific economies might have withstood the need for these bailouts without the financial crisis turning into a financial collapse. We argue that it was the interconnection of currency and financial crisis that led to this.

We begin with Thailand. There, particular vulnerability appears to have resulted from a real appreciation which was a feature of the boom phase. (See Warr (1998; 1999)) and also the discussion in the next section.) The negative shocks were already, by 1996, causing recession. The government was committed to a fixed exchange rate, departure from which, through a more expansionary monetary policy, would have involved a loss of credibility. Implicit in our discussion in the previous section is the argument that the costs of holding onto the peg became completely prohibitive. The chain of reasoning is as follows. Foreign investors came to foresee the possibility of a bad equilibrium in which the currency would devalue and so in which the burden of the foreign debt would become crippling. As a result, they imposed a risk premium which made the guarantees too costly to honour. That made investment collapse, which made it inevitable that the currency would have to collapse too, for,

otherwise the fall in output would be too great. This in turn validated investors' fears. This is a story about a 'flip to a bad equilibrium' happening in the financial system; a flip which is intrinsically entangled with the currency depreciation.

It is thus possible to argue that even in Thailand – where the Asian crisis first hit – the situation was quite different to Britain's exit from the ERM in 1992. A second generation analysis of that other crisis locates it in a choice by the government between two evils: the loss of credibility due to the collapse of the currency peg versus the unemployment consequences of continuing with the peg. Here the key choice was, we argue, between whether to pay the guarantees to the financial sector or not; the fall in the exchange rate fall was 'collateral damage' from the decision not to do so.

In the other crisis economies the negative shock in 1996 does not appear to have been as serious as that to the Thai economy. But our analysis suggests that of more importance than the size of negative shocks was the vulnerability to a bad equilibrium. One can then locate the onset of crisis in Korea, Indonesia, Malaysia, and the Philippines in a process of contagion: a flip to the bad equilibrium to which the economies were vulnerable, in response to the 'wake-up call' (i.e. signal) from Thailand that this was a possible outcome. (See the paper by Masson, in Agenor *et al.* (1999), and the discussion of that paper by Weber, both of which argue this point persuasively.)

Notice that the effect of currency depreciation in this situation, in which there are large foreign borrowings denominated in foreign currency, appears to be inherently non-linear. If it is small enough it acts in an 'orthodox way' – helping to relieve the macroeconomic downturn created by vulnerability and negative shocks. But if the devaluation is large enough to trigger the need for bailouts which cannot be honoured, then the effect is clearly, and potentially massively, negative. It is possible to argue that the critical policy mistake in the handling of the crises was to allow a currency depreciation which became sufficiently large to breach this non-linear threshold. But our view is that it was not at all well understood where this threshold was, or even that it existed. And for the Indonesian, Korean, Philippines and Malaysian economies hit by contagion it became almost impossible to prevent degrees of currency depreciation which, *ex post*, appear to have breached this threshold.

There is some circumstantial evidence in favour of this interpretation for Korea. Private conversations with one of the major rating agencies suggest that in rating, for example, Korean banks, the agencies knew that the banks were in financial difficulty but did not downgrade ratings because they still regarded the government commitment to bailout banks as firm. But in making this judgment they took into account the growing cost of the bailouts only so far as it concerned the cost of injecting enough capital to shore up the banks' adequacy ratios. This they considered to be well within the government's budget capacity. It appears that if the rating agencies had been aware of the possibility of a large currency depreciation and had had to factor in the cost to the government of honouring all of the banks' foreign liabilities in depreciated currencies then they would have considered that the budget deficit could not have



stood that. That binding budget constraint would, it appears, have led to a revision of their estimate of the likelihood of support for the banks and a consequent down-grading of bank ratings.

The above argument suggests the following tentative hypothesis about the Asian crisis. Estimates of the financial fragility of the banking sector in the absence of (before) the currency crisis appear not to have been enough to trigger a crisis. Markets (or at least the rating agencies which supply them with information) do appear to calculate the probabilities of banks' rescue and consider government budget constraints important in that. These probabilities change when budget constraints change. Estimates of sovereign risk may well take into account the likelihood of bank failure, but in this case it appears that the currency crisis had to come first before the failures became so large as to threaten the guarantees to the financial sector and create financial collapse. We might be able to assume that the style of analysis was similar in the markets themselves. Information about how one aspect of crisis – the currency crisis – is likely to affect another aspect of crisis – the financial crisis – may not have been perfect, and understanding this may play a crucial role in explaining how the crisis developed.

Notice how complex the contagion process becomes when there is the possibility of collapse of both the financial system and the currency. The mere fear of financial crisis and its consequences may be enough to provoke an expectation of currency depreciation. If that is strong enough to make the currency peg unsustainable then the currency depreciation can trigger the financial collapse which had been feared. This effect is *additional* to the way, discussed in Section 2, in which the fear of financial crisis can lead to a rise of the risk premium which in turn causes the financial crisis.

## 5. Macroeconomic Policy and the Crisis

### 5.1 Pre-crisis macroeconomic policy, the fixed exchange rate peg

We have not yet discussed macroeconomic policy, other than the fact of the fixed exchange rate peg. We agree with Grenville and Gruen (this volume) that the problems of the Asian crisis countries were *real* problems, and cannot just be put down to mistakes in *monetary* policy, or even to macroeconomic policy more generally. Nevertheless serious mistakes were made. The mistakes were most serious in Thailand, and we will discuss the Thai case, which is the one with which we are most familiar. The aim is to show that these mistakes increased the vulnerability which we have been discussing.

At the time the dangers involved were not understood. This is illustrated by a paper on Thailand published by the IMF in 1990 (Robinson *et al.* 1990) which described – with admiration – how Thailand's macroeconomic framework had been jointly based upon a fixed nominal exchange rate (to provide the necessary nominal anchor) and fiscal prudence (to make room for its export-led expansion). Such a

strategy, it was said, had served Thailand very well through to the late 1980s, and had formed the basis for behaviour which was regarded as little short of miraculous. Praise for this strategy was strongly echoed in a Fund paper published *as late as December 1996* (Kochar *et al.* 1996).

In retrospect it seems that there were two key mistakes.

The first mistake was to base the conduct of monetary policy around a pegged exchange rate regime. We have already seen how this created the time bomb of a debt overhang. But it also threw macroeconomic policy off course. The textbook Mundell-Fleming model shows that the trilogy of fixed exchange rates, autonomous national monetary policy, and open international capital markets is inconsistent.<sup>28</sup> What had happened in the decade between 1985 and 1995 was the opening of Thai capital markets to capital inflows, of a kind discussed in the previous section. Nevertheless, the Thai authorities tried to damp the boom in the first part of the 1990s by raising interest rates, even though the Thai baht was pegged to the dollar. The effect was to stimulate the unhedged foreign currency borrowing which created such a problem, as Thai companies and banks borrowed abroad at lower interest rates in dollars, without succeeding in successfully dampening the boom in the economy. Similar errors appear to have been made in Indonesian and Korean macroeconomic policy, although to a much smaller extent. It appears that policy authorities were continuing to use an approach to monetary policy which was only appropriate to the earlier period of much lower capital mobility.

The second mistake is less well understood and is to do with fiscal policy. In Thailand the fiscal stance appeared, by conventional deficit measures, to be very tight. A budgetary law, which constrained any year's fiscal expenditure to lie within a small margin above the previous year's tax revenue, prevented the emergence of fiscal deficits, and from the late 1980s produced small surpluses of 2 or 3 per cent of GDP because revenue was growing so rapidly. (See Warr and Nidhiprabha (1996)). Yet fiscal balance, or even surpluses of this size, may be an insufficiently restrictive policy when a country experiences a large boom, if monetary policy is immobilised by a fixed exchange rate.

The experience of Thailand, and of other Asian countries, in the past decade has shown that a macroeconomic boom is precisely what one would expect at a time of liberalisation.<sup>29</sup> We have already discussed the likelihood of an investment boom in Section 2. In addition, this is likely to be accompanied by a consumption boom,

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28. Many other countries have, before the recent experience in Asia, failed to learn this lesson. For example, monetary policy in the United Kingdom in the late 1980s and early 1990s contained contradictions of a very similar kind. An attempt was made both to control inflation and to peg the exchange rate at a low level in the mid 1980s. Then an attempt was made both to promote a recovery from recession and to maintain a fixed exchange rate within the ERM link in the early 1990s. Both attempts ended in fiasco.

29. Portes and Vines (1997) argued strongly, in a paper written during 1996, that this was the lesson to learn from the Mexican experience of 1994/95. Jeffrey Sachs had been saying this since immediately after the Mexico crisis. (See Sachs (1995; 1996).) See also the similar discussions of this issue in Dooley (1999) and Grenville and Gruen (this volume).

because liberalisation characteristically involves the removal of liquidity constraints.<sup>30</sup> Thus an overall boom in demand is the particular problem which macroeconomic management is likely to face in an emerging, liberalising, economy. It is our view that the inflexibility of monetary policy imposed by a fixed exchange rate is dangerous in these circumstances, unless fiscal policy can be extraordinarily contractionary.

The way in which this is dangerous has been documented by Warr (1998; 1999) and Vines and Warr (1999) for the case of Thailand. Warr shows how the boom which preceded the crisis was not choked off by an appreciating exchange rate precisely because of the exchange rate peg. He then argues that the consequence of this boom was that cost price increases were unchecked, making the export sector increasingly uncompetitive. This is an intrinsically sequential story. It suggests that, under fixed exchange rates and inflexible monetary policy, there will be an excessive investment boom (and perhaps also consumption boom) in an initial phase, and that the consequences will be an erosion of the profitability of the investment projects in a subsequent phase.<sup>31</sup> In this phase difficulties will emerge if there are negative external shocks.

With a commitment to a fixed exchange rate the problems which emerge in the period following the boom cannot be alleviated by means of subsequent currency depreciation if the value of the currency peg is to be maintained. In this subsequent phase there is an increased risk of financial crisis, in the face of exogenous shocks. Thus it is possible to say that the maintenance of a fixed exchange rate increased the vulnerability of the Asia-Pacific economies, and particularly of Thailand, in the face of any significant worsening of the external environment.<sup>32</sup>

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30. In addition, the investment boom is likely to be associated with an increase in stock market valuations, and that can add to the forces causing a consumption boom, as consumers who are more wealthy spend some of their gains.

31. This sequential argument makes two realistic assumptions. The first of these is that wage and price adjustment lags behind output, with the dual implication that wage and price adjustment fails to choke off the boom in the first period, and that wages and prices rise so far in the second period as to throw the boom into reverse. The second assumption is that investors are not sufficiently forward-looking as to see what is coming and so damp investment in the first period. Irwin and Vines (1995) developed this argument in some detail in an unpublished paper on the Mexican crisis.

32. Notice that financial crisis could also be precipitated simply by the downturn which follows the ending of the boom itself, for example as the stock market falls, without the 'trigger of a negative external shock'. It is thus also possible to argue that the fixed exchange rate rendered these economies macroeconomically vulnerable in a different way: leaving them exposed to a process of boom and bust, in which the bust caused financial crisis. That is the story proposed by Aghion *et al.* (1999). (That paper has flexible prices; the stickiness comes from 'time-to-build' in the supply-side effects of capital investment. For a while, increases in investment lead to increases in supply which can go hand-in-hand, sequentially, with increases in collateral and so further increases in investment. But eventually rises in non-traded-goods prices squeeze profitability and cause a reverse.) Edison, Luangaram and Miller (1998) have also produced a model to analyse this issue, concentrating on the possibilities for boom, and subsequent bust, in the price of a non-traded asset, namely land.

## 5.2 Macroeconomic policy during the crisis, and the interest rate defence

Our theme in this paper has been vulnerability, and the interconnection between this and the exchange rate collapse which was associated with a shift to a bad equilibrium. In this section we ask whether vulnerability was increased by a macroeconomic policy which led to larger currency depreciations than were warranted, or conversely whether, in the crisis countries, post-crisis exchange rate collapse could have been smaller and thus vulnerability lessened.<sup>33</sup>

A starting point is the observation that, when the crisis set in, it appears that markets had no clear idea what would replace the exchange rate peg as the nominal anchor, nor how this replacement anchor would work. Vines (1999) characterises this as a circumstance in which markets had no clear idea whether, after the crisis set in, the authorities were attempting to stabilise prices around the level which would involve little or no ultimate slippage of the price level or whether, instead, the authorities had become reconciled to having 'let prices go'. If this was so, Vines argued, then markets had no clear idea whether the long-run equilibrium exchange rate was that consistent with no slippage or that consistent with huge slippage. Without that guidance, it seems that markets took the view that what they were being offered was – on average – something in between, namely large slippage. That is why, we argue, we had such large nominal currency depreciations – an outcome larger than would have been sufficient to bring about the change in the real exchange rate discussed in the previous section without any rise in the domestic price level.

Here we ask whether there might have been ways of avoiding this.

One candidate for this is the strategy of inflation targeting. The important thing about such a strategy is that it effectively operates in two dimensions. The instrument of monetary control is the interest rate. But there is also an announced target trajectory for prices which it is the intention of monetary policy to achieve; it is the task of interest rate manipulations to steer prices onto this trajectory. The target trajectory is a critical part of this strategy. It is useful for domestic price and wage setters. It is also crucially important for the foreign exchange market in that it provides a partial anchor for the long-run nominal exchange rate.<sup>34</sup>

The more quickly something like this second element of the strategy can be put in place, the more quickly can overshooting of the exchange rate be avoided.

Eichengreen *et al.* (1999) have examined the conditions necessary for the introduction of such a strategy. Institutional conditions include the creation of an independent, or quasi-independent, central bank with the remit to pursue price stability as its central objective. There must be good data for a chosen measure of

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33. This point has been pressed vigorously by Stiglitz. (See Furman and Stiglitz (1998) and Stiglitz (1999).)

34. Such a target cannot entirely remove uncertainty about the long-run nominal exchange rate. This is because it does not remove uncertainty about the long-run real exchange rate, but only uncertainty about the price level at which this real exchange rate will be reached.

inflation, and also there must be the analytical capacity to make forecasts of this, and to project the difference that interest rate changes would make to out-turns for it. There must be operational capacity to manipulate the discount rate in a financial system which has been structured – through the terms of access of commercial banks to the discount window – so that this manipulation sets the base of the structure of market interest rates. And finally, the central bank must be widely believed to be accountable for the achieving of the inflation target, and the way in which it makes its decisions – feeding back from gaps between the inflation forecast and the inflation target to changes in the discount rate – must be transparent and must be believed to be so.

Of course all of this takes time to achieve. The idea that it could have been quickly available as a strategy for the crisis countries is wildly unrealistic.

Nevertheless, the question remains as to whether the excessive fall in the exchange rate could have been staunched by some reorientation which involved elements of an inflation target strategy. As it was, in the absence of the preconditions just described, the authorities, with Fund advice, cast their monetary policy strategy explicitly in terms of defending the exchange rate, rather than in terms of stabilising the price level, on the key grounds that the former involved responding to a day-by-day observable variable whereas the latter would have involved responding to developments in a variable which policy could not manipulate in a well-understood way.<sup>35</sup> Nevertheless they were unwilling to give any precise hostages to fortune about the exchange rate. As a result they were unwilling to commit themselves to any more than ‘achieving exchange market stability’. This gave market participants very little to base their forecasts on. In the absence of this, as the above example shows, the achieving of exchange stability can come at many different exchange rates. The one chosen depends upon the market’s perception of the authorities’ intentions. During the crisis months, it seems that there was a process of repeated testing of the authorities’ position at lower and lower exchange rates. We believe that there would have been a significant gain in instead revealing the authorities’ intentions to achieve low and stable inflation after the crisis and in describing – in broad terms – how interest rate policy would be constructed so as to achieve this objective. This would have avoided giving the markets the alternative hostage to fortune of trying to defend the current rate in the market. It would have given market participants unhindered freedom to take the spot rate lower as they chose. At the same time market participants would have been given the rough expectation that lower exchange rates would be associated with higher (nominal) interest rates and also with capital gain as the currency returned towards levels more consistent with the inflation strategy.

The argument here is that such a policy could have lessened vulnerability during the crisis.<sup>36</sup> In particular if this strategy had succeeded making possible a smaller fall in the exchange rate in some of the crisis economies then this could, arguably, have lessened contagion to the other economies.

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35. See Lane *et al.* (1998) for a defence of the IMF’s advice during the crisis, and also Fischer (1998; 1999).

36. McKibbin’s otherwise compelling empirical account of the overshooting of exchange rates in the crisis countries (McKibbin 1998; McKibbin and Martin 1998) does not address this issue.

## 6. Conclusion – a Historical Context

The present paper has offered a framework for understanding the Asian crisis. It has argued that the crisis was a consequence of vulnerability caused by insufficient institutional development in the region during the ‘miracle’ boom period. We have claimed that two key flaws were important. The first was the continuation, into the era of liberalisation, of a financial system containing implicit guarantees. The second kind was the continuation, into the era of liberalisation, of a pegged exchange rate regime. Of course our account oversimplifies. It would be possible in conclusion to list what was missing from it.<sup>37</sup>

Instead of doing this we want to step back a little and amplify the insufficient-institution-development point. We do this because we have come to see the crisis as a problem relating to the transition between two types of capitalism.<sup>38</sup>

There is, one might argue, what might be called ‘Gershenkron-capitalism’: an economy which is largely closed, in which what is produced and consumed is all pretty basic stuff. In such economies the ‘Asian values’ of thrift and hard work are of central importance, and what really matters for rapid growth and development is the mobilisation of domestic savings; efficiency, variety, and quality are all second-order virtues, and a modern financial system is probably unnecessary. This is what the Asian economies looked like in their early growth phase, up to the middle 1980s, before the ‘Asian miracle’ was a household phrase.

Then there is capitalism as we know it in the most advanced OECD countries – open, consumer-oriented, quality conscious, and subject to globalising competition in goods markets, and especially also in capital markets. No two OECD countries are identical, of course. But there is a generic similarity at this level of generality.

How can a country graduate out of the first category and into the second, as the Asian economies attempted to do from the mid 1980s onwards?

Without care, the growth literature can mislead here. It can be read as suggesting that what is involved is merely a process of capital accumulation, leading to ‘catchup’ which is continuous and smooth. Instead we would argue that the transition between these two forms of capitalism is a traverse which is difficult to manage. There are important and deep problems of institution design in the financial sector, and in macroeconomic policy-making, which must be managed to make this traverse go well. Without the necessary reforms, countries are vulnerable to crisis.

Viewed from this broad sweep, we can say that the Asian crisis countries made serious mistakes on the traverse. Others, e.g. in Latin America, have made mistakes before. The warning is that others, in the future, will be at risk of doing so again.

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37. Dooley and Walsh (this volume) provides a very good check-list of all the things that are missing.

38. We owe the idea in this conclusion to Crafts (1998). He does not quite use our labels, although they are implicit in what he says.

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# *Discussion*

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## **1. General Discussion**

Most of the discussion revolved around the nature and extent of implicit guarantees in the east Asian economies, and whether they had exercised an important influence on capital inflows to the region.

It was pointed out that implicit official guarantees exist in virtually all financial systems, since no government can credibly commit itself to remaining passive in the face of a crisis. The question then is not whether there were any implicit guarantees in east Asian financial systems, but whether or not those guarantees were abnormally comprehensive. Some participants argued that they were not and that the analysis by Corbett, Irwin and Vines had exaggerated their importance.

For instance, there was disagreement about the extent to which the fixed exchange rate regimes in east Asia provided an official guarantee of exchange rate stability to international investors. Some argued that governments which are expected to defend a fixed exchange rate socialise at least some of the costs of hedging exchange rate risks. To that extent, they reduce the private costs of hedging and so provide an implicit, if partial, guarantee of the foreign currency value of capital inflow. Others argued that the implicit guarantee was so weak as to be almost non-existent. Fixed exchange rates were maintained on a 'best endeavours' basis only: there was always the possibility that they would be adjusted. Well-informed investors in Indonesia, for example, would have been aware of the sizeable discrete devaluations that had occurred on a number of occasions in the past.

In a different register, one participant reasoned that capital flows to east Asia had the hallmarks of an asset-market mania, and that such manias often occur without official guarantees, implicit or otherwise. Indeed, it is very difficult to distinguish between the 'excessive' investment that occurs as a result of implicit guarantees and that which arises as a consequence of a market-driven euphoria.

Another participant suggested that the language of moral hazard and implicit guarantees is unhelpful when trying to understand the policy-setting process in east Asia. Many of Thailand's problems, for example, were identified as simple policy mistakes rather than deliberate, or even unconscious, efforts by policy-makers to underwrite foreign investment.

Against this, it was argued that investors could have expected support from official international institutions in the event of a crisis. Specifically, the international bailout of Mexico may have set a precedent and generated a perception that the IMF would support foreign investors in the event of a systemic east Asian crisis. If so, there may have been a rationale for the unhedged, and seemingly excessive, flows of capital into east Asia in the mid 1990s.

Not all were convinced that the IMF had been a source of moral hazard. For example, it was claimed that an IMF bailout of South Korea had been unforeseeable

prior to the crisis. Nevertheless, there was considerable debate about the role of the IMF in assisting economies suffering from acute capital flight, and it was argued by some that a diminished role for the Fund as lender of last resort would contribute to an easing of moral hazard and perhaps reduce the need for conditionality in its lending. The contrary view was also put: that the promise of Fund assistance eases the burden which national governments face in having to hold high levels of reserves in order to defend their financial systems against volatile capital flows.

It was also noted that the extent of official financial support varied considerably across countries: it was much smaller in east Asia than it had been in the 1994/95 Mexican crisis. This led some participants to the view that the moral hazards associated with bailouts were diluted by the fact that investors did not know the extent of their guarantees.

# Reforming the International Financial Architecture: Limiting Moral Hazard and Containing Real Hazard

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Michael Mussa\*

## 1. Introduction

During the past two years, financial and economic crises have engulfed most of the world's emerging market economies, and have inflicted severe damage on many of the most successful of these economies. Unlike previous crises that have deeply affected a wide range of developing countries, such as the debt crisis of the 1980s or the global Depression of the 1930s, the recent crises have not been associated with major difficulties in most of the industrial countries. While domestic macroeconomic policy imbalances were a key factor in some of the crisis countries, this was not so in others. Serious structural weaknesses, especially in financial sectors, were a common factor that heightened vulnerability to, and magnified damage from, the crises in the most affected countries. However, both in the build-up of conditions that preceded the crises and in their subsequent spread across many emerging market economies, there were clear signs of difficulties that transcended the bounds of any individual economy. That such deep crises would simultaneously afflict such a wide array of generally successful economies suggests that something is seriously wrong with the functioning of the international financial system.

This perception has led to a global effort to reform the architecture of the financial system.<sup>1</sup> This complex, multifaceted effort, involving actions and proposals in many areas, is usefully summarised in *A Guide to Progress in Strengthening the Architecture of the International Financial System* which is available on the IMF web site ([www.imf.org](http://www.imf.org)). If this effort is substantially successful – let me emphasise the *if* – then it should go a considerable distance in helping to avoid or ameliorate crises of the type that have recently afflicted many emerging market economies. However, there is one central issue in the international financial architecture where the debate has not effectively been joined – or rather where one side has had it pretty much its own way in support of a conclusion that is fundamentally in error. This issue is the appropriate magnitude of, and conditionality associated with, international financial support to countries experiencing, or threatened by, massive capital outflows.

On this issue, there has been a great deal of criticism of the large international financial support packages – the preferred term is ‘bailouts’ – that have been provided to some emerging market countries, beginning with Mexico in 1995, and

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\* The opinions expressed in this paper are those of the author and do not necessarily reflect the views of the International Monetary Fund. A pressing alternative engagement prevented Michael Mussa from attending the conference. He nevertheless contributed this paper.

1. For a useful and balanced discussion of many of the reform proposals, see Eichengreen (1999).

continuing with Thailand, Indonesia, Korea, Russia and Brazil in the past two years. The main complaint is that such large financial support packages generate substantial ‘moral hazard’ which encourages both emerging market countries and their creditors to undertake imprudent risks that ultimately materialise in damaging financial crises. Thus, the argument goes, the international support that is intended to ameliorate the effects of crises is actually the fundamental reason – or at least a key reason – why we have crises in the first place. The solution is to eliminate large international financial support packages, or at least to limit them to those few countries that meet exceptionally high standards for prudent policies.<sup>2</sup>

In this paper, I will argue that, correctly understood, the problem of *moral hazard arising from international financial support* has been greatly exaggerated. Financial crises, such as those that have recently afflicted many emerging market economies, do not occur primarily because of imprudent risk-taking induced by expectations of international financial support. Rather, there is a good deal of *real hazard*, resulting both from the internal problems and deficiencies of many emerging market economies and from the functioning of the international financial system, that manifests itself in severe financial crises that tend to spread contagiously across these economies. International financial support, which is conditioned on the adoption of appropriate remedial policies and which sometimes may be needed on a large scale, provides an important public good for the global economy in helping to contain these real hazards. The problems of moral hazard that are inevitably associated with such efforts are modest in comparison with the real hazards that such efforts seek to ameliorate.

## 2. Real Hazard and the Proper Role of International Support

Before taking up the concept of moral hazard and assessing its relevance for international financial support operations, it is important to examine the real hazards to which emerging market economies are exposed in their interactions with the modern global economic and financial system. In this connection, it is also important to discuss the desirable role of international financial support in dealing with real hazard.

The experiences of emerging market economies during the crises of the past two years leave no room for doubt or dispute that they are subject to very large risks arising from their interactions with the global economy. In particular, the estimates for growth for Indonesia, Korea, Malaysia, and Thailand in the latest *World Economic Outlook* provide a basis for gauging cumulative output losses for these

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2. The IMF’s new Contingent Credit Line (CCL) facility follows the logic of pre-qualifying countries with exceptionally prudent policies for substantial support in the event that they are victims of contagion from crises originating elsewhere. This new facility may well prove to be a very valuable innovation. However, it is doubtful that it can become a full substitute for the IMF’s traditional financing facilities which provide support, under appropriate conditionality, to countries whose initial policies often have significant deficiencies. Insurance only for those who are entirely innocent of any involvement in their own problems is too restrictive.

countries, relative to potential, covering the four years after the start of the crises. Assuming very conservatively that the potential growth rate is only 4 per cent, the cumulative output losses amount to 24 per cent of annual GDP for Korea, 26 per cent of annual GDP for Malaysia, 54 per cent of annual GDP for Thailand, and 83 per cent of annual GDP for Indonesia. Losses for other Asian emerging market economies are also estimated to be quite large, and substantial losses are also estimated for many emerging market countries beyond Asia.

Granted that not all of these economic losses are related to interactions of emerging market economies with the global economic system. Certainly purely domestic difficulties played important roles in many cases, and the pernicious interplay between international difficulties and domestic weakness, particularly in financial sectors, seriously deepened the crisis in many countries. Nevertheless, as emphasised by Eisuke Sakakibara in his paper for this volume and by others elsewhere, the boom in global capital flows to emerging market economies up to the summer of 1997, followed by the sudden global collapse in such flows through the autumn of 1998, were major disturbances – connected with the operation of the global financial system – that contributed very importantly to the depth of recent crises.<sup>3</sup>

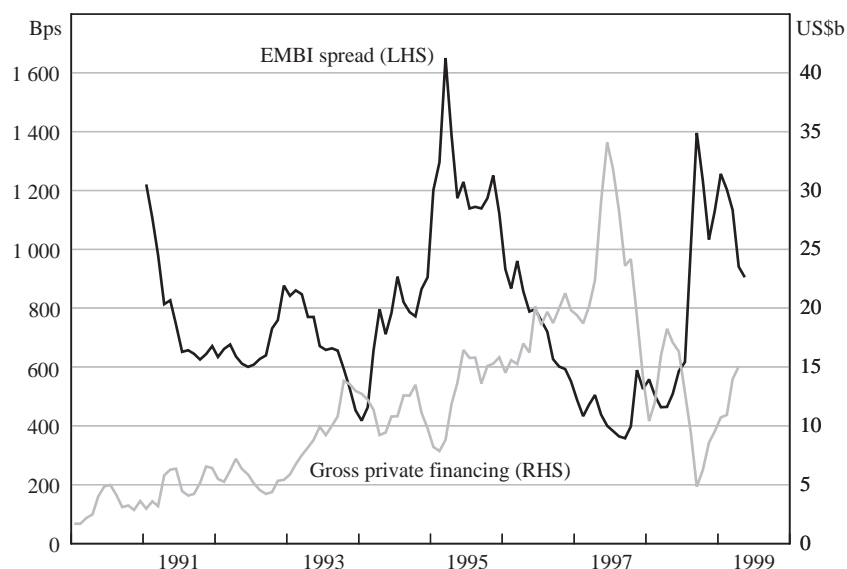
The data in Figure 1 provide some insight into this important problem. Gross private capital flows (which exclude foreign direct investment and non-syndicated interbank lending) rise to an exceptionally sharp peak in the summer of 1997, reaching an annualised rate of US\$400 billion per year. At the time of this peak, interest rate spreads for emerging market borrowers fell to an exceptionally low level. Global capital markets were exuberantly throwing huge amounts of new money at emerging markets. Then came a series of crashes as crises sequentially hit many emerging market countries. In the aftermath of the Russian and LTCM crises in the autumn of 1998, private gross capital flows to emerging markets were down to US\$60 billion at an annual rate. Interest rate spreads for emerging market borrowers went through the roof, and most countries were effectively frozen out of the market until year-end.

Data on net capital flows to emerging market economies, which are discussed by Sakakibara and are illustrated in Figure 2, show a pattern that is broadly similar to that in Figure 1. Conceptually, data on net flows are superior because they are more comprehensive and relate directly to flows of resources available to finance current account imbalances. Annual data on net flows, however, have the disadvantage of concealing something important about the magnitude of the shock, measured from peak to trough, between the summer of 1997 before the crisis really started and the autumn of 1998 when it reached its nadir. A shift of over US\$300 billion in the annualised gross flow of private capital to emerging markets during a period of 15 months reveals a really big shock, and a shock that intimately involves the interactions between emerging market economies and the global financial system.

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3. From its first discussion of the Asian crisis in the Interim *World Economic Outlook* released in December 1997, the IMF staff has consistently emphasised that the crisis has both important domestic and important external causes and that these causes have tended to reinforce each other.

**Figure 1: EMBI Spread and Gross Private Capital Flows**



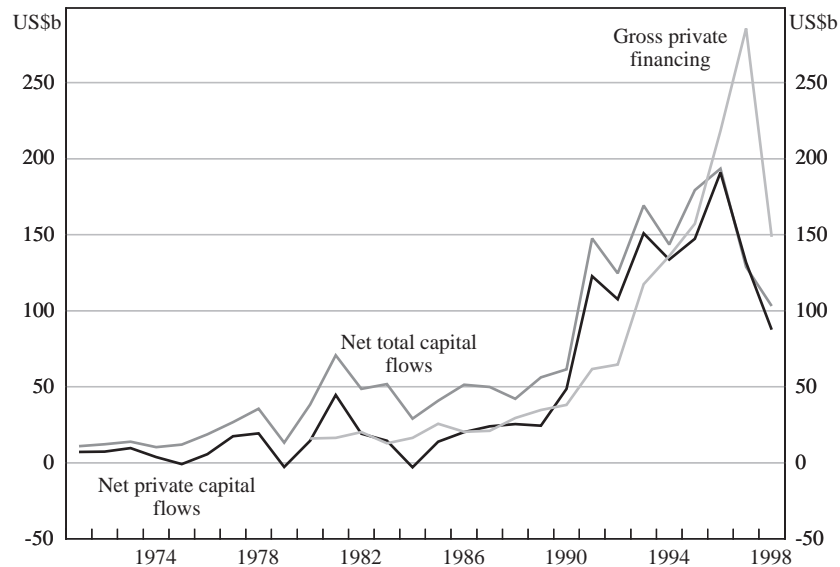
Note: The Emerging Market Bond Index (EMBI) is a series of returns on debt instruments in emerging markets and is constructed by J.P. Morgan. See [www.jpmmorgan.com](http://www.jpmmorgan.com) for further details.

One of the fundamental purposes of the International Monetary Fund is to assist members in dealing with balance of payments difficulties. Despite many changes in the international monetary system since the Bretton Woods Conference in 1944, the controlling language on the IMF's role in this regard remains unchanged as Article I(v): 'To give confidence to members by making the general resources of the Fund temporarily available to them under adequate safeguards, thus providing them with opportunity to correct maladjustments in their balance of payments without resorting to measures destructive of national or international prosperity'. The present day significance of this language was well summarised in a recent speech by the IMF's Managing Director, Michel Camdessus.

The objective of 'giving confidence to members' applies not only to times of difficulty. More generally, because open policies toward international trade bring public goods benefits to the global economy, it is desirable to persuade members to adopt such policy by offering some assurance of assistance in the event that they encounter external payments difficulties. I would assert that this argument applies as well to open and prudent policies toward international capital movements, and that it is high time for the Fund's Articles to be amended to reflect this.

The constraint that use of the Fund's general resources should be 'temporary', subject to 'adequate safeguards', and used to 'correct maladjustments' without resorting to 'destructive measures' reflects the policy of the international community to be prepared to provide interest-bearing loans, but not grants, to assist countries that are themselves acting constructively, from an international as well as a domestic



**Figure 2: Developing Countries: Total and Private Capital Flows**

perspective, to address their own problems. Thus, promotion of the global public good, not merely the correction of disequilibrium in the assisted country, is the clear purpose of the Fund's financial assistance.

I should add that these constraints on how and when the Fund provides assistance to its members show the prescient concern of the framers of the Articles for what is now referred to as the problem of 'moral hazard' potentially arising from international financial support. Because the Fund provides loans with firm expectations of repayment, it is not absorbing losses that should be borne by members of their creditors and is thus not contributing directly to problems of moral hazard. Furthermore, through the safeguards built into the Fund's conditionality, members receiving Fund assistance are pressed to reform their policies not only to correct current problems, but also to reduce the risk of future payments difficulties. Such reforms, including particularly the financial sector reforms that have been central to many recent Fund programs, work to correct problems of moral hazard that tend to be generated by national economic policies. With these reforms, and the continuing efforts to improve the architecture of the international monetary system and involve constructively the private sector in both lessening the risks and ameliorating the effects of financial crises, I am convinced that the problem of moral hazard can be adequately contained, though of course it cannot be completely eliminated.

Interestingly, the Articles of Agreement originally drafted in 1944 specified, and still specify today, that 'A member may not use the Fund's general resources to meet a large or sustained capital outflow...' Rather, members were expected to rely on capital controls to deal with disturbances to their capital accounts. The idea apparently was that through the use of capital controls (which were comprehensively

deployed by most countries before, during, and after World War II) it would be possible to suppress disturbances to the capital account and effectively isolate them from having any significant effect on the current account and on the real economy. Whatever the relevance of this conception a half century ago, it is – as recent crises so clearly demonstrate – nonsense today for those countries that have important connections to modern global financial markets.

In view of the IMF's mandate for the provision of financial assistance to members, and notwithstanding the difficulty about financing large or sustained capital outflows, it is not surprising that the IMF led the large-scale efforts to provide official financing for a number of emerging market economies in the recent crises. In view of the massive collapse of private capital flows and of the current account and other real economic adjustments implied by such a collapse, there was a clear need and rationale for official financing at least to cushion the blow. How much of a cushion was provided?

Figures on the gross amounts of international financing packages tend to be somewhat misleading. Most of the money is not available immediately. Some of the money in 'second lines of defence' may never be effectively available. It is better therefore to focus on funds actually disbursed, which are reported along with other relevant data in Table 1. According to the latest estimates from the *World Economic Outlook*, for the five Asian crisis economies (Indonesia, Korea, Malaysia, the Philippines and Thailand), net official flows to these countries in 1997 and 1998 amounted to US\$51 billion – a very sizeable sum, amounting to almost 5 per cent of combined pre-crisis GDP. For comparison, in 1997, the five Asian crisis countries drew down their own reserves of US\$30 billion, and then rebuilt their official reserves by US\$52 billion in 1998.

Net private capital flows to the five Asian crisis countries are estimated to have dropped by US\$91 billion between 1996 and 1997. This was effectively absorbed by US\$30 billion of reserve use, by US\$30 billion of official financing and by a US\$29 billion reduction in the current account deficit. In 1998, the current account adjusted massively (under the influence of highly depreciated exchange rates and collapsing domestic demand) to record a surplus of US\$69 billion – an adjustment

**Table 1: Asian Crisis Countries<sup>(a)</sup>**  
Selected data on financial flows, US\$ billion

	1996	1997	1998
Net private capital flows	63	-22	-33
Net official flows	-5	30	21
Change in reserves <sup>(b)</sup>	-5	30	-52
Current account balance	-53	-24	69

(a) Indonesia, Korea, Malaysia, the Philippines and Thailand

(b) A minus sign indicates an increase.

Source: *World Economic Outlook* database

of US\$83 billion from the preceding year and an adjustment of US\$122 billion from 1996. The two-year adjustment in the current account amounts to about 11 per cent of combined pre-crisis GDP and a substantially larger fraction of combined 1998 GDP converted at market exchange rates.

From these figures, it does not appear that official support for the five Asian crisis countries – large as it was – was anywhere near the size that would have been needed to reduce substantially the very large and economically painful adjustments of these countries' current accounts. Early in the crises, official support did help to cushion the blow (and avoid wider financial disruption), thereby allowing more time for exchange rate adjustments and other forces to bring current accounts in line with available net private financing. By the end of 1998, however, official financing amounted almost exactly to the recovery in official reserves. The overwhelming burden of responding to the external financing shock fell on adjustment of the current accounts and was not borne by official financing. Domestic and international prosperity suffered significant, although perhaps unavoidable, damage.

The point, of course, is not to belittle the impressive efforts to provide official financial support for the Asian crisis countries, or for other emerging market economies caught in recent crises. There are important constraints on the magnitude of official financing that can be made available, and official support cannot responsibly be disbursed except in support of a credible adjustment program. However, to those who complain that official support packages have been far too large, the question comes – by what standard? Surely not by the standard of what may reasonably be needed to respond appropriately to the real hazards that are sometimes faced by emerging market economies in their interactions with the modern global economic and financial system.

### 3. The Concept of Moral Hazard

Moral hazard is a pervasive phenomenon that infects virtually all human endeavours. Parents seek to protect their children from harm and privation. In protecting against some of the adverse consequences of their children's own behaviour, parents generate some moral hazard. Expecting parental protection, children are less prudent than they would be without such expectations – and parents know it. Nevertheless, no sane parent would not seek to rescue his child from drowning on the grounds that drowning would teach the kid a valuable lesson.

More narrowly in the area of economics, economists have identified dozens, if not hundreds of examples of the phenomenon of 'moral hazard' (see Kotowitz 1989). One classic example is the principal/agent problem where the risk neutral principal has to rely on the unobservable efforts of the risk averse agent to generate an output that depends on these efforts, from which the agent derives increasing disutility, and on other (unobservable) random factors. The ideal, but unachievable, solution would be for the principal to compensate the agent with a certain payment depending on his level of effort – up to the *economically appropriate* point where the expected value of the marginal product of effort is equal to the marginal payment which is equal to the marginal disutility of effort. Payment based on output, rather than unobservable

effort, provides a partial solution – it provides some incentive for the agent to supply effort which is linked probabilistically to output. But a distortion remains that leaves the agent supplying less than the economically appropriate level of (unobservable) effort. This distortion is the consequence of moral hazard. This distortion is also essentially the same as would result if effort were observable but a tax was imposed on the effort of the agent (or on the payment of the principal). This analogy between the distortions created by moral hazard with the distortions created by taxes and subsidies is quite general and will be exploited later in this discussion.

Another example of moral hazard that is instructive for the present discussion concerns insurance. The insuree wants to guard against a real hazard – the possibility of a large loss such as someone’s home burning down. The insuree, because he is risk averse, is willing to pay a premium for insurance that significantly exceeds the expected value of his possible loss. The insurer, who is able to diversify risks, is willing to sell insurance for a premium that is somewhat above the expected loss. Two cases should now be distinguished.

First, assume that there is nothing that the insuree can do that affects the size or probability of loss that is not known to the insurer. For example, the insuree could own a more valuable home with correspondingly higher expected loss in the event of fire, but a fire insurance policy with a premium depending on the value of the home would solve this problem. In this case of perfectly priced insurance, there is no moral hazard. Note, however, that the existence of insurance encourages (or enables) the insuree to undertake risks, or undertake greater risks, that he might not choose to undertake if insurance were not available. And this is a good thing. It is the purpose of insurance not only to provide compensation for losses (to those who have paid appropriate premia), but also the purpose to allow risk averse agents to undertake (socially diversifiable) risks that they would not otherwise choose to undertake – up to the economically appropriate level of such risk-taking.

Second, assume that actions of the insuree that are not observable by the insurer can affect the size or probability of loss. In this situation, if the insuree has an incentive to take actions which may increase expected losses or not take actions that would decrease them, then there is a problem of moral hazard. In effect, the insurance policy acts like a subsidy to actions by the insuree that may tend to increase risk of loss. The insurer knows this and necessarily charges a premium that takes account of how the insuree may be expected to behave under the incentives created by the fact that he is insured.

If the moral hazard problem is sufficiently severe, no insurance may be available. For example, life insurance policies generally preclude benefits for suicides in some initial period after the policy is written. However, while some degree of moral hazard affects virtually all insurance, the insurance industry does a thriving business. When real hazards are an important concern, and moral hazard can be reasonably contained, insurance is privately and socially beneficial. Again, the effect of insurance is

generally to increase the level of risk-taking toward the economically appropriate level.<sup>4</sup>

In insurance (and in many other examples of moral hazard), there is an incentive for both parties to find ways to diminish the moral hazard problem *ex ante*. Co-insurance is one such mechanism. So long as the insuree must absorb some significant part of a loss, the insurer knows that incentives for the insuree lie in the direction of keeping risks down, and premia for insurance reflect this. Also, the insuree may agree to undertake certain actions that can be monitored by the insurer which tend to reduce risks of loss, as is a common practice for casualty insurance and workmen's compensation insurance for businesses in the United States. In the context of the present discussion, such practices may be thought of as a form of conditionality.

#### 4. Moral Hazard Arising from Public Support

The moral hazard issue of immediate interest is the moral hazard that may be associated with international financial support packages. To lay the groundwork for addressing this specific issue, it is useful to consider the more general problem of moral hazard potentially arising from public support.

If a government regularly provides relief or compensation to those who suffer physical or economic difficulties or disasters, there is the concern that the *expectation* of such relief or compensation will encourage behaviour that tends to increase the likelihood of losses from such difficulties or disasters. Is this a problem of moral hazard; and, if so, how serious is it? The answer is – it depends on how public support is provided. An example that is somewhat removed from current controversies serves best to illustrate the key analytical points.

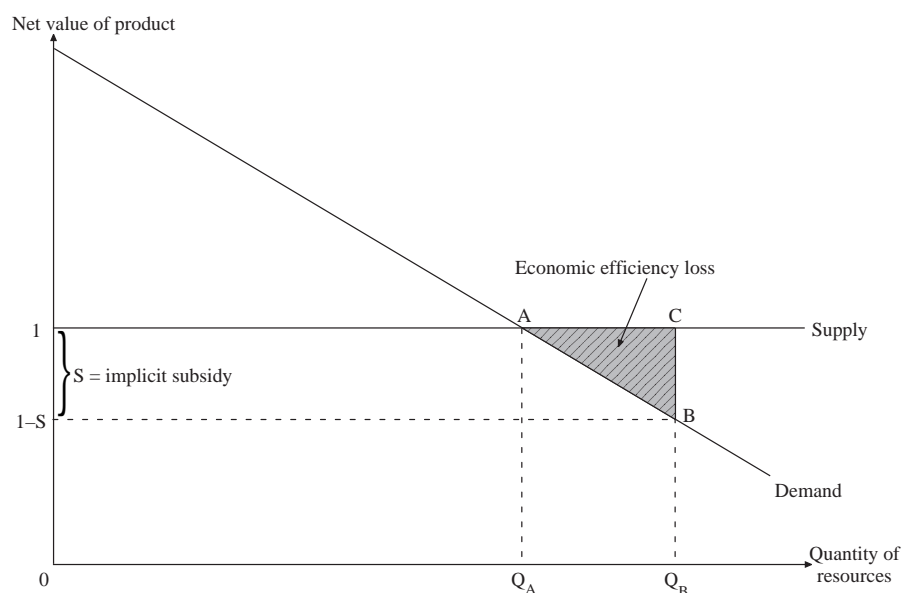
Take the case where the government regularly provides disaster relief to flood victims in the form of grants to compensate them for losses. Here there clearly is a direct problem of moral hazard. Farmers are unduly encouraged to cultivate the flood plain (which is usually very fertile) because they know that when floods occur their losses will be absorbed by the taxpayer. Others are also unduly encouraged to live or do business in ways that expose them to greater risk of loss from floods than they would undertake if grants of disaster relief were not expected to be available.

How large are the economic losses associated with moral hazard in this example? The diagram shown in Figure 3 is useful. The horizontal axis shows the quantity of resources invested in areas subject to risk of loss from flood. The supply curve for these resources is assumed to be flat, at unit height, to indicate that one unit of these resources has many alternative uses and the total supply of resources is very large.

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4. Reflecting the moral hazard problem, the insuree is likely to undertake some economically inappropriate risks. If the insurance policy is actually written, the presumption is that the benefits of raising overall risk toward the economically appropriate level outweigh the distortionary consequences of the insuree taking on inappropriate risks.

**Figure 3**



The demand curve,  $D$ , is downward sloping to reflect the wide variation in the value of activities (net of expected losses from floods, and organised in descending sequence of value per unit of resources) that may be undertaken subject to some risk of loss due to floods. At the undistorted equilibrium point  $A$ , where the demand curve intersects the unit level supply curve, resources are used up to the economically appropriate level  $Q_A$  where activities undertaken are those whose value (net of expected flood losses) exceeds their resource cost.

The distortion introduced by the government's flood damage compensation grants may be thought of as a subsidy, in the amount  $s$  per unit of invested resources, where  $s$  is the probability of sustaining a (total) loss in the event of a flood. With this subsidy, resources invested subject to flood risks rise above the optimal level to the level  $Q_B$  associated with the point  $B$  on the demand curve where the sum of the marginal value of the expected net product from the last unit of resources, plus the amount of the subsidy, equals the unit cost of the resources.

What is the loss from the moral hazard distortion? Economists know that the right measure of loss is measured by the modest triangle formed by the points  $A$ ,  $B$  and  $C$ . For the additional resources that are artificially encouraged to go into these risky activities, the loss is the excess of the alternative opportunity cost of these resources over the value (net of flood damage) of what they produce when deployed to the activities subject to flood risks. Almost everyone other than economists (and the beneficiaries of disaster relief) tends to think of the cost as the budgetary cost of the implicit subsidy, which is measured by the substantial rectangle bounded by vertical axis and  $Q_B$  and by the horizontal lines at unity and at  $1-s$ . As I believe that budgetary costs are important, even if they mainly constitute transfers rather than real resource

costs, I do not wholly reject this common sense view. However, I would emphasise that the budgetary cost should generally be regarded as a generous overestimate of the distortionary costs associated with moral hazard problems of this kind.

Next, suppose that the government does not provide grants of disaster relief, but instead supplies flood insurance at a fair premium to those who choose to buy it. (The government might need to be in this business because concerns about ‘catastrophic losses’ keep private insurers out of this market.) In this case, there is no moral hazard problem, even though the government ends up paying substantial amounts of compensation for flood damage (which are paid for on average by premia collected for such insurance). The fact that an appropriate premium is charged for those who want flood insurance leaves incentives for risking resources to flood damage appropriately undistorted. Indeed, if such insurance were not available without government intervention, economic efficiency would be improved by government provision (at a fair price) as this would enable risk-adverse operators to undertake an economically appropriate amount of flood risks.

What if, rather than grants or insurance, the government provides loans (for rebuilding) to those who have suffered damage from floods? (The government might make such credits available because private institutions are, for a variety of reasons, unreasonably reluctant to lend to flood victims.) If interest charged on such loans is without subsidy, then there should be no moral hazard distortion, as in the case of fairly priced government-supplied flood insurance. Unlike insurance, however, loans for flood victims do not get around the problem that exposure to flood risk is below the economically appropriate level because of risk aversion. A modest subsidy on disaster relief loans, it might be argued, is a way to compensate (imperfectly) for this deficiency. More generally, however, loans with a significant interest subsidy element are likely to generate some moral hazard.

To analyse the cost of this moral hazard, we can again use Figure 3, assuming for simplicity that the amount of the flood relief loans corresponds to the full amount of losses sustained in floods. Now, however, the amount of the subsidy is not equal to the probability of losses from floods – as it was in the case of full compensation grants. Rather, the subsidy distortion is only equal to that fraction of the initial loan value that is represented by the present value of the interest subsidy. By the same principle as before, the budgetary cost of the interest subsidy (in present value terms) is a generous overestimate of the economic efficiency loss generated by the moral hazard distortion.

## 5. Moral Hazard from International Financial Support

The commonsense view of the ‘moral hazard’ problem held by many of the less careful and sophisticated critics of international support packages is simplistic and fundamentally wrong. This view derives from the mistaken impression that billions of dollars of taxpayers’ money supplied by industrial country governments are being *given away* to bailout the imprudent creditors of emerging market economies. The fact is that international support packages are loans and not grants, and they come at very little, if any, cost to taxpayers in the industrial countries. Some creditors,

notably creditors of sovereigns and interbank creditors, have been helped by international support packages, relative to what probably would have happened if such support were not available. But avoiding the likely adverse consequences of defaults to these creditors for the debtor countries was also of great value to these countries – which is generally why their governments chose to avoid such defaults.

Moreover, most of those who supplied capital to the emerging market countries prior to crises have sustained substantial losses (although many who have stayed invested have now recovered). And, it should be emphasised, the conditionality associated with international support packages has generally sought to narrow, rather than expand, the extent to which national governments in crisis economies assume responsibility for private foreign credits at the expense of domestic taxpayers, especially for credits beyond those to the core of the financial system.

While they usually do not try very hard to dispel popular misconceptions that support their policy agenda, the more careful critics who are concerned about moral hazard recognise the key facts about international financial support packages. They also understand that the problem of moral hazard does not arise because someone *ex post* escapes losses; it arises because someone *ex ante* undertakes economically inappropriate risks in the expectation that if the outcome is adverse he will somehow be shielded, as a consequence of international financial support, from some of the losses he would otherwise have taken. What can be made of this more sophisticated view of moral hazard, beyond the observation that virtually everything in economic life involves at least some marginal element of moral hazard?

From an analytical perspective, there are good reasons to believe that international financial support operations, as they are now practised, do not usually generate substantial moral hazard problems. In the above analysis of moral hazard arising from government disaster relief programs, the point was made that a system of grants where taxpayers' money is used to absorb losses can generate significant moral hazard. In contrast, fairly priced government insurance or fairly priced relief loans do not generate significant moral hazard, and may, in some circumstances, move risk-taking to a more optimal level. From this analysis, it follows that international financial support that is in the form of loans with reasonable interest rates and high prospects of timely repayment should be expected to generate relatively little moral hazard. Those who want to argue otherwise have an intellectual responsibility to lay out a clear analysis of how support that ultimately does not absorb somebody else's losses nevertheless induces somebody else to take inappropriate risks. (More on this later.)

Another analytical point concerns the link between moral hazard and the effect of international support on expectations and on risk-taking. For there to be a moral hazard effect from international support, it is necessary that expectations of such support affect decisions about risk-taking. That there is such an effect, however, absolutely does not prove that moral hazard is being generated. It is also essential to show that risk-taking is being induced to go beyond the level that is economically appropriate. As discussed above, fairly priced insurance for an insuree whose (unmonitorable) behaviour cannot affect risks does normally encourage and enable



greater risks to be taken. This is economically appropriate. Indeed, in most practical insurance situations, where there is some unavoidable element of moral hazard, the effect of insurance is to encourage or enable greater risk-taking. This too is economically appropriate, provided that the damage from the moral hazard does not outweigh the benefits of dealing more efficiently with real hazard.<sup>5</sup>

How can one judge whether international financial support is being provided beyond the economically appropriate level? One key test is whether such support can generally be repaid in a timely manner with reasonable interest. This goes back to the issue of the subsidy (or lack thereof) associated with international financial support. If the recipient of support did not repay in full, there would be a subsidy to the extent of the deficiency. If the interest charge is too low, there is another element of subsidy. Subsidies, as previously argued, generate moral hazard. Conversely, little or no subsidy implies little or no moral hazard.<sup>6</sup> Here it might also be noted that for the countries that receive international support, there is a large element of co-insurance. Clearly, these countries are not protected against all losses.

Recipients of large-scale international support packages are typically in, or on the verge of, financial crises and face very high interest rates in private capital markets, if they can borrow at all. As the interest charge for official financial support is usually well below these distress market levels; doesn't this imply a substantial subsidy? Not really. The providers of official financial support to the government of a country in distress are in a fundamentally different position than private creditors. Official support comes with conditionality, and a key purpose of this conditionality (and its primary legal justification) is to provide reasonable assurance of timely repayment by the recipient of official assistance. Private creditors have no comparable means of enforcing such conditionality. Moreover, as a condition for official support, its providers may sometimes insist that already existing private credits be 'voluntarily' rolled over or restructured as a condition for the provision of official assistance – as happened in the debt crisis. Thus, the providers of official support effectively have better security/collateral for their loans than other creditors, and the interest they charge should appropriately reflect this situation.

Turning from these general analytical points to specific cases, it should first be recognised that in one important case, Russia, moral hazard arising from expectations of economically inappropriate official financial support probably played a meaningful role in stimulating private capital inflows before the recent crisis. Many thought that Russia was too important – too nuclear – to be allowed to fail. The perception was that well beyond the economically appropriate level of official support consistent with Russia's capacity to meet its official credit obligations and comply with the

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5. In the private insurance business, when moral hazard problems are great, the market tends not to exist. For official interventions that have the character of insurance, it is important to verify that they are not going beyond the point where potential moral hazard problems are too great to leave a reasonable expectation of overall benefit. The appropriate level of moral hazard, however, is generally not zero.
  6. The economist's measure of the economic efficiency loss from a subsidy distortion generally rises with the *square* of the subsidy, not linearly. For small subsidies, the efficiency loss is *second order of smalls*.

normal conditionality associated with international support, the international community would provide support, virtually without limit and without meaningful conditionality, to avoid a Russian sovereign default. As the spreads on Russian GKO's (and less so on Eurobonds) rose to considerable heights before mid-August 1998, it is clear that not everyone was absolutely firm in this expectation. But among the most fervent believers were probably those who invested heavily in Russian credits, who also turned out to be those most surprised when the IMF enforced for Russia the same rules that apply to all other members.<sup>7</sup>

Beyond Russia, for the other recipients of large-scale official support packages, it is much more difficult to see a strong case that expectations of economically inappropriate international support played a substantial role in motivating private capital flows before the recent crises. For Mexico in 1995, the massive financial support packages from both the IMF and the US Government were literally unprecedented. Nothing on nearly that scale had ever been arranged for any country. For Mexico itself in the debt crisis of the 1980s, the approach had been quite different. Official financial support was modest, and banks that held most of the credits were co-ordinated to roll over, and ultimately scale back, their credits. Thus, there seems little rational basis for creditors to have formed expectations about what ultimately transpired for Mexico in 1995.

Moreover, while it is wrong to assert that (*ex ante*) moral hazard was present for Mexico on the basis of the financial support that actually was provided (*ex post*), the *ex post* results are relevant to the critical issue of whether the support provided was economically appropriate. In fact, the Mexican stabilisation program succeeded in its main objectives. Mexico has already repaid all of its borrowings from the US Government and a significant fraction of its credits from the IMF. The judgment has been effectively confirmed that the Mexican Government faced fundamentally a liquidity problem in 1995. An unnecessarily damaging potential sovereign default was avoided through a strong stabilisation effort and with the benefit of large-scale official assistance. The providers of that assistance incurred no significant risk or cost.

After Mexico, it can plausibly be argued that its example provided a reasonable basis for expectations that large international support packages might be used in similar future cases. But, if Mexico in 1995 was not an example of economically inappropriate international support, then it cannot be a reasonable basis for expectations for the scale and type of support that would generate moral hazard. Again, international financial support has many of the characteristics of insurance; and, as

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7. Whether there will be *ex post* a significant subsidy in official support extended to Russia remains unclear. So far, Russia has remained current on its obligations to the IMF, paying all interest and paying down the principal by about US\$1 billion since last summer. If the new IMF program with Russia is fully disbursed, the principal will still fall by about another US\$1 billion by the end of next year. The Russian Government has also remained current on its other Russian-era debts. However, Russia's payments on its Soviet-era debts have been deferred and these debts are in the process of being restructured. Some Russian authorities have suggested that substantial write downs of Soviet-era debts will be needed. This is a channel through which an *ex post* subsidy could flow.

with insurance, some encouragement to risk-taking is desirable, is not necessarily a sign of moral hazard, and is surely not a sign that any moral hazard that may be generated outweighs the benefits of dealing better with real hazards. Going forward, this is really the vital issue. So long as international support packages, and their associated conditionality, are restricted to circumstances where they are economically appropriate, they should not be responsible for significant moral hazard.

Looking back more specifically to the Asian crisis, it is difficult to see that expectations of international support played a significant role in motivating private capital flows prior to the recent crises. Korea, Indonesia, and Thailand had not used international financial support in many years, and there was little expectation until just before the crises broke that they might need such support. The Asian crisis countries had long records of outstanding economic success: sustained high growth, relatively low inflation, well-disciplined government budgets, high domestic saving and investment, well-educated labour forces, generally stable governments, and wide participation in the fruits of economic progress. Without calling heavily on moral hazard from expectations of inappropriate international support, there are plenty of reasons why capital should have been flowing to these economies, especially in a period when growth was relatively sluggish in many industrial countries.

Also, capital flows to these countries, and more generally to emerging market economies, took many forms: direct investment generally had the largest share; portfolio equity flows were often quite important; credit flows went to many private borrowers; and interbank flows, while important in several cases, were not overall dominant. Of all of these types of flows, only interbank flows received substantial protection – from national governments and at the ultimate expense of their national taxpayers. Based on past experience, only for the interbank flows (and sovereign debts which were not a factor in Asia) could there be any reasonable basis for expectations of protection. The breadth of the capital flows across instruments and countries, and the attractiveness of their pricing for the receiving countries, suggest that something other than moral hazard (from expectations of inappropriate international support) was driving most of these flows.

Concerning the international interbank flows, there is clearly an issue of moral hazard. But this problem (which is discussed further below) reflected expectations concerning the policies and actions of national governments – that they would, as in the past, bailout virtually all of the creditors of domestic banks and other financial institutions that got into difficulty. International financial support (or expectations of such support) did not create these government policies or expectations concerning them. International financial support has not, and will not in the end, pay for the costs of these policies; they will be borne by national taxpayers. More generally, while there are important moral hazard problems arising from a wide variety of national policies where the taxpayer is called upon to absorb someone else's losses, such policies and their consequences are not fundamentally the responsibility of international financial support.

## **6. Indirect Moral Hazard**

Even if international financial support is not fundamentally responsible for moral hazard arising from national policies and practices, in the financial sector and elsewhere, it might be argued that international support facilitates these policies and practices. Mussa *et al.* (1999) refer to this as the problem of 'indirect moral hazard'. Analytically, we know from the theory of the second best that policies that do not distort the markets in which they operate directly can nevertheless generate welfare gains and losses by indirectly affecting other markets where there are pre-existing distortions. This may be a relevant concern with international financial support, but it is one that needs to be treated with considerable care.

Countries in need of large-scale official assistance are typically in rather dire circumstances. The conditionality associated with official support might be used to leverage policy changes (or at least promises of policy changes) in many areas. If conditionality is not used effectively to promote what is seen (by someone) as desirable change in some particular area, it might be argued that the practices surrounding international support are responsible, in some important degree, for the remaining defects in national policies. Such an argument clearly goes too far. The police may be said to be responsible for crime if they directly commit crimes, or if they accept bribes and knowingly allow others to commit crimes, or if they are unreasonably lazy or incompetent. But, if crime persists, or even grows, despite the energetic best efforts of the police, they are not responsible – directly or indirectly. Similarly, if international financial support is to be held (partially) indirectly responsible for moral hazard problems generated by national economic policies, there needs to be some meaningful linkage between official international support and the national policies that are the fundamental source of the problem.

The linkage that is usually asserted runs through the supposed effect of expectations of international support on the behaviour of creditors. Because creditors expect that international financial support will enable them to be bailed out without significant loss, they lack appropriate incentives to be prudent in their lending. This, in turn, tends to make crises more likely and more difficult. As previously discussed, because international support comes as loans with reasonable interest rates and high repayment prospects, it is fallacious to argue that international financial support bails out any creditors. If this happens, it is at the expense of the borrowing country, as it should be. Also as previously discussed, among the many suppliers of capital to emerging markets, only two groups of creditors have any reasonable expectation of being bailed out by national governments: creditors of banks and other financial institutions, especially international interbank creditors; and creditors of the sovereign itself. The merits of whether and when international support should or should not facilitate a national government's policies to honour these two types of claims require separate consideration.

In virtually all countries, the national policies and practices provide very extensive support to the depositors and other creditors of domestic financial institutions whenever there are threats of systemic problems in the financial system, and often for creditors of particular institutions when they get into difficulty. The budgetary

losses associated with such policies and practices have been very large in many countries; and the moral hazard problems in this area are deeply implicated in many (if not all) of the recent, very costly financial crises. International financial support may be accused of being indirectly involved in these problems in a number of cases. If the support had not been available, national governments in some instances would not have had the foreign exchange resources to meet the claims of foreign creditors on domestic financial institutions. Defaults or restructurings of these foreign credits would have been forced in some instances, with larger losses to creditors. Presumably, foreign creditors, as well as domestic financial institutions, would have learned to be somewhat more cautious in their lending and borrowing practices. Moral hazard arising directly from national support policies and practices would have been somewhat reduced.

Granted that all of this is true, or at least not unreasonable, there is a powerful other side to the argument. Virtually all governments seek to protect their financial systems from systemic collapse if they are able to do so; and they are right to do so even if this inevitably generates some amount of moral hazard. In virtually all countries, however, the government's financial safety net is too broad and too undisciplined, generating unnecessary problems of moral hazard and often contributing to risks of financial crises. Reforms in this area should seek to narrow the safety net and make the owners and major creditors of individual financial institutions more responsible to absorb losses – while still guarding against systemic financial collapse. This would be worthwhile in virtually all countries. These things are true both for countries that might plausibly be candidates for international financial support and for countries where there is no such plausible expectation. Japan, for example, is currently experiencing grave problems in its financial system that are partly the consequence of a variety of policies tending to generate moral hazard; and there are many other examples among the industrial countries. For the emerging market countries that recently experienced crises related to deficiencies in their financial sectors, the problems with financial sector policies were of very long duration, extending back well before when there was an inkling of a thought of a possibility of large scale international support. Thus, there is no essential link between the deep problems with national support policies for the financial sector and official international support for countries experiencing balance of payments difficulties.

This conclusion does not imply that problems with financial sector policies that contribute to serious risks of crises should be ignored in considering international financial support. It is entirely appropriate that the conditionality associated with support packages should focus, as it has in many recent cases, on improving financial sector policies with an eye to reducing future problems of moral hazard (resulting from national policies) and reducing risks of future crises. It is also entirely appropriate that the IMF, as the international financial institution primarily responsible for assisting countries in dealing with financial crises, should play a leading role (through its surveillance and technical assistance activities) in the global effort to improve financial sector policies. Indeed, it would be derelict if it did otherwise. But, that is very far from saying that IMF policies are, in some meaningful sense,

indirectly responsible for the grave deficiencies of national policies toward the financial sector and for the substantial moral hazard they generate.

For sovereign credits, there is an even stronger case why the international community should seek to avoid defaults whenever that is reasonably feasible. Defaults by the sovereign are typically very damaging to the whole economy. Beyond a national government's sense of responsibility to meet its sovereign obligations, concern about the adverse consequences of sovereign default is a key reason why governments strive hard to avoid it (see Bulow and Rogoff 1989). If defaults were easy, the functioning of credit markets would be seriously impaired by their most serious moral hazard problem; namely, the obvious incentive for debtors to walk away from their debts if there is no effective means to compel them to repay.

The international community certainly should not foster this moral hazard problem on the part of its sovereign members. If a sovereign faces a liquidity problem in meeting its maturing obligations, especially its foreign currency obligations, it is not unreasonable to provide official international support, under appropriate conditionality. This was the case, for example, in Mexico in 1995. If the sovereign faces something more difficult than a liquidity problem, then the approach to international support should arguably be more cautious, which was the way the debt crisis of the 1980s was handled in many cases. When the sovereign appears incapable of taking the actions fundamentally required to establish fiscal responsibility, then sovereign default effectively becomes unavoidable, and the international community should stand back from providing large-scale assistance to delay default. This is what happened in Russia in August 1998.

That restructurings of sovereign credits and even sovereign defaults do occur from time to time, with adverse effects for creditors, helps to contain potential concerns about moral hazard arising from official support to sovereigns in distress. For the providers of such support, the critical issue is to make sure that the support and its associated conditionality are economically appropriate. If large-scale official support is provided to meet liquidity problems, and conditionality assures that underlying problems are forcefully addressed, then the effect of such support will mainly be to reduce or ameliorate real hazards and moral hazard concerns will be limited.

## 7. What to do to Improve the System?

I have already noted that there are a wide range of useful proposals to improve the architecture of the international financial system which, if implemented, could do much to improve the functioning of the system. I would also note that there is the important issue of the appropriate exchange rate regime for many emerging market countries – specifically whether the preservation or re-introduction of regimes that involve very tight exchange rate management or *de facto* exchange rate pegging are really a good idea for most of these countries. This is a principal subject of a paper for consideration of the IMF's Executive Board, the preparation of which has unfortunately precluded my personal participation in this conference. I will not comment on this important issue now.

Rather, in this conclusion, I return to the main theme of this paper – whether the scale of official financing prospectively available to emerging market economies facing external payments difficulties is too large or too small. Most of the argument on this issue suggests that official financing has become too large. Let me suggest four points on the opposing side – not in the expectation that the politics of the issue will endorse this answer, but in the view that the intellectual merits of the case do matter somewhat.

First, as emphasised above, there can be no reasonable doubt that real hazards faced by emerging market economies in their interactions with the global financial system, as illustrated in recent crises, are sometimes very large. The evidence is clear that these real hazards in recent crises have been much larger than could be effectively managed, without substantial damage to national and international prosperity, within the confines of the (otherwise seemingly generous) levels of available international support.

Second, the IMF is the international institution charged with the responsibility of providing support, under appropriate conditionality, to countries experiencing external financing difficulties. According to their charters, this is not a task for the World Bank or the regional development banks. Nevertheless, in efforts to provide official support to countries caught up in recent crises, the World Bank and the regional development banks have been called upon to supply additional financing beyond that available from the IMF. To some extent, this may reasonably be justified by the longer-term, structural content of many adjustment programs. But the excuse wears thin. And the fact that bilateral creditors have been called in to supplement resources available from the multilateral institutions reinforces this conclusion. When there is a real crisis, rather than merely talk about what to do in a possible future crisis, the revealed preference of the official community for larger official financing packages than the IMF can support on the basis of its own resources suggests that those resources are too limited to serve their officially designated and desired purposes.

Third, looking back to Bretton Woods, countries were, by modern standards, quite closed to international trade, and it was expected that they would actively use their widely deployed controls over capital flows to contain external payments pressures. Nevertheless, countries were thought to need IMF quotas amounting, on average, to something more than 2 per cent of national income. Using the same quota formulas developed at Bretton Woods, emerging market economies with their generally deep involvement in international trade would merit IMF quotas generally in the range of 4 per cent of GDP or higher. This compares with actual IMF quotas for many of these countries of well under 1 per cent of GDP. If IMF quotas were raised to the levels envisioned at Bretton Woods, and especially if further allowance were made for the fact that capital controls are no longer viewed as an effective or desirable means for dealing with external payments problems originating in the capital account, then the scale of recent official financing packages would not appear particularly large by the standards that were thought relevant years ago.

Finally, the main objection to large official financing packages, other than the practical problem of lack of political support in key creditor countries, is the concern that such packages tend to generate significant problems of moral hazard. When subjected to careful analysis, however, these concerns appear to have relatively little substance, especially in comparison with legitimate concerns about real hazards in functioning of the global financial system. Fears about problems that cannot be convincingly demonstrated should not be a barrier to responsible actions to ameliorate risks that are demonstrably apparent.



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# *Discussion*

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## **1. General Discussion<sup>1</sup>**

There was broad discussion on the general topic: New Financial Architecture or ‘Minor Interior Decorating’? The debate was dominated by four issues for policy reform:

- measures to help prevent currency and financial crises;
- crisis management and measures to reduce the severity of crises;
- the reform of international institutions; and
- the adequacy of reform undertaken so far.

On the first point, there was general agreement that there are benefits from improved financial transparency and regulation of financial systems. These may develop either in the countries from which capital originates or in recipient countries. Either way, recipient countries face the added responsibility of developing legal and administrative frameworks for dealing with bankruptcy.

The role of foreign exchange reserves in defending fixed exchange rates was also discussed. Some believed that recent currency crises had firmly validated the policy of maintaining ample stocks of reserves as a deterrent to runs on a currency. Others pointed out that reserves have a social cost because the return on them is likely to be less than the opportunity cost of holding them.

There was also some debate about the ability of capital adequacy standards to prevent currency and financial crises. Although standards tend to improve the health of those financial institutions to which they are applied, if they are too onerous, they may also cause the growth of alternative financial institutions which are beyond the purview of regulators and which may therefore become an alternative source of financial fragility.

Capital controls were also discussed. Some participants felt that they are so distortionary as to be obviously undesirable. Furthermore, they contended, capital controls are susceptible to evasion and they buckle under pressure. Others took issue with these arguments, pointing to the case of Chile, where capital controls appear to have increased the average maturity of foreign-currency-denominated debt. Since a heavy weighting of short-term foreign-currency-denominated debt in external liabilities is a robust leading indicator of currency crises, some participants inferred from Chile’s experience that well-designed capital controls may contribute to domestic financial stability.

In discussion of crisis management, there was debate about the relationship between private and public sectors. The relations between the state and foreign

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1. Discussion in this session proceeded without the benefit of Michael Mussa’s paper which arrived after the session finished.

investors were likened by one participant to the relations between competing creditors in a situation of corporate financial distress: when trying to restrain capital flight, the state is effectively contesting a foreign investor's right to withdraw capital, much as one private creditor to a firm might contest another's right to withdraw funds and wind up the firm.

Other participants saw the situation differently. They argued that capital flight is essentially a competition among foreign investors over an exhaustible stock of liquid tradeable assets. The government's role in these circumstances is to mediate the competing private claims of foreign creditors in such a way as to limit the economic dislocation imposed on fundamentally sound domestic enterprises. By limiting capital flight – perhaps via a standstill or by imposition of direct capital controls – it achieves this objective.

The general analogy with financial distress and bankruptcy informed subsequent debate about the international financial architecture, with participants noting the lack of an international equivalent to national bankruptcy laws and procedures. At the national level, such laws and procedures provide an economically efficient way in which corporate-ownership issues can be resolved when normal commercial arrangements have broken down. The lack of an international equivalent to these mechanisms means that alternative, economically less efficient, mechanisms have to be invoked when there are international financial crises. Some suggestions, such as standstills, are imperfect attempts to reproduce the mechanisms of domestic bankruptcy laws at an international level.

Participants also considered the relationship between the IMF's lending facilities and the problem of moral hazard. One advantage of the IMF's promise of liquidity support to member countries is that it eases the burden national governments face in having to hold high levels of liquidity as insurance against sudden capital flight. Furthermore, the promise of assistance encourages the governments of developing economies, and foreign investors in those economies, to take actions which improve economic growth, but which would otherwise be too risky. One participant noted that moral hazard problems only arise when the extent of promised assistance is so great as to encourage governments and foreign investors to become too complacent in their assessment of risks.

Participants were divided on the question of whether the moral hazard problem would overshadow the benefits of providing greater resources to the IMF for supporting countries in distress. One suggestion was that any redesigned IMF should lend sparingly to individually distressed countries and conserve its resources for financial crises which threaten to extend beyond national borders. Others pointed out that this principle had characterised the Fund's operations in east Asia: actual IMF disbursements to the troubled east Asian economies had indeed been small relative to their needs.

The welfare implications of various mechanisms for resolving crises were also noted. One problem with workouts which assign priority to international lenders is that they often, and quite arbitrarily, subordinate the interests of domestic taxpayers

to those of foreign investors. This was quite clearly true of the bailouts of Mexico and parts of east Asia, where domestic residents bore a disproportionate share of the burden of restoring stability in the aftermath of crises.

# Private Capital Flows, Living with Volatility, and the New Architecture

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W Max Corden

This is a ‘think piece’ covering the major – and very large – issues of the conference.

I will have in mind the Asian crisis countries and not Russia or Brazil – the latter being countries with high budget deficits and hence public sector borrowing. Much of what I have to say also applies to Mexico 1994–95. I shall not have in mind the special moral hazard problem in the Russian case. I am focusing on international lending by the private sector in developed countries to private-sector borrowers in developing countries.

In preparing for these notes I have greatly benefited from reading, and indeed, intensively studying the comprehensive and very sensible book by Barry Eichengreen (1999). This acknowledgment takes the place of continuously referring to this study for fuller exposition of the relevant issues.

## 1. Volatility, Herding and Financial Sector Inefficiency

The heart of the problem has been – and is very likely to be in the future – the extreme volatility of private capital flows to emerging market countries. Market psychology shifted suddenly from euphoria to panic. It was reasonable to expect very high capital inflows to slow down, and exchange rates to be forced off their informal pegs and to depreciate. There is no shortage of ‘fundamentals’ to justify this. But the extreme and sudden movements in the Asian crisis countries were unexpected and have not seemed reasonable, other than in terms of *ex post* theories which can always make anything seem rational. There was certainly an element of self-justifying expectations.

The volatility of market psychology led to extreme movements in net capital flows only because so much borrowing had been short-term. Thus, it is important to discuss why there was so much short-term borrowing, and why it was particularly high on the part of the banks and firms of some countries (notably Korea) and not by others (notably Malaysia and Taiwan). Furthermore, this volatility did not apply to direct investment, though it did apply to portfolio flows, reflected in (and both caused by and causing) stock market fluctuations.

A plausible rational explanation of this extreme volatility is ‘herding’ behaviour caused by lack of information by lenders about the way the borrowers used their funds and what their financial situations actually were. Such borrowers included banks, non-bank financial intermediaries and non-financial corporations. Perhaps there was also a lack of information about the macroeconomic situations in the countries concerned. To some extent the information was actually available but was not used or assimilated. In the absence of detailed knowledge, there is a tendency to

move with the herd, the herd being led by those particular sheep that appear to have better information. I must add that personally, I do not rule out a substantial element of irrationality, as in many manias and panics in financial history. But let me pursue this rational approach further.

If one accepts the information problem as one possible cause of extreme volatility, it follows that measures to improve information are desirable from this point of view. This seems to be the implicit logic of various proposals for measures designed to improve accounting and auditing, make corporate governance more transparent, avoid insider trading, reduce crony capitalism and so on. The many proposals that have been made along these lines, if implemented, would improve the efficiency of the financial and managerial system, and thus raise the marginal productivity of capital. This is, in any case, desirable, though not necessarily an urgent objective for the Asian crisis countries. But, insofar as such measures involve improvements in information, they should also reduce volatility.

I shall not go into details here, but only observe that many developing countries may need many years to bring about the suggested improvements because of lack of human resources, cultural factors, and so on. I also wonder whether all the changes that are proposed (such as turning family businesses into public companies) are wholly desirable, bearing in mind some advantages of what used to be described as 'the Asian model'.

Other reforms that have been proposed are designed to make renegotiation of private debts in a crisis easier. This includes putting new provisions into loan contracts and establishing adequate bankruptcy procedures. This is a different issue and comes under the heading of 'living with volatility', referred to further below.

## **2. Moral Hazard – Does it Explain Volatility?**

One might ask why moral hazard should give rise to volatility. If lenders expect to be rescued when there is some trouble, why do they suddenly panic? Do they no longer expect to be rescued? Moral hazard can help to explain excessive capital inflows during the boom but does not, it seems to me, explain the panic. Perhaps market participants have suddenly become aware of new information, but does that have anything to do with moral hazard? Perhaps it can be argued that the greater is the inflow in the boom period, the bigger can be the fall when the herd thinks it has new information. More generally, one might argue that the perception of expected rescue can be unstable, so that the existence of moral hazard does indeed contribute to volatility.

Much has been written about the likelihood that moral hazard has been an important factor in the Asian case. It seems fairly clear that many borrowers had reason to expect to be rescued, or at least somewhat protected, by their governments. But this does not apply to all. Perhaps foreign banks also felt more secure because of the Mexican rescue, though they might have realised that Mexico's relations with the United States made it a special case. But the euphoria also affected portfolio investors who had no reason to expect to be rescued, and who did indeed incur substantial losses.

I believe that the exceptionally favourable economic histories of all the Asian crisis countries led to some excessive euphoria, and to a failure to take adequately into account certain signs of economic problems ahead (deteriorating terms of trade, diminishing returns to investment, rising real wages).

In view of Korea's history, I doubt that the thought of the possible need for an IMF rescue for Korea crossed the minds of many market participants.

Still, this is not to deny that there is a moral hazard problem, especially in the case of banks, which need to be adequately regulated and supervised. Moral hazard may have led to excessive borrowing in the case of banks, and also by corporations in Korea and Indonesia. It is a matter of discussion whether it also contributed to excessive volatility.

### **3. Living with Volatility – More Reserves, Contingent Credit**

If capital inflows are volatile and unpredictable, and this volatility severely damages the domestic economy, as well as creating the danger of default, then the more foreign exchange reserves the country has, the better. If defaults and crises are to be avoided, at the minimum, short-term foreign borrowing by the private and public sector should be backed by comparable reserve levels. This assumes that sufficient help from outside – e.g. the International Monetary Fund – cannot be relied upon. It is now well accepted that the ratio of short-term debt, private and public combined, to reserves is crucial. Indeed, the whole of the domestic money supply, broadly defined (M2), is a potential foreign liability of the government.

It is worth noting that the Asian crisis countries did accumulate considerable reserves during the period of capital inflow – the result of interventions designed to avoid nominal exchange rate appreciations. It is also true that the two east Asian countries that avoided a crisis, namely Taiwan and Singapore, had exceptionally high reserves relative to GDP.

But the accumulation of foreign exchange reserves has costs and problems. The accumulation of reserves really represents very short-term lending by the public sector abroad. If the private sector is borrowing short-term abroad and the public sector is lending short-term and if, as is usual, the interest rate on the borrowed funds is higher than that received on highly liquid reserves, a cost is incurred. If the private sector had to accumulate its own foreign exchange reserves to match its borrowing, it would not engage in such activities. One might then say that the problem is the implicit transfer of risk from private to public sector – that is, the moral hazard problem. The private sector acquires liquid liabilities and this then requires the public sector to acquire liquid assets.

But there is also an externality factor. A private-sector crisis turns into a national domestic crisis through the Keynesian multiplier effect, and it is this effect that can be modified or even avoided through the use of fiscal policy which would involve a decline in reserves. (I discuss fiscal policy further below.)

Reserves can also be accumulated through current account surpluses and through long-term capital inflow. Here I will focus on current account surpluses. Taiwan has had large surpluses over long periods. China (PRC) has also had substantial surpluses. Even Korea ran surpluses for four years, from 1986 to 1989. If a high level of reserves can protect a country from the kind of severe downturns we have recently seen in east Asia, then reserves accumulation seems to me a very sensible use of private and public savings. It would reflect a spirit of self-reliance.

But one has to take note of the US problem, namely, an excessive political concern with bilateral ‘imbalances’ even if only lasting for a few years. Overall, current account surpluses in east Asian countries inevitably lead to large bilateral trade surpluses with the United States. For example, the Korean current account was in deficit in every year from the early 1960s until 1985, and then followed four years of surplus. This generated complaints from the United States – and pressure on Korea to open its markets – as if Korea were a chronic surplus country. Only deliberate trade distortions causing Asian countries to discriminate in their imports in favour of the United States can break this link.

In addition to reserves accumulation, countries might negotiate contingent credit lines with international banks. Argentina has done so, as has Mexico, and perhaps a few others might also succeed in doing so. I am not sure how realistic this is for many countries. But I do have one question. Membership of the IMF actually involves a form of contingent credit provision. One might ask why developing countries’ governments should be advised to go to the private sector for this purpose when this is exactly the role of the IMF, which has more experience and competence in this activity. The moral hazard problem is the same in both cases. The IMF deals with this problem with conditionality. I suppose the standard arguments for privatisation apply here. It might be worth pursuing this question further. Perhaps encouraging countries to establish contingent credit lines with international banks is simply a way of overcoming the political difficulties of getting more resources for the IMF.

#### **4. Living with Volatility – the Question of Capital Controls**

Here is ‘the hottest subject in town’. On the basis of an interpretation of the experience of the 1930s, the IMF Articles of Agreement did not require countries to open their capital markets, and only exchange restrictions on current account transactions were to be removed. This reflected Lord Keynes’ view, among others, that capital movements in the 1930s had been destabilising. In fact, from the 1970s capital markets did become more open, partly because of the increasing difficulty of controlling capital movements when trade restrictions were lowered or removed (and trade increased), and multinationals became more important. I need hardly add that, in more recent years, ideological commitments to liberalisation, pressures from interested parties, and technological developments have played major roles.

It is important to stress that the more open a country is to trade, the more need there is for trade credit, and the more opportunity there is for speculation through leads and



lags. All this makes evasion of controls on short-term flows easier. In addition, shifts of funds and transfer pricing by multinationals provide evasion opportunities. I would guess that the ability of India to have effective capital controls is partly the result of its general lack of openness.

But we are fortunate to have two very valuable laboratory experiments in economies that are very open, namely, that of Chile with its now-famous taxes on short-term inflows (in the form of requiring inflows to be accompanied by non-interest bearing deposits), and that of Malaysia with its controls on outflows. The Chilean measures appear to have been successful not in reducing total inflows (which was not necessarily desirable, in any case), but in reducing the share of short-term relative to longer-term inflows. The Malaysian case is very recent but no doubt is already being studied.

The argument that the monetary authorities should try to limit short-term capital inflows, when they seem to be getting excessive, seems to be overwhelming. If there is a typical domestic 'euphoria' boom, it is desirable to raise interest rates and tighten credit so as to tone down the boom. But the problem then is that this will attract more capital and lead to further real appreciation of the exchange rate. Controls or taxes on inflows are then surely appropriate. Naturally taxes (whether explicit or implicit) are preferable to quantitative controls, for the same reason that tariffs are preferable to import quotas. In addition, prudential controls should obviously be imposed on banks.

The case for controls (or taxes) on outflows is weaker. For one thing, when a country is in a serious crisis, the pressures for capital flight by local residents as much as by foreign lenders, are then immense and can overwhelm the effort. There are good examples of this from Latin America (especially Mexico and Argentina) in the 1980s. Hence there is an enforcement problem. Furthermore, with regard to controls or taxes both on inflows and outflows, I need hardly mention the administration/corruption problem. What is possible for Chile may not be possible or desirable for Indonesia, for example.

## **5. Living with Volatility – Need for Functional Finance**

Reserves are meant to be available in a crisis. This applies not only to reserves accumulated through earlier private capital inflows (and even current account surpluses), but also to reserves boosted by drawing on contingent credit facilities from international banks and on credit from the IMF. They can have three uses: to pay off foreign credits that are coming due and cannot be refinanced, so as to avoid default; to maintain the exchange rate or at least to finance intervention to moderate depreciation; and finally, to finance continued current account deficits resulting from Keynesian countercyclical fiscal expansion.

In the future there should be less of the first use if proposals to encourage or require 'bailing-in' private creditors are adopted, and there should be less of the second use if fixed exchange rate commitments have been avoided and borrowers have been encouraged to hedge against possible depreciations or to borrow in domestic

currency. (I discuss the exchange rate regime issue below.) The primary purpose of building up reserves for a crisis situation should be to finance continued, if reduced, current account deficits for a transitional period until the switching effect of devaluation boosts exports and reduces imports. These continued deficits would then result from temporary fiscal expansions. The aim would be to avoid, or at least moderate, the deep recessions into which both Mexico in 1995 and east Asian countries in 1998 were plunged.

If countries are to live with private-sector volatility, they will have to relearn the lessons that were taught in the 1950s by the advocates of ‘functional finance’: lessons that went out of fashion in academic circles in later years, though such policies were still practised to some extent. In boom times countries need to have fiscal surpluses so that they can have deficits when the boom-time music stops. These deficits may need to go beyond the levels that would result from the automatic stabilisers. (This was certainly required in the recent Asian episodes.) In other words, public spending may actually need to increase.

Of course, to some people it is counter-intuitive that when a country is in trouble and a fiscal deficit naturally increases, the fiscal deficit should be increased even more by deliberate policy. Herbert Hoover certainly found it counter-intuitive in the 1930s. Governments should have infrastructure projects prepared for this kind of situation, and some part of the increased spending should take the form of social safety-net expenditures (which is really a form of automatic stabiliser).

The market does not like budget deficits, especially ones that are deliberately increased. And in a crisis, market opinion certainly matters. That is a serious problem for the functional finance approach. The answer here is that a credible, conservative fiscal policy should be established in good times. Indeed, to a great extent the Asian crisis countries had done so, certainly more so than countries in Latin America. Substantial surpluses in boom times should be regarded as normal (a message for US politicians!). This would be rational from the point of view of optimal public borrowing even if market opinions did not matter.

I have heard or read two arguments.

One says that a current account improvement will eventually be needed in a capital market crisis, and standard theory has taught us that this requires not only real devaluation (‘switching’) but also a decline in total spending (‘absorption’). And the only way in which public policy can bring about the decline in spending is through fiscal contraction. The answer is that the decline in absorption automatically results from the private-sector recession in demand and, in the short run, at least, it may be a bigger decline than was required.

I have also heard (and it has been said in Korea) that when the private sector has to bear the burden of the crisis, the public sector should share it. The answer is that the necessary fiscal deficit could be brought about by increased social safety-net spending, for example, or temporary tax cuts, which would reduce the private sector burden. Furthermore, extra public spending, even on infrastructure, will increase private incomes.

Let me end this Keynesian interlude by noting the political economy problems raised by the functional finance approach. Do we really think that Indonesia would have benefited in 1998 if the Soeharto regime had felt free, or even been encouraged, to spend and subsidise more? Do we think that many developing countries can manage the required flexibility of functional finance? Also, the view is sometimes expressed that fiscal expansions at crisis time would inevitably protect not only the innocent bystanders but also the owners and managers who had been guilty of unwise and excessive borrowing and misuse of the funds borrowed.

## 6. The Exchange Rate Regime

It has been a standard view that high capital mobility and a fixed-but-adjustable (FBA) exchange rate regime are incompatible or, at least, that the combination is undesirable because it is highly likely to lead to crisis. This view goes back to the breakdown of Bretton Woods and certainly finds support from the 1992 Exchange Rate Mechanism (ERM) crisis, from the 1994 Mexican crisis, and from the recent Thai and Korean crises.

In the standard view there are really two objections to the FBA regime. First, when a devaluation or depreciation is inevitable because of fundamental factors or because of self-justifying speculation, the central bank (which tries, unsuccessfully, to maintain the exchange rate) ends up making losses to the benefit of speculators who have effectively engaged in one-way bets. Second, the FBA regime ends up in political crisis: in the effort to maintain the regime, the finance minister is obliged to make a credible verbal exchange rate commitment or promise which, it then turns out, he cannot keep. Ask Mr Lamont, Chancellor of the Exchequer of Britain in 1992, what he thinks about such a regime.

Such FBA regimes have often actually lasted a long time, the best example in recent times being Thailand – even though the baht was not formally fixed to the dollar. But eventually the FBA regime ends in crisis because of a drastic change in fundamentals or because of increasing capital mobility, usually caused, as in the Thai and Korean cases, by capital market liberalisation.

It is interesting that the Asian crisis has led to a new argument against FBA regimes. The argument is that private-sector borrowers, including banks, had faith in the commitment to the fixed rate, and so borrowed in dollars (or yen or Deutsche Mark) rather than domestic currency, but without hedging against depreciation. When the depreciation came, they then incurred huge capital losses in domestic currency, and these losses severely damaged the financial system and bankrupted firms. The effect was deflationary. Through this mechanism the depreciation was contractionary. The argument goes that, if the promise of a fixed exchange rate – apparently a credible promise – had not been made in the first place, borrowing might have been in domestic currency, or foreign currency borrowing would have been hedged.

But there is something I have wondered about. Why did banks and others borrow in dollars rather than, say, baht? The answer presumably is that dollar interest rates

were relatively lower. But why were they lower (for the same borrower from the same country)? Presumably the answer is that the market did allow for the possibility of devaluation or depreciation. Of course, it was only a possibility. Why then did the borrowers feel more certain about the exchange rate staying fixed than did ‘the market’?

It may be that the borrowers simply gambled and lost. They gambled because of the general euphoria that was prevalent and perhaps because, one way or another, they expected to be rescued by their government or central bank – a case of moral hazard. It might also be said that the likelihood of losing – that is, of a depreciation – did not seem high. The common argument is that a FBA regime encourages such a gamble. In essence, in my view, the standard or classic arguments against FBA regimes given earlier are sufficient to support the now common view that when there is high capital mobility, a commitment to such a regime is undesirable.

But what is the alternative to the FBA regime? The disadvantages of free floating when it concerns the US dollar-yen-Deutsche Mark (now euro) relationships have been rehearsed so often, I need not do so here. Of course, there can be some intervention, some management, whether sterilised or not. Here it may be useful to look at the Australian and Canadian floating rate experiences in recent years to see what can be learnt.

But here I want to refer to the Indonesian case. Indonesia did not have a fixed-rate regime before the crisis, though something near it. It had a modestly crawling peg with a fairly wide band, and when the crisis came, it allowed the rate to float almost immediately. It did not follow the ERM-Mexican-Thai precedents and try to maintain the rate, to the loss of the central bank. In my view it did all the right things. (This contrasts with Korea later in the year.) The Indonesian rupiah depreciated in the market beyond all reason and with very damaging effects on borrowers and the financial system, as well as on consumers or users of imports.

The Indonesian experience is no recommendation for floating. What was needed was some stabilising speculation. No doubt there was some, but clearly not enough. Perhaps the market was too thin. It may be worth discussing this episode. Was there any reasonable basis, given the knowledge (or lack of it) at the time for the extent of depreciation in early 1998, and why was there not more stabilising speculation?

I will also not take time now to rehearse the arguments for and against currency boards and their more extreme version, namely, dollarisation. Such regimes seem to be appropriate for very small economies – of which there are many in the world – and for countries with a history of very high inflation where there has been a major problem of monetary discipline in the past. Here Argentina is the most important example. Bulgaria satisfies both criteria – smallness and inflationary history. For the choice of a currency board regime, it is also desirable that the country’s trade be heavily biased towards the countries which are in the currency area which that country has effectively joined. (But is that true of Hong Kong?)

I suspect that more countries will move in the currency board direction. But it has to be remembered that all the empirical evidence from many developing countries

suggests that nominal exchange rate depreciations do have significant *real* exchange rate – and hence ‘switching’ – effects. And there are times when significant real depreciations are needed, the alternative being massive recessions.

My provisional and rather pragmatic conclusion on the choice of exchange rate regime is that for many middle-sized or larger developing countries, some kind of managed floating or flexible peg with a band, with the peg possibly crawling, and with no strong commitment to it, may be a reasonable compromise.

## 7. New Architecture?

I come now to the pretentiously entitled ‘New Architecture’. So far I have discussed a variety of actions that developing countries – the recipients of capital flows and the victims of excessive volatility – might take to protect themselves in the future. But what can the ‘international community’ do? Numerous proposals, often of a radical nature, have been made which are simply unrealistic, and I shall not discuss them here. In the range of feasible and sensible proposals (all of which are worth pursuing and have pros and cons) are several that directly involve the IMF.

Broadly, they fall in three categories.

First, in a crisis, the IMF should be more active and speedy in encouraging and facilitating restructuring of debts owed to the private sector, and in putting pressure on lenders to come to the table (through the IMF ‘lending into arrears’). In other words, more emphasis should be placed on ‘bailing-in’ rather than ‘bailing-out’ the private sector.

Second, the IMF should be active in encouraging improvements in developing countries’ financial sectors, not only by giving advice but by setting minimum standards or making prior improvements a condition for providing funds in a crisis. Possibly the interest rate it charges could vary with the extent of prior improvements achieved.

Finally, the IMF should be more sympathetic to controls or taxes on capital inflows, and possibly even outflows, especially in cases where the financial sectors are still quite inadequate. It should advise on implementation of such taxes or controls, where appropriate.

It might be argued that in the case of countries that have grossly inefficient financial sectors, perhaps all capital inflows, other than in the form of direct investment or trade credits, should be discouraged. If lenders cannot really know how their funds will be used, owing to lack of transparency – whether caused by weaknesses in corporate governance or by informal relationships between government and business – and if bankruptcy laws are inadequate, they should have the sense not to lend. The question is whether the IMF can help, at least with information. On the other hand, the usual market response to uncertainty or lack of information is to charge high interest rates and thus gamble. And what is wrong with that, it might be asked: is not risk-taking the business of the market? The answer is that, when the gamble does not come off, there are adverse effects not just on the gambler but also on bystanders.

At the margin of political feasibility is the proposal (which I favour) that the resources of the IMF be substantially increased so that it can adequately finance transitional current account deficits resulting from functional finance policies designed to avoid deep recessions. The problem is to define the appropriate cases rather narrowly and avoid or minimise moral hazard. While the IMF can never be a real lender of last resort because its resources are limited, in particular cases it can ease the temporary pains caused by the market's volatility.

Yet the funds available to the IMF are now so small relative to the massive private capital flows to developing and transitional economies that we have seen in boom times, that this line of thought is probably unrealistic.

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Recent publications include: with Anna J Schwartz, *A Retrospective on the Classical Gold Standard 1821-1931* (University of Chicago Press, 1984); with Lars Jonung, *The Long-Run Behavior of the Velocity of Circulation: The International Evidence* (Cambridge University Press, 1987); with Barry Eichengreen, *A Retrospective on the Bretton Woods International Monetary System* (University of Chicago Press, 1993); with Claudia Goldin and Eugene White, *The Defining Moment: The Great Depression and the American Economy in the Twentieth Century* (University of Chicago Press, 1998); and *Essays on the Gold Standard and Related Regimes* (Cambridge University Press, 1999).

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Horace ‘Woody’ Brock is president and founder of Strategic Economic Decisions, Inc. of Menlo Park in California. His firm specialises in applications of the modern economics of uncertainty to forecasting and risk assessment in the international economy and its asset markets. This research places considerable emphasis on tracking ongoing structural changes in the economy. The existence of such changes explains why the future is different from the past, and thus often surprises the markets when it arrives. The research also draws upon leading-edge academic work to explain from first principles ‘excess volatility’ and other forms of counter-intuitive market behaviour.

Dr Brock holds five academic degrees. He earned his BA, MBA and MS (mathematics) from Harvard, and his MA and PhD from Princeton (mathematical economics and political philosophy). Dr Brock was an Andrew Mellon Foundation bi-centennial Fellow in 1976. Aside from numerous publications in professional journals, he has published a series of op-ed pieces in the New York Times and the



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Professor Corden is the author of: *The Theory of Protection* (Oxford University Press, 1971); *Trade Policy and Economic Welfare* (Oxford University Press, 1974, 1997); *Inflation, Exchange Rates, and the World Economy* (Oxford University Press and University of Chicago Press, 1977, 1985); *Protection, Trade and Growth* (Oxford: Basil Blackwell, 1985); *International Trade Theory and Policy* (Edward Elgar, 1992); *Economic Policy, Exchange Rates, and the International System* (Oxford University Press and University of Chicago Press, 1994); and *The Road to Reform* (Addison-Wesley-Longman, 1997).

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Gordon de Brouwer is currently Chief Manager, International Markets and Relations, International Department at the Reserve Bank of Australia. He has been in this position since August 1998. Before joining International Department, Dr de Brouwer worked in Economic Research Department and Economic Analysis Department where he worked on a range of issues including assessing monetary policy rules, models of the Australian economy, and inflation expectations. Dr de Brouwer has a doctorate in economics from the Australian National University. His recent publications include *Financial Integration in East Asia* (Cambridge University Press, 1999) and *Asia-Pacific Financial Deregulation* (Routledge, 1999, contributing editor).

## **Michael P Dooley**

Michael P Dooley joined the faculty at the University of California, Santa Cruz in 1992 following more than 20 years' service at the Board of Governors of the Federal Reserve System and the International Monetary Fund. His published research covers a wide range of issues in open economy macroeconomics including work on crises in emerging markets, capital controls, international capital movements, debt restructuring, capital flight and liberalisation of financial markets.

Professor Dooley is a research associate of the National Bureau of Economic Research and is a managing editor of *International Journal of Finance and Economics*. He has been a visiting scholar at the Federal Reserve Board of Governors, the International Monetary Fund and the Bank of Japan and has taught at Bucknell University, George Washington University, the University of Texas, the University of Chicago Graduate School of Business, the IMF Institute, the World Bank Economic Development Institute and the Kiel Institute of World Economics.

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## Stephen Grenville

Stephen Grenville became a Deputy Governor of the Reserve Bank of Australia in December 1996, after having spent the previous four years in charge of the Bank’s Economic Group. He has been with the Bank for 14 years, working mainly in the Economic Research area, but also in Financial Markets. Before joining the Bank, he was at the Organisation for Economic Co-operation and Development in Paris for three years, and before that, spent two years in the International Monetary Fund Representative Office in the Central Bank of Indonesia. He worked for seven years with the Department of Foreign Affairs, and also spent time at the Australian National University.

## David Gruen

David Gruen became Head of Economic Research Department at the Reserve Bank of Australia in May 1998. He has been with the Bank for 10 years, working in the Economic Research and Analysis Departments. From August 1991 to June 1993, he was visiting lecturer in the Economics Department and the Woodrow Wilson School at Princeton University. Before joining the Reserve Bank, he worked as a research scientist in the Research School of Physical Sciences at the Australian National University. He holds PhD degrees in physiology from Cambridge University, and in economics from the Australian National University.

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Ricardo Hausmann is the Chief Economist of the Inter-American Development Bank. The oldest and largest regional multilateral development institution, the Bank was established in December 1959 to help accelerate economic and social development

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Michael Mussa is the Economic Counsellor and the Director of the Department of Research at the International Monetary Fund, a position he has held since September 1991. In this capacity, he is responsible for advising the Management of the Fund and the Fund's Executive Board on broad issues of economic policy and in providing analysis of ongoing developments in the world economy. In addition, he supervises the activities of the Research Department, including preparation of the *World Economic Outlook*, the reports on International Capital Markets, and a variety of other materials related to the Fund's economic surveillance activities, as well as a wide-ranging program of research on issues of relevance to the Fund.

Before joining the staff of the Fund, Michael Mussa was a long time member of the faculty of the Graduate School of Business of the University of Chicago, starting as an Associate Professor in 1976 and being promoted to the William H. Abbott Professorship of International Business in 1980. From 1971 to 1976 he was on the faculty of the Department of Economics at the University of Rochester. During this period he also served as a visiting faculty member at the Graduate Center of the City University of New York, the London School of Economics, and the Graduate Institute of International Studies in Geneva, Switzerland.

Dr Mussa's main areas of research are international economics, macroeconomics, monetary economics, and municipal finance. He has published widely in these fields in professional journals and research volumes. He is a Research Fellow of the National Bureau of Economic Research. In 1981, the University of Geneva awarded Dr Mussa the Prix Mondial Nessim Habif for his research in international economics. In 1987, Dr. Mussa was elected a Fellow of the Econometric Society. By appointment of President Ronald Reagan, Dr Mussa served as a Member of the US Council of Economic Advisers from August of 1986 to September of 1988.

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Paul A Volcker was recently named Henry Kaufman Visiting Professor at New York University's Stern School of Business. He also serves as director of, or consultant to, a number of corporations and non-profit organisations and he is North American Chairman of the Trilateral Commission and Chairman of the Group of Thirty, among other international organisations. Following two terms as

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Joseph CK Yam received his first class honours degree in economics and statistics at the University of Hong Kong in 1970. He started his civil service career in Hong Kong as a statistician in 1971. In 1976 he was transferred to the Economic Services Branch of the Hong Kong Government Secretariat as an economist. There he worked closely with the Financial Secretary and the Secretary for Economic Services on budgetary matters and on economic analysis.

In 1982, Mr Yam was transferred to the Monetary Affairs Branch as a Principal Assistant Secretary. He was subsequently appointed Deputy Secretary for Monetary Affairs in 1985 and Director of the Office of the Exchange Fund in February 1991. Mr Yam was responsible for many of the reform measures introduced since the mid 1980s to strengthen Hong Kong's monetary system and to develop Hong Kong's financial markets. These measures have contributed much to monetary stability in Hong Kong and its development as an international financial centre.

Mr Yam was instrumental in the establishment of the Hong Kong Monetary Authority in April 1993 when he was appointed Chief Executive. In July 1995, Mr Yam was honoured with the first Banker of the Year Award in Hong Kong by the Hong Kong Institute of Bankers. *Euro money* also awarded Mr Yam Central Banker of the Year in Asia in 1996 and Central Banker of the Year in 1997. Moreover, Mr Yam was awarded Man of the Year by Hong Kong Business magazine in December 1997. In May 1998, Mr Yam was awarded Central Bank Governor of the Year by *Asiamoney* for his role in piloting Hong Kong through the Asian currency turmoil.

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## Acknowledgment

The editors are very grateful to Pam Dillon, John Dokovic, Paula Drew, Angela Lalopoulos, Amanda Thornton and the staff of Economic Research Department for much help in organising the conference and producing this volume.