# CAPITAL FLOWS and CRISES

Barry EICHENGREEN

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Barry Eichengreen

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# Contents

# I Background

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# 1 Introduction

The implications of capital mobility for growth and stability is one of the most contentious and least understood issues of our day. The controversy is long standing: one only need recall Nurkse's emphasis on destabilizing capital flows in the 1920s or Keynes's and White's effort to construct an international regime with limits on capital mobility following World War II.[1] But the depth of disagreement in both academic and policy circles was pointed up by the Asian crisis. This event, which followed on the heels of widespread capital account liberalization in the first half of the 1990s, convinced many observers that early opening to international capital markets is a recipe for disaster. But it also led others to the opposite conclusion—that the problem in Asia was the failure to more fully deregulate markets and transactions, including international financial transactions, and to limit government's role. It is hard to think of another issue over which there is more dispute or where the stakes for policy are higher.

The essays here speak to this controversy. They provide historical, theoretical, empirical, and policy perspectives on capital flows. The emphasis is on the connections between capital flows and crises, because this is where much of the controversy resides. But crises are not the entire story. If they were, economists would have no compunction about recommending and policymakers would have no reluctance about pursuing policies to limit the economy's exposure to capital flows. There are compelling arguments against such policies, reflected in the models of theorists and the revealed preference of governments. Foreign finance can be used to augment domestic savings, helping relax resource constraints on capital formation; depending on its form, it can come packaged with expertise and be a conduit for technology transfer. International financial markets are

also a source of discipline on policymakers. For all these reasons, there are grounds for thinking that capital flows can have positive welfare effects. But the magnitude of these benefits is disputed, and none them is guaranteed, especially if capital movements set the stage for costly crises.

History illustrates these points. The twentieth century, although not a controlled experiment, is a rich repository of information on the effects of capital flows. The century, broadly speaking, can be divided into four parts, corresponding to four distinct capital market regimes. Before 1914, capital movements were free and net flows across borders reached levels never achieved again, not even in the 1990s. World War I was followed by a two-decade-long transition unlike both the period of free capital mobility that preceded it and the period of tight controls that followed. In the 1920s, policymakers aspired to reconstruct international financial markets and transactions along prewar lines but never entirely succeeded. Capital flows were smaller, the postwar boom in lending was brief, and governments played a more prominent role in artificially supporting and attempting to sustain those flows. When the world economy collapsed into the depression of the 1930s, capital markets collapsed along with it, culminating in the most severe international financial crisis of the century. Currencies were forced off the gold standard, countries defaulted on their debts, and governments slapped controls on capital flows. These policies and the problems to which they were a response set the stage for the third quarter of the century, during which countries maintained tight restrictions on international financial transactions. Measures limiting capital account transactions were then progressively relaxed and lifted starting in the 1970s, inaugurating another period of growing capital flows.

Chapter 2 surveys this historical experience in an effort to recover its implications for the policy debate. It argues that it is impossible to understand the pattern of capital flows—their magnitude, direction, and effects—without reference to the broader international system in which they occurred. Lending has tended to surge and its impact has been most favorable when international trade has been expanding, other international factor flows (labor flows in particular) have been unimpeded, macroeconomic policies have been sound and stable, and political ties between lenders and borrowers have created a "nexus of contracts" discouraging opportunistic behavior by the parties to these transactions. The importance of these contextual fac-

tors is evident in the contrast between the periods immediately before and after World War I. International migration was freer before this watershed; capital and labor flowed in the same channels. Trade was freer: foreign finance flowed more naturally into export-linked activities that generated the foreign exchange revenues needed to service and repay the loans. Neither aspect of the prewar system survived the 1914–1918 war. The political context also changed, as flows between the European powers and the overseas regions of recent European settlement were superceded by loans from the United States to the once and future belligerents of continental Europe, notably Germany. As monetary and fiscal policies in both the borrowing and lending countries became politicized, they increasingly responded to capital movements in destabilizing rather than stabilizing ways.

These observations help shed light on the effects of capital flows in the 1970s and the 1990s, two occasions when surges of international lending again culminated in costly crises. On both occasions, lending was promoted by the expansion of trade, the deregulation of financial markets, and economic reform in the borrowing regions. But this foreign money was not always invested productively, especially when governments and state banks with political agendas were on the receiving end. The flow of finance was then disrupted by sharp policy shifts in the lending countries. How easily the borrowers accommodated the consequences depended in part on the openness of the trading system. (Whereas the "new protectionism" of the 1980s complicated the efforts of Latin American debtors to export their way out of their crisis, for example, in the 1990s the North American Free Trade Agreement, NAFTA, and the willingness of the United States to act as importer of last resort had the opposite effect.) It depended on the flexibility of their economies and (as the counterexample of Indonesia reveals) on the robustness of their political systems.

This historical perspective makes clear that the association of capital flows with crises is not new. But is it growing closer? Chapter 2 reports the findings of a research project, conducted jointly with Michael Bordo and other collaborators, tracing changes over time in the frequency and severity of banking and currency crises and of their bad seed, the twin crisis. The most intriguing comparison from the point of view of current policy concerns is between the two periods of high capital mobility, before 1914 and after 1971. There is

little sign that crises are growing more severe, whether measured by the associated output losses or the time before recovery commences. By contrast, there is a clear increase in the frequency of crises, currency crises in particular—and because currency crises have occurred more frequently, there has been an increase in the incidence of twin crises (this despite the fact that the frequency of banking crises has remained essentially unchanged). Throughout the twentieth century, twin crises have been especially costly and disruptive to output. It is understandable that observers should have evinced concern about their growing frequency in the century's closing decades. The question, for present purposes, is whether their causes are essentially the same as in prior periods or whether their nature is changing. The last two sections of this volume attempt to establish these facts with reference to both recent experience and historical evidence and to draw out their implications.

Chapters 3 and 4 first review the evidence of the connections between capital mobility and growth. Chapter 3 summarizes what cross-country studies have to say about these connections. As it turns out, they say disappointingly little, positive or negative, about the effects of capital flows on economic growth. In part, this reflects the difficulty of measuring the openness of an economy to capital flows. Observed capital movements reflect not just the stringency of restrictions on foreign borrowing and lending but also the effects of domestic policies that attract or repel foreign investors, and of global economic and financial conditions that determine the attractiveness of the alternative investment opportunities. The standard International Monetary Fund (IMF) indices of the presence or absence of controls on capital account transactions, for their part, provide only a crude summary indicator of the relevant statutory measures.

In addition, the failure of the data to speak more clearly reflects the tendency for investigators to look for these effects in macroeconomic aggregates rather than at the sectoral or firm level. One might say it reflects the economist's habit of generalizing excessively—of attempting to uncover universal rules of economic behavior, in this case about the relationship between capital mobility and growth. If recent crises have taught us one thing, it is that this relationship is likely to be contingent on, inter alia, the strength of the institutions and markets that mediate the influence of the foreign funds, and on the compatibility with an open capital account of a country's other economic policies. Chapter 4 takes this proposition seriously: it asks

whether the growth effects of capital account liberalization are more favorable in countries with strong legal and contractual institutions (where the "rule of law" prevails) and with relatively deep and developed financial markets. There is considerable support for the first of these contingent relationships but only weak support for the second.[2] In addition, the broader policy context is critical—what turns out to be important, to put it another way, is the sequencing of reforms. Specifically, countries that open the capital account before eliminating severe macroeconomic imbalances are courting disaster. This finding has important policy implications, as I make clear in the final section of this volume.

Before getting there, I first devote five chapters to the crisis problem. Chapters 5 and 6, coauthored with Andrew Rose and Charles Wyplosz, are drawn from an empirical project on the causes of currency crises on which the three of us have been collaborating for some years.[3] There is a large literature in which it is now standard to distinguish currency crises from devaluations, to measure the former using indices of exchange market pressure (constructed from actual exchange rate changes, interest rates changes, and reserve changes), and to compare the behavior of the variables of interest in crisis and noncrisis periods. I like to think that it is from our research project, of which these chapters are the summary statement, that these methodological insights are drawn.

Those in search of simple answers may again be struck by the contingent nature of the findings. As chapter 5 documents, crises are heterogeneous; they vary among themselves and are more difficult to generalize about than currency devaluations. This is not surprising, because it is what theory predicts: there exist several different generations of theoretical models of currency crises based on different assumptions that point to different economic and political covariates.[4] Moreover, as in other contexts where the return to an action depends on how many other economic agents undertake that same action, multiple equilibria can arise. Although many of the propositions suggested by standard models and intuition find support in the data—crises are more likely when growth is weak, unemployment is high, the real exchange rate is overvalued, and macroeconomic policy is lax—the empirical counterparts of those propositions have only limited explanatory power. Their predictive power is even more limited. This is an important caution for those who would otherwise place excessive confidence in so-called leading indicators.

Chapter 6 applies this approach to the problem of contagion. The definition of contagion developed there has been widely adopted in the literature (so large that some refer, only half in jest, to the subfield of "contagion studies"). We define contagion as present if a crisis elsewhere in the world increases the likelihood of a particular country experiencing a crisis of its own, even after one controls for other observable fundamentals associated with crisis risk. The evidence is consistent with the presence of contagion in foreign exchange markets: a crisis elsewhere increases the probability of a crisis in the subject country by 8 percentage points, even after taking account of other domestic and international economic and political factors.

The limitation of this analysis is the difficulty of distinguishing contagion from common shocks caused by sudden changes in global economic conditions—what Paul Masson (1998) calls "monsoonal effects." We address this issue of identification by placing additional structure on the problem, weighting crises in other countries by the amount of trade in which they engage (to capture potential beggar-thy-neighbor effects), or by the similarity of their macroeconomic structure and policies (to pick up guilt by association). Again, the results are strongly suggestive of contagion, and again, the approach has been widely utilized in the subsequent literature. What is surprising, given how the growth of financial flows has so outstripped the growth of trade, is the tendency for contagion to spread so strongly among trading partners. One is tempted to dismiss this as a figment of the historical data, as trade figured more importantly than finance in the past, and to a greater extent in the past than in the present. In fact, however, subsequent research has shown this pattern to be robust.[5]

Panel data are suited for testing sweeping hypotheses such as the existence of contagion but less useful for providing a feel for the texture and dynamics of crises. For this one must turn to the history. With this in mind, the next three chapters analyze three of the crises of the 1990s—the European Monetary System (EMS) crisis, the Mexican crisis, and the Asian crisis. Chapter 7 compares the Mexican crisis, dubbed by Michel Camdessus (1995) "the first financial crisis of the 21st century," with the Baring-Argentina crisis, the last financial crisis of the nineteenth. Camdessus's remark suggests that there was something distinctive and unprecedented about the Mexican crisis that set it apart from its predecessors. He presumably had in mind the prominence of financial factors and the speed with which

events unfolded. But the comparison with the Baring crisis a century before suggests that there was little new about the causes of the Mexican crisis or how that episode played itself out. Parallels include the enthusiastic reaction of investors to the combination of low interest rates in the financial center and economic reform in the developing world, and the role of public banks in accentuating the impact of foreign capital on the domestic economy and of political weakness in hamstringing the government's management efforts.

Chapter 8 views the 1992–1993 crisis in the European Monetary System (EMS) from a similar vantage point. It might seem peculiar to describe the 1992–1993 episode as an emerging market crisis. Europe is not an emerging market. Its economy is highly developed and diversified. Its financial markets are deep. Yet despite these differences, the debates provoked by the EMS crisis parallel, to a remarkable extent, those stimulated by its emerging-market successors. There is the debate over the role of fundamentals versus destabilizing shifts in investor sentiment in the outbreak of the crisis. There is the debate over the importance of imbalances in the crisis countries themselves versus shocks from outside (in the European case, the German unification shock; in the Mexican case, the U.S. interest rate shock). There is the debate over the role of capital account liberalization in heightening financial risks, most of Europe's capital controls having been removed in the years leading up to the crisis. And there is the importance of banking-sector problems in limiting resort to interest rate increases to defend the currency. All this suggests that there is little new about the contemporary crisis problem. Only the removal of capital controls was needed to render Europe susceptible. In Latin America and Asia, the combination of capital account liberalization with political democratization, which made it harder for governments to credibly subordinate all other social and economic goals to the overriding imperative of exchange rate stability, sufficed to bring about the same result.

The implication is the extreme difficulty—and the extreme danger—of attempting to operate an exchange rate band, target zone, or crawling peg, and the importance of replacing such regimes with more robust exchange rate arrangements, either harder pegs or freer floats. In Europe, countries responded to these realities by moving to freer floating, as in the cases of Sweden and the United Kingdom, or by accelerating the transition to monetary union, the hardest of all hard pegs.

It will not surprise the reader that I draw the same lessons from the Asian crisis. Chapter 9 tells the story of that crisis.[6] Financial-sector weaknesses played a larger role than macroeconomic imbalances in setting the stage for the crisis. Among these weaknesses were poorly regulated banking systems, pervasive connected lending, unreliable bankruptcy and insolvency procedures, and weak creditor rights generally. When in the first half of the 1990s capital accounts were liberalized (often in the worst possible way, by permitting banks to borrow offshore while still limiting foreign investment in domestic bond and equity markets, and providing artificial incentives for short-term rather than long-term flows), this volatile mixture combusted. But it is not enough to argue that these policies were ill advised and that future governments should avoid them. It is important to understand that the policies in question were integral to the Asian development model. Banks were the agents of the government's industrial policy; it was in return for acting in that role that they received implicit government guarantees. That they were favored by the particular approach taken to capital account liberalization was hardly coincidental. Not only were they politically well placed, but ensuring their ample funding was critical to the success of the authorities' industry-promoting development plans. Crony capitalism was integral to the pursuit of rapid economic growth in the absence of a transparent contracting environment. In a sense, the Asian crisis was such a flashpoint because it revealed the dark side of that region's exceptionally successful development model, and the International Monetary Fund's advice and conditionality were so controversial because they recognized the need to remake that model along more market-oriented lines if Asian countries were to persist in integrating with world financial markets.

The last two chapters consider these issues of policy advice. Chapter 10 explains that the pressures for financial integration are powerful, bordering on the irresistible. Advances in information and communications technologies render capital controls designed to seal off economies from international financial markets immensely more difficult to operate. Such controls are still workable, but only if a government is able and willing to apply them comprehensively. Doing so is at odds with the desire to develop domestic capital markets and abandon policies of financial repression. Moreover, the spread of democratization in the Third World creates popular resistance to strict regulations that limit citizens' freedom of financial

action. Although capital controls may have a future, both trends suggest that it will be a limited one.

How then should emerging markets navigate this transition? Chapter 11 suggests some rules for the road on the assumption that capital account liberalization is the ultimate destination—after all, today's Organisation for Economic Cooperation and Development (OECD) economies all have liberalized financial markets and open capital accounts—but that moving in that direction is prudent only once the institutional and policy environment has been strengthened. Until corporate governance and supervisory infrastructures have been sufficiently upgraded to ensure that banks and firms can manage their own risks, policy should be used to limit their external borrowing. As the strengthening of institutions proceeds, foreign direct investment should be liberalized, followed by stock and bond markets. Only then should banks be permitted to borrow offshore. In addition, domestic policies should be better aligned with the capital account regime. This means adapting exchange rate and monetary policies to the openness of the capital account, and specifically abandoning pegged-but-adjustable exchange rates, crawling bands, and target zones in favor of either harder pegs or freer floats.

None of these guidelines are any guarantee against crises, given the volatility of financial markets and the asymmetry of the information environment. Some economic risks are worth taking, and crises are an inevitable concomitant of risk. Crises, like firm failures, can be seen as a manifestation of the Schumpeterian process of creative destruction. The role for economic analysis is to ensure that the creation dominates and that the destruction is not too costly.

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# 2 A Century of Capital Flows

## 2.1 Introduction

Perspectives on capital flows tend to be of two types. The first portrays international capital mobility an engine of growth. Capital flows relax constraints on resource mobilization, convey technological and organizational knowledge, and catalyze institutional change. The task for policy is thus to encourage funds to flow from capital-rich to capital-poor economies.

The second perspective sees capital mobility as a source of instability. Capital flows are volatile because they occur in an environment where information is incomplete. International capital movements are especially volatile, because information asymmetries are greatest when lenders and borrowers are separated by physical and cultural distance. Flows can turn on a dime, and when they do, they can bring the entire financial infrastructure crashing down. The task for policy is therefore to insulate economies from this risk by strengthening prudential supervision and limiting recourse to especially volatile forms of foreign funding.

As in an Escher print, whether the staircase is ascending or descending depends on how one focuses the eye. Depending on one's perspective, both views register with the brain. This suggests that the task for policy is to maximize the benefits of foreign investment while minimizing the risks—to enhance the resource mobilization, technology transfer, and institution-building roles of capital flows while limiting threats to financial stability.

Proponents of both views enlist history in their support. In the nineteenth century, some observe, foreign investment contributed significantly to capital formation in emerging markets. It prompted

far-reaching changes in financial structure and regulation. Foreign investment—as in the case of Argentine railways, where Englishmen not only provided the capital but also scheduled and drove the trains—came packaged with technical expertise.

But the association of capital flows with crises is equally evident. One recent study of the period 1880–1913, the last age of high international capital mobility preceding our own, counts 22 separate crises in 15 emerging markets.[1] The resemblance to our day extends beyond mere numbers. Take, for example, the Argentine crisis of 1889–1890, the context for which was connected lending and uneconomical investment, and where the failure of foreign investors to take up the Buenos Aires Water Supply and Drainage Company loan threatened to bring down an overextended Baring Brothers and placed the international financial system at risk.[2] Substitute Russia for Argentina and Long-Term Capital Management for Baring Brothers, and the parallels are clear.

## 2.2 Precis

The twentieth century saw four lending booms: 1880 to 1913, the decade following World War I, the years of petrodollar recycling that ended with the Mexican crisis of 1982, and the 1990s. The first wave was the largest: capital flows as measured by the absolute value of the current account balances of the principal capital exporting and importing countries reached 3.5 percent of Gross Domestic Product (GDP) between 1880 and 1913, compared to 2.5 percent in both the second half of the 1920s and first half of the 1990s[3] (see fig. 2.1). Their composition differed, however, with shifts from bond finance before 1930 to bank finance in the 1970s, and then to bond and equity investment in the 1990s, accompanied by the steadily increasing importance of foreign direct investment (FDI).

Moreover, these four lending booms occurred in similar settings.

### Lending Booms Have Tended to Occur During the Upswing of the Global Business Cycle

In the nineteenth century, the economic context was the spread of "modern economic growth" (as the process was labeled by Simon Kuznets) from its early outposts in Europe and North America to the overseas regions of recent European settlement, and the incorporation into the expanding world economy of new regions specializing

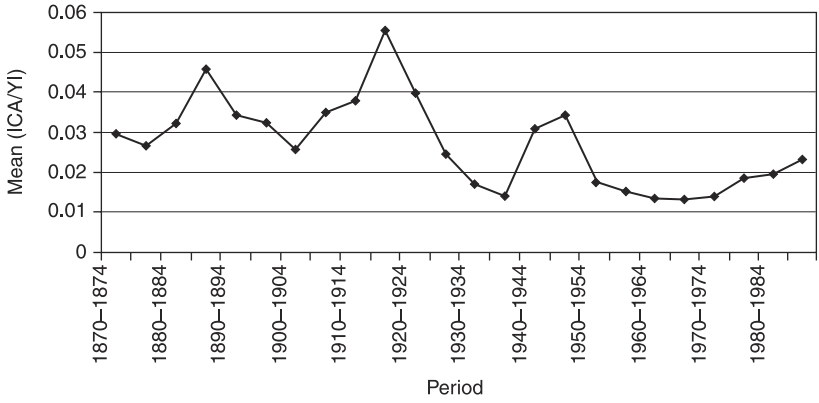


**Figure 2.1**
Current Account Relative to GDP: Summary Statistics
*Source:* Taylor 1996.

initially in the production of primary commodities. But regardless of whether activity in these new regions was predominantly extractive, pastoral, agricultural, or industrial, it created a demand for capital and therefore an incentive for funds to move. In the 1920s, capital exports from the United States responded to the economic legacy of World War I (in Europe, the capital needs of postwar reconstruction; in Latin America and Asia, the demand for infrastructure to support the increased agricultural and industrial production stimulated by the hothouse conditions of war). After 1973, flows to Latin America and Asia responded to improving growth performance and declining barriers to trade. And in the most recent period, the growth of lending was a concomitant of the triumph of global capitalism, specifically to the resumption of growth in Latin America, the ratcheting up of growth rates in East Asia, and the graduation from disequilibrium to the growth of transition economies in Eastern Europe and the former Soviet Union.

### Lending Booms Have Tended to Occur in Periods of Expanding World Trade

Without access to export markets, borrowers cannot earn the foreign exchange needed to service their debts, and in the absence of expanding commercial opportunities, their incentive to stay on good terms with their creditors, who are also their customers, is weak. For

both reasons, trade and lending have gone hand in hand. Over the four decades preceding World War I, the share of exports in GDP in Angus Maddison's sample of 11 systemically important countries nearly doubled, as transport costs fell and governments adopted trade-friendly policies.[4] Although the oil shocks of the 1970s produced balance-of-payments dislocations, between 1973 and 1981 world trade still expanded nearly twice as fast as world income. In the 1990s, multilateral and regional trade liberalization initiatives combined to create another boom period for trade.

After World War I, in contrast, efforts to negotiate a tariff truce under the aegis of the League of Nations came to naught. Still, countries moved quickly to eliminate import and export prohibitions. It was thus possible for trade to recover, even in the tariff-ridden conditions of the 1920s, which in turn provided encouragement for foreign lending.

**Lending Booms Have Tended to Occur Under Supportive Political Conditions**

In the nineteenth century, the British government took a hands-off approach to private lending. This is not to deny that politics shaped capital flows. Default by the colonies was not an option, and default by the self-governing dominions was all but inconceivable. The British Empire was a political bloc, a defense bloc, and an economic bloc, as well as a financial bloc, and these links discouraged unilateral financial action. Similar ties did not bind other lenders to their borrowers, but Paris, Berlin, and Washington used political pressure and sanctions to encourage debtors to meet their contractual obligations.

In the early 1920s, the U.S. and British governments sought to strengthen the competitive position of their banks and firms, using reconstruction and development loans as a lever, while at the same time husbanding capital for domestic use. The U.S. State Department reviewed each foreign loan, encouraging the belief that the authorities backed the enterprise. The post-1973 surge of syndicated bank lending did not develop under active encouragement by the American government, but when the developing-country debt crisis threatened the stability of the U.S. banking system, officials orchestrated a solution, the Brady Plan, which set the stage for the resumption of securitized lending. In the 1990s, the explosion of lending to emerging markets responded to the collapse of the Soviet bloc

and to economic and financial liberalization in developing and transition economies.

**Lending Booms Have Been Associated with Financial Innovation**

The late-nineteenth-century expansion of lending stimulated and was stimulated in turn by the development of financial institutions and arrangements to mediate the flow. French banks established risk-assessment departments to gauge the credit worthiness of borrowing countries. European and U.S. investment banks lent their imprimatur to bond issues. Australian banks opened branches in Britain to raise deposits from foreign savers. Bondholders' councils were formed to represent their members in negotiations.

When lending shifted to New York in the 1920s, U.S. banks branched abroad to gain a foothold in foreign markets. Investment trusts (the contemporary equivalent of mutual funds) provided investors with diversification services. When repayment became a problem, an American bondholders' council was created with the support of the U.S. State Department.

The resumption of portfolio capital flows in the 1970s similarly derived impetus from the growth of the Eurodollar market and the relaxation of capital controls, prompting the rise of the bank syndicates that became the vehicle for capital flows for the better part of a decade. The 1990s saw the securitization of bank claims and the emergence of dedicated emerging-market investors, notably the emerging-market segment of the hedge fund industry.

**The Crisis Problem**

It is when we come to the crisis problem that the theme of "*plus ça change, plus c'est la meme chose*" becomes irresistible.[5] Banking and currency crises were a hardy perennial before 1913. They dominated the interwar years. In the quarter-century following World War II, in contrast, crises—banking crises in particular—were few and far between, reflecting the prevalence of controls on capital flows and tight financial regulation. Banking and currency crises then returned with a vengeance in the 1970s, with the liberalization of financial markets and transactions and the resumption of international lending. The frequency and severity of crises was one of the most worrisome aspects of the 1990s.

But is the crisis problem growing? The answer, so far as Bordo et al. (2001) can determine, is that crises are growing more frequent

but not more severe. Relative to the pre-1914 era of financial globalization, crises are twice as prevalent today. This increase can be traced to the growing incidence of currency crises, which in turn points to the role of the monetary regime. A theme of recent research is the fragility of soft currency pegs in a world of high capital mobility.[6] Central banks should evacuate this unstable middle ground, it is argued, in favor of hard pegs or more flexible exchange rates. Hard pegs will limit currency risk and devaluation-related balance-sheet damage to banks and firms, whereas more flexible rates will encourage agents to hedge their exposures and free the authorities from the need to defend indefensible currency pegs. Because this evacuation of the middle ground is still underway, however, it is not surprising that the frequency of crises today is greater than it was under the gold standard a century ago.

There is less evidence that the output losses from crises are growing or that the time required for recovery is lengthening. Output losses from crises, as measured by these authors, were remarkably similar before 1914 and today. Taking all crises together, there is little evidence of an increase between then and now in recovery time. Nor is it obvious that the contagion problem is growing. Although the tendency for crises to cluster in time is greater since 1973 than it was before 1913, it was actually somewhat less in the 1990s than in the immediately preceding decades (the Asian crisis notwithstanding).[7]

Understanding what is distinctive about the recent period thus requires more detailed consideration of its predecessors—starting with the 1880–1913 episode with which comparisons are so frequently drawn.

## 2.3 Pre-1914 Capital Markets

The high point of capital transfer was 1880–1913. British capital exports averaged 5 percent of GDP and reached nearly twice that level toward the end of the period; the capital exports of the other leading creditor countries, France and Germany, averaged roughly half of British levels[8] (see fig. 2.2). Capital inflows financed as much as a third of investment in Canada and a quarter in Australia and New Zealand—compared to less than a tenth in developing countries in the first half of the 1990s.

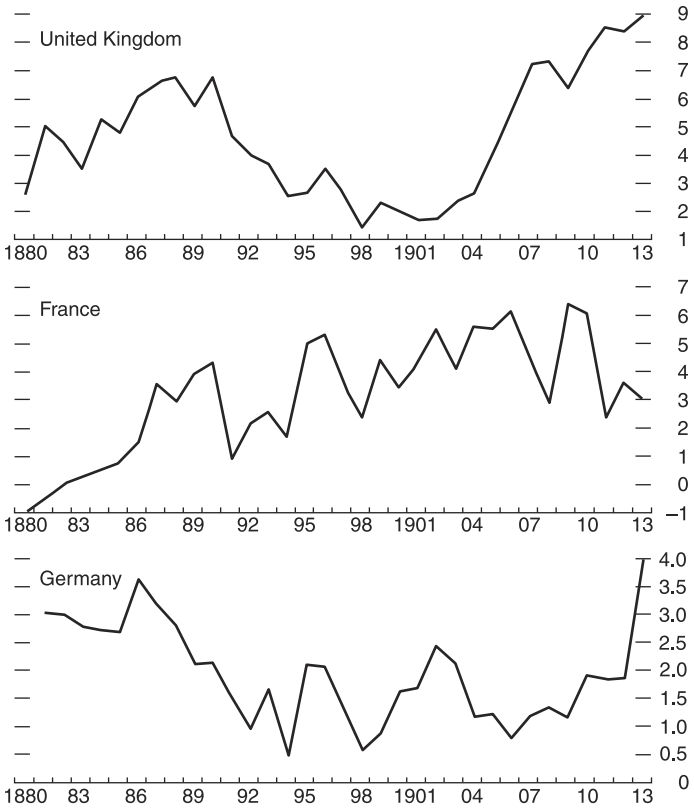


**Figure 2.2**
Net Capital Outflows as a Percent of GNP, 1880–1913
*Source:* Bloomfield 1968.

## The Economic Context

Lending booms, as noted above, have tended to occur in periods of global expansion. The decades preceding World War I were just such a period. Railroads linked the prairies of North America to the factories and processing centers of Chicago and St. Louis, and the pampas of Argentina to Buenos Aires. Urban conurbations developed around these processing and entrepôt centers, which in turn provided outlets to world markets. High levels of immigration, which brought labor power and skills, supported expanding production outside the European core.

Capital movements were integral to this process. The incorporation of overseas regions of recent European settlement into the world

economy required capital-intensive infrastructure and "population-sensitive" investment in housing and urban amenities. Nine out of every 10 pounds of British investment in Argentina, Australia, Canada, and the United States between 1865 and 1890 went into railroads and government bonds.[9]

The dominance of infrastructure meant that foreign investment was clustered in time. Much of the relevant infrastructure network had to be completed before it could be brought on line and returns began to accrue; this created an incentive to invest at the same time other investment was taking place so that the returns were not unduly delayed.[10] At the same time, the long gestation period of this investment made debt service difficult. In the case of a railway, the lengthy process of laying trunk and branch lines had to be completed before migration, production, and finally traffic could respond to the increased supply of transportation services. Receipts to service the loan could be few initially, making it hard to keep current in the absence of additional finance.

These interactions created positive feedbacks. Migration to the overseas regions of recent settlement, responding to the availability of land and opportunity, attracted capital flows to provide the infrastructure and housing services demanded by the migrants. But the induced capital transfer, by boosting growth in the recipient economy, in turn stimulated immigration. In this way, capital formation fed on itself, in the upswing of the Kuznets Cycle, until something—typically, an exogenous shock like a rise in European interest rates—brought the process to a halt.[11]

**The Commercial Context**

Trade was one of the great facilitators of nineteenth-century economic growth. Britain eliminated tariff barriers after 1840; within two decades, France and Germany moved in the same direction. To be sure, nineteenth century "free trade" was never entirely free—infant-industry protection in the United States and the alliance of iron and rye in France and Germany illustrate the point—but the increase in trade/GNP ratios Western Europe–wide, from 10 to 16 percent of GDP between 1870 and 1913, is impressive nonetheless.[12]

Beyond Europe, commercial expansion entailed the incorporation of new regions into the world economy. Declining shipping costs due to the railroad and the steamship were especially important to primary producers.[13] In particular, the advent of the freight car and

the refrigerated steamship allowed perishable products to be transported over longer distances than ever before.[14]

In the late nineteenth century, trade and capital flows were complements.[15] Trade encouraged the development of a financial infrastructure with which investment opportunities could be identified and funds could be disbursed. By discounting bills of exchange for exporters, for example, British banks gained familiarity with foreign markets. From providing financial services to British exporters, it was only a small step to providing analogous services to foreign suppliers. From there, it was another small step to underwriting foreign investments.

The openness of the British consumer market and the expansion of trade also facilitated the adjustment of capital-importing countries. Servicing debts was easier insofar as Britain provided a ready market for the commodity exports brought on stream by foreign investment. Kindleberger (1978) points to Britain's role as importer of last resort—that is, in providing an open market for distress goods—as critical for the stability of prewar capital markets. Generalizing this point, Fishlow (1986) attributes the stability of prewar capital markets to the way they fit into the economic system. Pre-1913 international lending was part of an export-oriented pattern of economic development. The exports to which it gave rise found a ready market in the creditor countries, in turn underpinning financial stability in the borrowing regions. These relationships were complementary at high as well as low frequencies. Thus, when economic conditions deteriorated in Britain, investment was redeployed from home to overseas markets (Cairncross 1953). British imports might decline, worsening conditions in the periphery, but when they did, British capital exports would rise, exercising an offsetting effect. Capital flows were stabilizing, in other words, because they were countercyclical. Thus, the operation of the financial system was eased by the economic context in which the capital transfer took place.

### The Political Context

Whereas Fishlow attributes the stability of prewar capital markets to the economic context, Feis (1930) emphasizes instead the political context. His approach has the advantage of accounting for the happier results of British, as opposed to French and German, lending.

British industry did not object to freedom of overseas investment, given its awareness of the value of overseas markets for its own

export sales. Investment in railroad construction, mining, shipping, and land development generated orders for British firms. Much of the land that the capital helped to develop, moreover, was owned by Englishmen. For these and other reasons, political opposition to capital exports was muted. The government, for its part, maintained a hands-off attitude toward overseas investment consistent with the prevailing ideology of laissez faire. Because the government distanced itself at the lending stage, it could commit not to intervene if problems subsequently arose, which in turn strengthened market discipline. This encouraged capital to flow along development-oriented lines. Admittedly, the authorities made clear their opposition or support for a loan when they felt that strategic interests were involved, as in Turkey, China, and Persia in the years leading up to World War I. But these were exceptions to the rule described in 1914 by Sir Edward Grey, secretary of state for foreign affairs, when he observed that "British financiers run their business quite independent of politics, and, if we attempt to interfere, they naturally consider that we come under some obligation.... It is much better that we should leave them to deal with these matters of loans."[16]

To be sure, partners in the issue houses sat in the Commons and Lords and communicated with the ministries. The Bank of England cooperated with the clearing and merchant banks, but communication between government and the markets was "irregular."[17] Only when political and financial interests coincided (as in the case of Chile's conquest of Peruvian territory in 1883) might the Foreign Office intervene on behalf of the bondholders.[18]

By comparison, the French and German governments intervened more extensively at the lending stage. Loans by these countries were more likely to underwrite the military ambitions of their allies, and investors, having lent at official behest, were in a stronger position to obtain assistance in the event of difficulties. Communication between the markets and the ministries was commonplace. Beginning in 1823, approval by the Ministry of Finance was required for admission of a foreign loan to the French Bourse. France had a more dirigiste tradition, of course, and the perceived slow growth of French industry sustained support for financial Colbertism. This led the government to discourage loans to foreign industry, the decision to prohibit listing U.S. Steel stock in Paris being a famous case in point. It led the government to tie approval to a commitment by the borrower to buy French goods.

In Germany, intervention was grounded in the Listian tradition. Late development was capital-intensive development (Gerschenkron 1962), encouraging industry and government to husband finance for domestic use. The arms race of the early twentieth century reinforced this predilection. The German chancellor appointed the commissar of the Berlin Stock Exchange, who oversaw the admission of foreign issues. The banks consulted the foreign office before underwriting loans.

Both the French and German governments vetoed issues on behalf of hostile governments and authorized those of countries offering political assurances. Paris intervened on behalf of the bondholders in Egypt in the 1870s and in Turkey after 1900. It dispatched a battleship to San Domingo in 1892 to protect a French bank and threatened to repeat the exercise in 1903 until the debtor agreed to give the foreign bondholders first call on all customs receipts.

United States government intervention on behalf of American investors tended to be, according to the classic study of the subject, "the result of two parallel lines of policy, one political and one financial, which converged and became amalgamated in one unified policy."[19] In San Domingo in 1903, the background to intervention was the debt of the Dominican government to the San Domingo Improvement Company, an American concern, and the desire to preempt further French intervention. In Nicaragua, where the United States intervened in 1910, strategic considerations centered on the desire for a U.S. naval base at Fonseca Bay and on plans for a canal that were opposed by the Nicaraguan government; a civil war that prevented customs revenues from being used to service a loan provided a pretext for landing the marines.

This tendency to employ finance in the strategic interest shows up in the dominance in French and German investment portfolios of claims on Europe (including Russia), Egypt, Turkey, and other parts of the Near East (fig. 2.3). Much of this lending financed public consumption and investment of dubious economy. It did little to encourage export-oriented development. The frequency of subsequent debt-servicing difficulties therefore comes as no surprise.

For English-speaking residents of Britain's colonies and self-governing dominions, in contrast, loans were the glue that held the Empire together. Australia and Canada obtained their funding almost exclusively in London, until the latter began accessing the New York market in the years preceding World War I. A default that

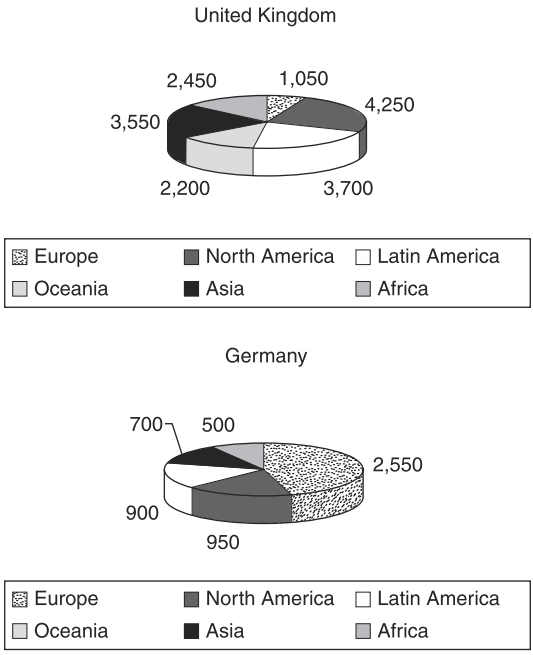


**Figure 2.3**
Geographical Distribution of Foreign Investment of the United Kingdom, France, Germany, and the United States in 1914 ($U.S. millions to the nearest $50 million)
*Source:* Fishlow 1986, 18.

caused the borrower to be de-listed by the London Stock Exchange thus threatened to foreclose market access.

Where political ties were strong, it was governments that were bound, and, knowing this, investors preferred government and government-guaranteed claims. Thus, loans to the commonwealth and dominions were disproportionately channeled through the public sector. Although this practice relaxed credit constraints, allowing countries capable of making credible commitments to borrow more freely, it did not ensure efficient use of the funds. When a railway enjoyed a government guarantee, bondholders had little incentive to monitor the uses to which their finance was put, because even if the funds were dissipated this was of little direct consequence for investors. The task of monitoring management fell to the taxpayers, or more precisely to their elected representatives, whose record of carrying it out was mixed, at best.

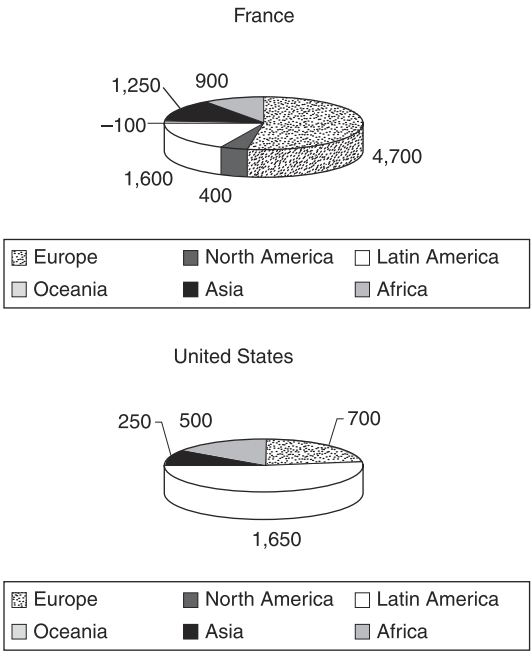


**Figure 2.3** (continued)

## The Financial Context

The late nineteenth century saw the construction of a complex institutional matrix to channel funds from capital-abundant to capital-scarce regions. The literature on asymmetric information points to its functions: these included gathering information on investment opportunities, signaling borrower credit worthiness, and monitoring projects. Examples of information-gathering and dissemination mechanisms include financial publications such as *The Investor's Monthly Manual, Burdett's Stock Exchange Official Intelligence, Poor's Manual of Railroads*, and *Herapath's Railway Journal*, rating agencies such as R. G. Dun & Company, and the research and rating department of Credit Lyonnais, the largest bank in the second largest creditor country.[20] Vehicles for risk sharing, diversification, and delegated monitoring included investment trusts serving a clientele of high-income investors. By 1914, as much of 90 percent of the assets of British investment trusts were overseas holdings.[21] The years following 1870 also saw the development of insurance companies as vehicles for holding foreign investments. British insurance

companies increasingly invested in marketable securities, foreign securities in particular. As a result, a growing number of working-class savers held foreign securities indirectly, via their insurance policies.

On the capital-importing side, institutional arrangements similarly responded to local need. In the United States, where the public sector had limited borrowing requirements (the federal government was paying down debt for much of the period, and many state governments, still in default on their earlier borrowings, were excluded from the capital market), the imperative was to mobilize resources for railroad construction, a task to which investment banking was ideally suited. Each of the seven leading London merchant banking houses established a North American counterpart—Davis and Gallman (2001) refer to them as "junior partners"—to gather market intelligence and arrange transactions. The senior partners in London provided bridge loans and placed the securities with British investors. After 1890 or so, the junior partners, including such well-known names as Drexel Morgan, Kidder Peabody, and August Belmont & Company, acquired a growing role in the mobilization and allocation of domestic as well as foreign funds (DeLong 1990). They developed links, through interlocking directorships and stock holdings, with commercial banks, life insurance companies, and trust companies, which in turn used investment-bank intelligence to guide their investments. There is thus a sense in which the distinctive features of late-nineteenth-century U.S. capital market development were an outgrowth of institutional arrangements originally developed to mediate capital flows.

In Canada, less suspicion of government meant a larger public role in infrastructure development, which was carried out by the extension of municipal and central government guarantees. Guarantees reduced the need for commercial intelligence; what mattered was the credit worthiness of the governments backing the bonds. From the 1890s on, capital mobilization relied on the bond houses, specialized bond dealers who channeled foreign funds into municipal finance by bestowing on municipal issues their "Good Housekeeping Seal of Approval." From there it was a small step for the bond houses to become vehicles for channeling savings, domestic as well as foreign, into commercial and industrial concerns. Reflecting this distinctive market structure, Canadian industry remained unusually dependent on bond finance up to World War I.

Australia is an even more extreme case, where colonial governments, rather than limiting themselves to the provision of guarantees, invested in social overhead capital directly. As a result, there was even less need for market intelligence. The main need was for an orderly market in the securities of the colony's governments, which was maintained by London joint-stock banks such as the London and Westminister and stock brokers such as the house of Nivison.[22] In contrast to the case of British investments in the United States, investment banks played little role. More generally, there were few incentives for financial-sector development or innovation.[23]

Compared to portfolio capital flows, foreign direct investment played a limited role. Dunning's (1983) estimates suggest that FDI accounted for less than a third of the stock of total overseas investments on the eve of World War I, much less than today.[24] Prior to 1880, that FDI that did occur was dominated by purchases of controlling equity interests in foreign companies by European corporations and individual investors. Only thereafter was a significant component accounted for by foreign branches of enterprises already operating in their home countries. Throughout, FDI was limited by the cost of communications and the consequent difficulty of monitoring management and controlling enterprise abroad.

**The Crisis Problem**

There is of course no single explanation for the incidence of financial crises, whether before 1913 or today. The precipitating event could be a sharp change in asset prices in the creditor countries, such as the May 1873 crash that originated in Central Europe but quickly spread to the United States and other capital-importing regions. It could be a nonfinancial disturbances, such as a harvest failure, whether in Europe or the overseas regions of recent settlement. It could involve graft and malfeasance, which tended to be the favored explanation of investors.

As previously noted, the countercyclical pattern of foreign lending had stabilizing effects. There were exceptions, however. Although policy was largely passive in the high gold-standard years, periodic monetary shocks at the center still aggravated the crisis problem at the periphery. In 1906, for example, Britain's demand for funds for its war in Southern Africa, the fiscal consequences of the conflict between Japan and Russia, and the accelerating arms race between Germany and its rivals put upward pressure on global interest rates.

The fact or prospect of gold losses then caused European central banks to raise their discount rates. These policies created stringency in emerging financial markets, which was one factor behind the 1907 crises in the United States, Canada, Italy, and Chile. Thus, the familiar twentieth-century pattern, in which rising interest rates and credit stringency in the lending countries set the stage for financial problems by curtailing capital flows to the borrowers, was evident in the nineteenth century as well.[25]

In the worst cases, financial distress forced governments to suspend payments on their debts. Default was not something into which governments entered lightly, but neither was it infrequent. Suter (1992) estimates that some 20–25 percent of the foreign bonds held by British, French, and German investors were in default at the end of the 1820s, due to a wave of Latin American suspensions; in the 1840s, when various U.S. states defaulted; and again in the 1870s, due to another wave of defaults by both Latin American borrowers and U.S. states. By comparison, the debt crisis of the early 1890s affected less than 5 percent of foreign bonds despite defaults by Argentina, Colombia, the Dominican Republic, Honduras, Paraguay, Uruguay, and Portugal.

Default was not entered into lightly because of its implications for market access. Suter estimates that the time from default to settlement averaged 14 years between 1821 and 1870, but just six years in final three decades of the century. The decline is plausibly attributable to the development of mechanisms for orderly restructuring, notably standing committees representing the interests of the creditors. So organized, the bondholders could put up a cohesive front, bar the debtor from the market, and lobby for the application of diplomatic or military force. The British Corporation of Foreign Bondholders was probably the most effective of these organizations. Only by concluding settlement negotiations on terms acceptable to the corporation could a debtor avoid being barred from the Stock Exchange and having its loans de-listed. After 1898, the *Association Nationale des Porteurs Français de Valeurs Étrangères* operated a similar set of arrangements with the Paris Bourse, and analogous entities grew up in other countries.[26]

The other prerequisite for regaining market access was to restore gold convertibility, preferably at the pre-crisis rate of exchange. Bordo and Rockoff (1996) find that countries on the gold standard were able to borrow at more attractive rates than countries with in-

convertible currencies. The restoration of gold convertibility was a regime change that swamped any lingering effects of debt-servicing difficulties. By accepting the disciplines of the gold standard, governments reassured investors that not just current but also future policies would be sound and stable. Although default and devaluation had costs, it nonetheless appears to have been possible to reestablish creditworthiness through a convincing change in regime.

## 2.4 The Interwar Years

The next surge of lending in the 1920s bore at least superficial resemblances to its predecessor. Beneath the surface, however, lurked important changes from the prewar setting.

### The Economic Context

The second half of the 1920s, like the other episodes considered here, was a period of global growth. World manufacturing production grew at a compound annual rate of 6 percent from 1924 to 1929. This bode well for the capacity of the borrowers to service and repay their debts. From the perspective of capital-market dynamics, however, the issue was whether this growth was sustainable.

World War I dealt a setback to industrial production; Lewis (1978) estimates that the war cost four and a half years of normal growth. In the disorganized conditions of the immediate postwar period, it was hard to make up lost ground. Only when fiscal imbalances were redressed, inflation contained, and stability returned to the foreign exchange market could investment resume. Germany, where production was disrupted in 1923 by passive resistence and hyperinflation and where green shoots of recovery sprouted in 1924, is only a particularly graphic illustration of the general point. Once prices were stabilized, foreign finance flooded into the country, attracted by the high interest rates characteristic of a recent inflation stabilization. Much—by some estimates half—of this lending was short term (shades of the "carry trade"). By the end of the 1920s, Germany had become the world's leading foreign debtor. These inflows fueled the concurrent surge of investment and growth. But to the extent that the rapid growth of 1924–1929 was a rubber band–like reaction to the postwar slump, there were reasons to doubt how long it would last. If growth slowed, questions were bound to arise about the viability of these debts.

Nor was this lending as neatly integrated into the larger process of economic development as it had been before the war. Now some two-thirds of new capital issues on London were for governments; in New York, the comparable figure was nearly 80 percent.[27] The 1920s being a decade of budget deficits, governments borrowed to finance public consumption. Spending on veterans' pensions and municipal swimming pools did not obviously translate into an increase in export capacity, in other words. Latin American governments, when floating issues in London and New York, proclaimed their allegiance to the nineteenth-century developmental model, borrowing for the construction of railways and ports (and also, increasingly, for schools, hospitals, gas and electrical works, sewer systems, and street and highway paving). Unfortunately, many of these investments were ill planned. Streets were paved "out in the desert."[28] These inefficiencies reflected the growing role of politics in the allocation of finance and in particular the politicians' use of loans to favor their cronies and consolidate their power.[29]

Nor were the output and exports that were supposed to flow from foreign investment supported by complementary flows of labor, as countries slapped controls on immigration. Argentina had been moving in this direction since the turn of the century but tightened its restrictions during and after the war. Brazil restricted immigration in the first half of the 1920s. In Australia and Canada, the response was delayed until 1930, but the consequences were the same.

Importantly, the capital flows of the 1920s were pro- rather than counter-cyclical and destabilizing rather than stabilizing from the point of view of the capital-importing regions. In the nineteenth century, as noted above, whenever the British economy slowed, capital was redeployed abroad. Hence, the macroeconomic impact of declining export revenues at the periphery was cushioned by the increased inflow of funds that could be used to underwrite domestic investment and finance the current account. In contrast, between 1924 and 1928, when the United States boomed, so did its foreign lending, but when U.S. growth collapsed in 1929, so did capital exports.

This inversion of the prewar pattern reflected more than the shift from London to New York; it mirrored the changing role of monetary policy. In the nineteenth century, monetary policy had been essentially passive, responding as dictated by the gold-standard rules.[30] When activity in Britain turned down, interest rates declined

to restore equilibrium to the money market, in turn making overseas lending more attractive. In the 1920s, in contrast, monetary policy was used more actively. When the United States cut interest rates in 1924 to help Britain back onto the gold standard and again in 1927 to keep her there, the consequences were stimulus to U.S. growth and additional capital exports. When the Federal Reserve then raised interest rates in 1928–1929 to rein in the stock market, it put downward pressure on U.S. growth and at the same time discouraged foreign lending (by making domestic yields more attractive). Thus, conditions in commodity markets and capital markets now moved together. Nor was this more activist approach to monetary policy exclusively an American innovation; it was evident in the United Kingdom and other countries as well. It reflected changes in the financial environment and in the way monetary policy was conceptualized. In turn, it had profound implications for the impact of capital flows.[31]

**The Commercial Context**

In the three other episodes considered here, trade grew faster than output, greasing the wheels of international finance. Between 1924 and 1929, in contrast, trade rose no faster than manufacturing production.[32] The failure of trade to grow more rapidly reflected the failed tariff-truce negotiations of the 1920s. The backdrop was the wartime expansion of agricultural, primary, and manufacturing production in Asia and the New World. Once the war disrupted supplies of grain from the Old World's Central and Eastern European breadbasket, countries such as Canada, Australia, and Argentina sprang to fill the void. Excess supply and weak prices consequently became chronic problems when hostilities drew to an end and traditional sources of supply came back on line. The 1920s were marked by weak agricultural prices, which in turn intensified the pressure for tariff protection from farm interests.[33]

Similarly, the war interrupted traditional patterns of trade in industries such as cotton textiles, stimulating import substitution and nontraditional exports by countries such as Japan and India. Here too the consequences were chronic oversupply and weak prices, with protectionist pressure evident even in long-standing free-trade bastions like Lancashire.

The postwar settlement only aggravated this situation. It created new nation states in Central and Eastern Europe. These new states,

faced with building tax administrations from scratch, relied on import duties for public-sector revenues. Thirty-three billion dollars of German reparations and $27 billion of Allied war debts did not help: reparations and war-debt transfers weakened the balance of payments of the debtors, augmented gold outflows, and threatened exchange rate stability. Countries became increasingly "balance-of-payments conscious," as one study put it.[34]

For all these reasons, the 1920s were not the ideal commercial context for international capital flows, but they were far better than the 1930s. With the onset of the Depression, trade collapsed, reflecting the downward spiral of incomes and the tariff hikes triggered by the Hawley-Smoot Tariff. It is hardly surprising in this light that many of the financial obligations incurred in the 1920s proved unsustainable.

**The Political Context**

The debt overhang bequeathed by World War I meant that postwar lending was politicized. Significant private lending would have been impossible without political intervention to set the stage. Under the leadership of Secretary of State Charles Evans Hughes, the United States sought to restart German growth and reintegrate Germany into the European economy. Doing so required shrinking its debt, which made the United States an advocate of reparations revision. Its efforts culminated in the Dawes Conference of 1924 and the $220 million Dawes Loan, half of which was placed in the United States by a syndicate of four hundred banks and eight hundred bond houses led by Morgan and Company. Under the leadership of Benjamin Strong of the Federal Reserve Bank of New York, the United States also pushed for the reconstruction of the international gold standard. Free capital mobility was of course one of the foundation stones of the gold-standard system. To this end, the New York Fed provided stabilization loans to get the key players back on their gold-standard feet.

In the summer of 1921, Secretary Hughes requested that U.S. bankers underwriting foreign issues consult with his department so that the government could make known its attitude toward their loans. This led to the State Department Rule of March 3, 1922, under which the department offered an opinion on any projected loan. "[W]henever the department 'passed upon' a foreign deal as not detrimental to the political interests of the United States, the public

(with the help of the security's promoters who usually mentioned the State Department action) believed that this meant that the deal was therefore commercially promising and the investment a good one."[35]

In practice, the State Department rarely voiced reservations about foreign loans. This reflected its perception that the United States and United Kingdom were engaged in a struggle for financial and commercial supremacy and that foreign loans were the weapon of choice. The Bank of England and the British government pressed other countries to hold their reserves in London, to invoice their transactions in sterling, and to obtain trade credits from British banks. To encourage them to do so, they arranged stabilization loans, as in the case of Austria. Strong and his compatriots sought to bring the same business to New York. As South Africa's leading banker explained, "Trade really follows the bank, and if South Africa is financed by America, no doubt America will get a larger share of South African trade."[36] This may or may not have been the reality, but it was the perception. It led politicians to turn a blind eye to financial excesses.

The weakness of the British balance of payments played into this American policy. Reflecting the reduced interest earnings consequent on wartime sales of foreign securities, successive British governments embargoed long-term foreign lending at the beginning of the 1920s, in 1925, and again toward the end of the decade. These restrictions worked to further reorient the economic relations of the borrowers, especially in Latin America, toward the United States. They rendered emerging markets more vulnerable when U.S. capital exports and commodity imports turned down at the end of the 1920s.

**The Financial Context**

The capital flows of the 1920s were associated with another wave of financial innovation, most prominently in the United States, responding to the need for information and diversification services. Although none of these innovations were fundamentally new, their essential forms already having developed before the war, they exhibited distinctive features when they took root in foreign soil.

Much U.S. lending before 1913 had taken the form of foreign direct investment in railroads, mining, and commodity processing in the Western Hemisphere. World War I transformed this situation. The Liberty Loan campaign promoted the growth of a deep and liquid

bond market, expanding the customer base.[37] The majority of U.S. foreign investment in the 1920s was thus in securitized instruments. Notwithstanding direct investment by the United States and Europe in oil drilling in the Gulf of Mexico, the East Indies, and the Persian Gulf, in nonferrous metals in South America, and in rubber production in Liberia, Malaysia, and the East Indies, and the establishment of branch plants by manufacturing concerns in markets blockaded by tariff barriers, the FDI of the principal creditor countries was consistently outstripped by their portfolio investments, just as it had been before 1913.[38]

Second- and third-generation American investment banks, which had started by helping to arrange capital flows into the United States and then moved into the mobilization of domestic savings, now jumped with both feet into the origination of foreign loans. They continued to work with their British counterparts, but whereas the American partner had traditionally provided the market intelligence while the British partner provided the finance, now their roles were reversed. Morgan dominated the foreign loan business of Argentina, Dillon Read that of Brazil, J. and W. Seligman that of Peru, Kuhn Loeb that of Chile. United States commercial banks branched abroad, soliciting foreign loans, underwriting foreign securities, and placing the bonds with domestic customers. They established bond departments and securities affiliates, opened store-front sales offices, and took out newspaper ads. Investment-trust and insurance-company balance sheets expanded rapidly, and these non-bank intermediaries provided the same portfolio management and diversification services as their British counterparts. Foreign securities were increasingly among their holdings.

Because the majority of this borrowing was by governments, and because market access required only hooking up to an existing infrastructure, these capital inflows did less to stimulate the development of financial markets than in Canada or the United States before 1913. In Latin America, there was little domestic market for government bonds. It took time to develop a central and commercial banking system in the image of the Federal Reserve System and its members. An exception was the capital-importing countries of Central and Eastern Europe, some of which already possessed reasonably well-developed banking systems. By offering high interest rates for foreign deposits, those banking systems became ports of entry for short-term capital inflows, which the banks used to invest in indus-

try and real estate. The consequences of this combination of liquid liabilities and illiquid assets, which came home to roost in 1931, will be familiar to any observer of the Asian crisis.

When the majority of the foreign bonds issued in the 1920s lapsed into default in the 1930s, it became fashionable to blame these institutions.[39] Stoddard (1932) describes conflicts of interest among the deposit-taking, underwriting, and marketing activities of U.S. commercial banks. As Sessions (1992, 11) summarizes the view, "The chronicle of American private investment abroad during the twenties, with all its insanity, tells a story of unbelievably foolhardy purchases on the part of investors and irresponsible flotations on the part of foreign governments and their collaborators in the issue house establishment in the United States."

**The Crisis Problem**

Recklessness there may have been, but it is hard to know how much to make of it given the macroeconomic context. In the absence of the Great Depression, in other words, things might have turned out differently. The single most important implication of interwar experience may be that whatever the financial structure, international financial transactions will come to grief in an unstable macroeconomic environment. As output and prices spiraled downward, one country after another experienced a banking crisis, and as production and trade imploded, one country after another depreciated its currency, voluntarily or not. By the end of the 1930s, the list of countries experiencing banking and currency crises reads like an atlas of the world.[40] Currencies toppled like dominos, starting with depreciation by selected commodity-exporting, capital-importing countries in 1929, accelerating with Britain's sharp depreciation in 1931, and culminating with the 40 percent devaluation of the U.S. dollar in 1933. A handful of countries, led by France, clung to the gold standard in a desperate effort to shield their currency pegs, but by 1936, the end was nigh.

The output costs of these crises were larger than their predecessors.[41] In a sense, this is why this particular slump came to be known as the Great Depression. The devastating nature of the banking crises of the 1930s, of course, is Friedman and Schwartz's (1963) explanation for the severity of the Depression in the United States, which they attribute to the decline of prewar methods of managing crises in conjunction with the failure of the Federal Reserve System

to assume that responsibility. Cross-country comparisons suggest that the phenomenon was general: the unusual severity of interwar banking crises was evident also in other countries.

Part of the explanation for the contrast with the preceding period lies, ironically, in the extent of financial development. In the nineteenth century, the macroeconomic effects of banking crises may have been less because banking systems were less developed. Because enterprise did not rely so heavily on external finance, financial crises had more limited effects.[42] By the 1920s, in contrast, banking systems had developed further, heightening the effects of financial-sector disruptions.

In addition, there was the problem of flight capital ("hot money," as it was known to contemporaries). The credibility of the commitment to the gold standard had been cast into doubt by the myriad changes set afoot by World War I. The franchise was extended, giving voice to working-class voters with other priorities, such as reducing unemployment, that might be at odds with maintaining convertibility. Wartime experience had shown that fiscal policy could be directed toward new goals, suggesting that the budget might no longer be subordinated to maintenance of the currency peg. Theories had been developed linking monetary policy to the state of the economy. For these reasons and others, capital no longer flowed in stabilizing directions in the event of shocks. Instead, deteriorating economic and financial conditions might only heighten doubts about whether governments were prepared to stay the course. Where those doubts were serious, the result could be large-scale capital flight, leading to a financial meltdown. The changing nature of capital flows, in other words, was at the root of interwar financial problems.

As in Asia in 1998, some depreciation of currencies was needed to correct problems of overvaluation and debt deflation. Once markets were convinced that abandoning the gold standard did not mean that the authorities would succumb to inflationary excesses, governments could reflate, stabilizing the banking system and the economy. Given that the gold standard had been the linchpin of economic policy and that its removal inaugurated a new era of uncertainty, however, the authorities had to proceed cautiously so as not to excite investor fears. The initiation of reflationary policies, more often than not, was delayed, and monetary reflation, once commenced, remained surprisingly tentative. To prevent reflation from precipitat-

ing capital flight, some governments even felt compelled to impose capital controls. Currency depreciation and monetary reflation often presupposed the suspension of service on external debts, because the latter were denominated in foreign currency.[43]

The defaults of the 1930s took, on average, 10 years to clear away, a long time by pre-1913 standards. World War II provides part of the explanation for the delay in financial normalization, but so too does the collapse of international capital markets and international transactions generally, which reduced the incentive to settle.

## 2.5 From the Oil Shock to the Debt Crisis of the 1980s

Whereas lending in the 1920s resembled that before 1913, no one could mistake the 1970s for the episode that preceded it.

### The Economic Context

In contrast to the 1920s, a decade of weak primary commodity prices, the period starting in 1973 was characterized by sharp commodity price hikes. In addition to the oil price increases of 1973 and 1979, there was the commodity price boom of 1973–1974. Rising commodity prices increased the capacity of primary-commodity-dependent developing countries to generate export receipts. They enhanced the attractions of projects that involved the expansion of commodity producing capacity. They implied negative real interest rates for the borrowers (fig. 2.4).

To be sure, different emerging markets were affected differently. The most visible divide was between oil-exporting and oil-importing countries. More generally, developing countries fared differently as a function of the commodity or commodities on which they depended for export revenues.[44]

The growth of financial flows occurred against the backdrop of economic reform and market opening in the developing world. Latin American countries had already begun turning away from the policies of import substitution to which they had been driven in the 1930s. Tariffs were reduced. Chile, Colombia, and Brazil adopted crawling exchange rate pegs as a way of maintaining their international competitiveness. Other countries subsidized nontraditional exports. In East Asia, the 1960s and 1970s saw the birth of the "miracle." More than any time in half a century, developing countries became a place to do business.

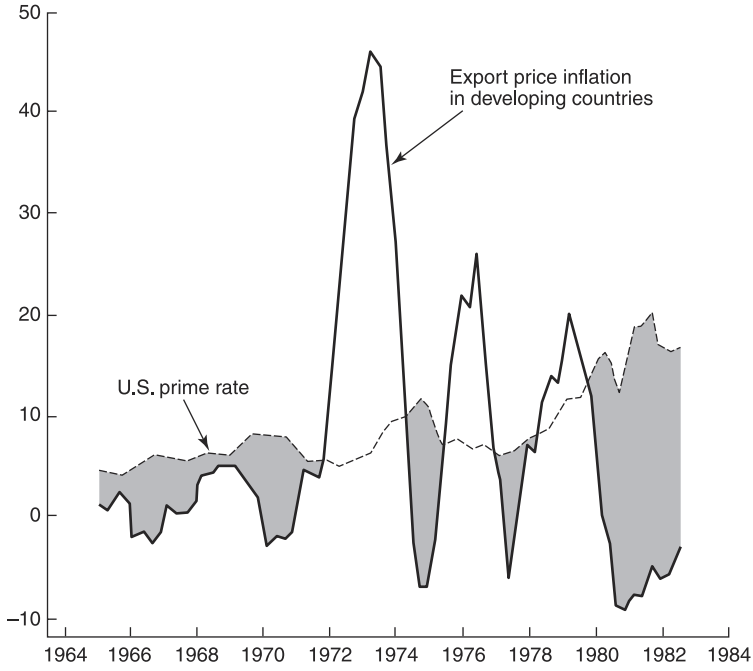


**Figure 2.4**
Real Interest Rates, 1973–1982
*Source:* Dornbusch and Fischer 1985, 59.

In addition, the lending of the 1970s occurred in a world flush with liquidity. Contrary to worries that the current account surpluses of oil exporters would create a global liquidity shortage, the result was large amounts of finance chasing a limited number of investment opportunities. For oil exporters, the money center banks were the logical place to park their funds, and the banks had nowhere better to lend than to oil-importing developing countries. To be sure, recycling oil revenues facilitated adjustment in countries prepared to adjust. But to the extent that bank lending financed deficit spending as well as adjustment, it raised questions of sustainability.

That more questions were not asked reflected the exceptional liquidity of the markets in a decade of worldwide inflation. Creditors as well as debtors preferred to finance rather than adjust to the oil shock and enlisted their central bank printing presses. Given the resulting low level of real interest rates, banks flush with funds

searched for higher yields abroad. In this low real interest rate environment, developing countries had every incentive to borrow.

**The Commercial Context**

Contemporaries saw the 1970s as troubled times, reflecting the acceleration of inflation, the breakdown of the Bretton Woods System of pegged-but-adjustable exchange rates, and two severe recessions in the industrial countries. Trouble, of course, is relative: global GDP in fact grew at an average annual rate of 4 percent between 1970 and 1981. It is hard to imagine that international capital markets would have started up in a less favorable environment. What was true of output was also true of trade. Between 1973 and 1981, world trade grew by 9 percent per annum. As a result, the debt/export ratios of the non-oil-producing developing countries were actually lower in 1979 than in 1970–1972, despite the extensive borrowing in which they had engaged in the interim.

Credit is due in part to the Tokyo Round of GATT negotiations that began in 1973 and concluded in 1979. The Tokyo Round is generally regarded as the most comprehensive GATT round. It yielded six codes dealing with nontariff measures (the most important of which concerned government procurement and subsidy/countervailing duty measures), tariff reductions by the industrial nations averaging 35 percent, and several revisions of the GATT of special interest to developing countries. In particular, the latter were promised that they would have escape-clause protection from GATT disciplines in the event of terms-of-trade shocks. This in turn gave them the confidence to persist with export-led growth.

Although these measures were agreed to only at the end of the 1970s, the fact that negotiations were ongoing discouraged backsliding. "In retrospect, there is little doubt," as Winham puts it, "that the Tokyo Round offered a rationale for governments to avoid taking protectionist actions during the 1970s."[45] As a result, the exports of non-oil-producing developing countries grew by 21 percent per annum in dollar terms from 1974 through 1980, a period in which the interest rates they paid averaged less than 13 percent.

**The Crisis Problem**

Alas, this happy situation was not sustained. The debt/export ratios of non-oil-producing developing countries rose by 23 percent between 1980 and 1983 and by fully 38 percent in the case of

the non-oil exporters of Latin America. A deteriorating international economic environment accounted substantially for this shift. Real interest rates soared with disinflation in the capital-exporting countries. The three-month London interbank offer rate nearly doubled, from 9 to 17 percent between 1978 and 1981. Transfers to developing countries slowed at the beginning of the 1980s, as commercial banks completed the process of stock adjustment in response to deregulation that allowed them to diversify their portfolios internationally. Starting in 1979, the advanced industrial countries entered a recession of unprecedented severity.[46] Their appetite for imports and the terms on which they provided finance deteriorated almost as sharply as 50 years before. The rate of growth of the exports of non-oil-producing developing countries fell by half between 1976–1979 and 1980–1981 through little fault of their own. Net private capital inflows were in decline even before Mexico threatened default in August 1982.

The impact of these shocks varied across countries: rising interest rates and deteriorating access to foreign finance were more important for the heavily indebted countries of Latin America, whereas the OECD recession and terms-of-trade deterioration mattered more for East Asia's exporters of manufactures.[47] Different countries responded differently. South Korea, whose debt/export ratio was typical for a non-oil-producing developing country, reduced labor costs, strengthened its competitiveness, and boosted its exports in prototypical East Asian fashion, starting in 1979. Latin American governments, in contrast, ran budget deficits in an effort to maintain domestic demand. Their deficits fueled inflation and predictably led to overvaluation and declining competitiveness.

**The Financial Context**

The overwhelmingly important change in the financial context in the 1970s was the emergence of the syndicated bank loan as a vehicle for capital transfer. Between 1973 and 1982, bank loans comprised more than half of all capital flows to emerging markets (see the top panel of figure 2.5 for the end-of-period breakdown). This was a change from the pre–World War II period, when bond flotations dominated. The international bond market remained quiescent after World War II, reflecting the experience of the 1930s, when two-thirds of all foreign dollar loans lapsed into default and strict controls were placed on securities markets. This memory encouraged the belief that insti-

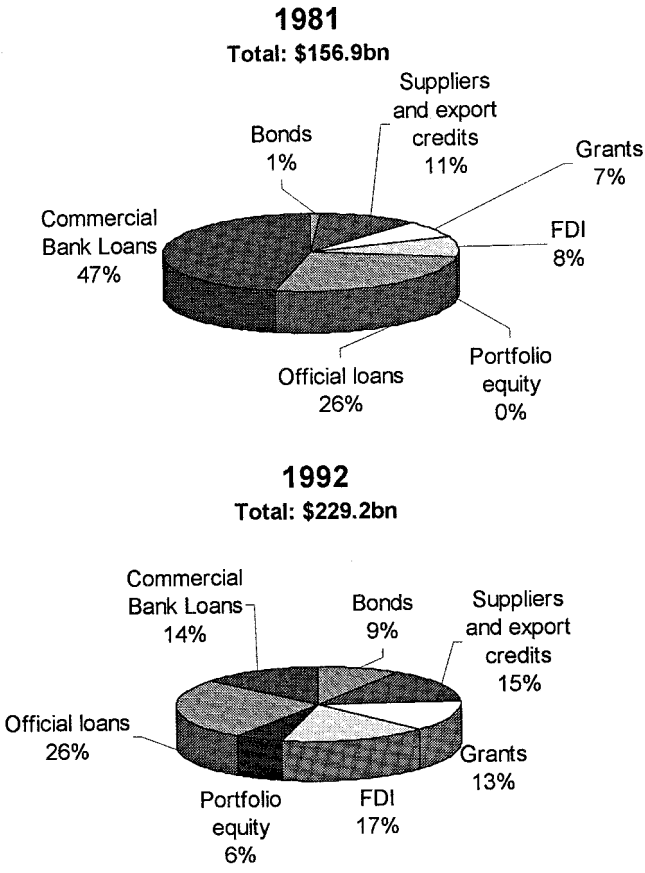


**Figure 2.5**
Gross Long-term Capital Flows to LDCs

tutional investors—banks, in particular—could more efficiently acquire information and enforce contracts. Deregulation of the banks' international activities, under pressure from the growth of the Eurodollar market, allowed them to expand into this business even before the first oil shock. The flood of petrodollars then provided the resources to invest. With slowing growth and falling real interest rates in the advanced industrial countries, banks had an obvious incentive to pursue opportunities in other parts of the world.

This enthusiasm for sovereign lending gave rise to theories of "overlending" and "disaster myopia" that questioned the rationality of the lenders.[48] But even very risky lending may have been rational

to the extent that the banks anticipated official intervention in the event of difficulties. In part, their logic was geopolitical: the tendency for "American banks taking the preponderant role in Latin America and West German banks in Eastern Europe . . . must be attributed to beliefs that strategic interests would force government support on behalf of troubled borrowers."[49] In addition, the 1930s had heightened awareness of the macroeconomic costs of bank failures.[50] There may have been few specific assurances that banks would be bailed out in the event of problems (Johnson 1983), but there was still good reason to think the governments would intervene rather than permit significant numbers of banks to fail. In turn, this strengthened the incentive to lend.

**The Political Context**

The governments of the advanced industrial countries were concerned above all with the threat to their banking systems. This observation goes a long way toward explaining the policy response. In 1982, when the crisis broke out, claims on the major debtors by U.S. banks amounted to 255 percent of bank capital. The comparable figure was 119 percent for British banks and 50 percent for German banks. Clearly, repudiation by the major borrowers would have dealt a body blow to the U.S. and European banking systems. Similarly, any response that involved significant debt forgiveness was ruled out for fear of destabilizing the banks.[51]

The first phase of the policy response, from 1982 to 1984, had three elements: IMF assistance for problem debtors, conditioned on policies to strengthen the balance of payments; multi-year rescheduling agreements to defer interest and amortization until the most serious difficulties had passed; and concerted or "involuntary" lending (a polite label for the practice of lending just enough money to prevent the debtor from falling into arrears). The official diagnosis was that the borrowers were illiquid but not insolvent; with adequate adjustment and liquidity support, they would be able to quickly normalize their finances and regain market access. If they surmounted their immediate difficulties through the receipt of new money and repayment deferral, the banks would not be threatened. The problem was that no one bank had an interest in providing additional liquidity that benefitted the creditors as a group. The corresponding solution involved jawboning the banks by IMF and U.S. government officials.

Through 1984, the strategy seemed to be working, mainly as a result of strong balance-of-payments adjustment by the debtors and faster than expected growth in the United States. However, new money was less than anticipated, raising fears that official finance was simply replacing private finance. An earthquake in Mexico City and new political uncertainties in Argentina and Brazil then cast doubt on the viability of the strategy. Involuntary lending to Latin America fell to $2 billion in 1985, down from $16 billion the year before.

The response was the Baker Plan, in which the banks agreed to lend $20 billion to 15 problem debtors over three years, the multilaterals committed to doubling their lending from $10 billion to $20 billion, and the debtors promised stronger balance-of-payments adjustment and structural reform. The Baker Plan combined old with new: the something old was that official finance not be allowed to replace private finance; the new element was greater emphasis on structural reform—on privatization and the removal of restrictions on inward foreign direct investment, in particular.

In the event, new money from the banks came to only two-thirds of the $20 billion target. The multilaterals delivered about the same share of their promised contribution.[52] By 1987, there were growing worries that the banks would no longer play. Having raised capital and securitized their claims (enabling them to employ debt-equity conversions and debt buybacks to spin off unwanted positions), they had reduced their exposure as a share of capital to half of 1982 levels. This dampened the banks' enthusiasm for the Baker Plan. It weakened their incentive to provide new money in order to avert the suspension of debt-servicing payments, because they were now in a better position to withstand the damage. Again, the fear was that official money would only end up replacing private money, and this time jawboning could not solve the problem.

The United States and the multilaterals responded in 1989 with the Brady Plan. Rather than replacing private money with public resources, the latter were used to collateralize "conversion bonds," into which nonperforming debts were transformed. Debtors and creditors were given an expanded menu of options, including, as before, new money. Within five years, 18 countries, accounting for roughly 80 percent of the eligible debt, had negotiated Brady deals. About a third of the debt was written off in these operations. Collateralization enhancements paid for by the IMF, the World Bank, and the Japanese Import-Export Bank came to about 40 percent of the debt forgiven.

New money from the private sector was minimal, but new money was not the point. Rather, by clearing away the nonperforming loans that served as a drag on secondary markets and by creating a collateralized security, the Brady bond, which quickly came to be traded internationally, the initiative set the stage for the resumption of lending, this time through the agency of the bond market.

## 2.6 What Was Different about the 1990s?

One answer to the question posed by the title of this section is "not much." Like the three episodes of lending to emerging markets that preceded it, the 1990s were years of economic and commercial as well as financial expansion. Global GDP in inflation-adjusted dollars expanded at an annual rate of 3 percent despite the slump in the world's second largest economy, Japan, and the collapse of state-led heavy industry in Eastern Europe and the former Soviet Union. The United States recorded its longest-ever expansion, extending from the resumption of lending to emerging markets in the early 1990s through the end of the decade. Western Europe continued to grow despite fiscal consolidation. Growth resumed in Latin America following the "lost decade" of the 1980s, and accelerated further in East Asia.[53] Even in the transition economies, performance improved as the period progressed.

On the commercial front, exports again expanded as rapidly as output, facilitated by the Uruguay Round of GATT negotiations and regional trade arrangements. The growth of trade provided the market access and foreign exchange needed to service and repay debts; output growth produced both the savings to fund foreign investment and the projects needed to attract it.

There is a sense in which the preceding does less than full justice to the far-reaching changes in the international division of labor that became evident as the decade progressed. "Globalization," as this larger phenomenon is known, responded to advances in information, communications, and production technologies. These developments enhanced control of branch-plant operations in far-distant places, facilitating the outsourcing of production previously concentrated close to home. Whether this meant producing computer code in India or processing frequent flyer accounts in the Philippines, it had profound implications for employment, for trade in goods and services, and for capital flows alike. These changes in

technology and in the international division of labor created a larger dynamic of global economic development into which foreign investment could fit, much as opening new pastoral and agricultural lands in the Western Hemisphere and Australasia had done in the late nineteenth century. Thus, at the end of the twentieth century, as at the end of the nineteenth, international lending was stimulated and stabilized by how it fit into the larger economic system.

But if the catch-phrase "globalization" points to what was similar to previous periods of large-scale international lending—namely, the complementarities among economic, commercial, and financial trends—it also points to what was different. Financial globalization went further, ran deeper, and encompassed more of the world than ever before. In the nineteenth century, railroads and government bonds accounted for the majority of capital flows. In the 1970s, portfolio capital flows involved almost exclusively lending to governments. In the 1990s, in contrast, portfolio investment flowed into manufacturing, finance, and nonfinancial services alike, reflecting the impact of new technologies in enhancing the ability of investors to obtain information on conditions in these sectors.

In addition, the countries on the receiving end differed from earlier historical periods. In the nineteenth century, as we have seen, the recipients were mainly advanced economies and overseas regions of recent settlement that shared cultures and institutions with the capital-exporting countries. In the 1920s, the pattern was similar insofar as the leading debtor, Germany, was far from a low-income country. Although the story in the 1970s was more complex, once again the bulk of the funds did not flow to low-income economies. Today, in contrast, neither an advanced stage of economic development, as measured by per capita income, nor institutions and values similar to those of the capital exporting countries are prerequisites for accessing international finance. China, the single most important importer of capital, is the most visible case in point.

Finally, in the late nineteenth century, portfolio investment meant investment in bonds. Although bonds are also important today, our age differs by virtue of the importance of equity investment stimulated by the privatization of public enterprise (which creates a pool of companies with equity to buy), improvements in information and communications technologies that make it easier for shareholders to monitor management decisions, and the growing investor base mobilized by insurance companies, pension funds, and mutual funds.

All this is to say that financial globalization and its implications today run even deeper and wider than before. The capacity of capital flows to transfer technological and organizational know-how and to catalyze institutional change are, if anything, even greater than in earlier periods. Where a century ago foreign capital mainly financed investment in railways and the public finances, and where even 20 years ago foreign lending meant mainly lending to sovereigns, today no sector is immune. Direct investment once based on the free-standing company has given way to a dense network of inter- and intra-firm linkages between host and home country through which technological and organizational knowledge can flow. With equity stakes come shareholder control, hostile takeover bids, and pressure for management to acquire the technical and organizational knowledge to be competitive in global markets. That so many countries are competing for foreign investment and adapting their institutions and policies accordingly is evidence that policymakers as well as analysts hold this view. Indeed, capital mobility is causing countries to rethink even the most fundamental aspects of the nation state. How else are we to understand the willingness of Europe's governments and societies to proceed with monetary unification, which entails creating transnational institutions of monetary governance, or the willingness of Latin American governments to contemplate unilateral dollarization, which involves abandoning monetary functions previously regarded as fundamental to national sovereignty?

The other implication is that the crisis problem is back, after having gone into remission for several decades. But, leaving aside those decades of exceptional stability following World War II, it is not obvious that crises are growing more severe. It is not clear that contagion is more of a problem. Still, these are no grounds for self-congratulation. At the national level, governments and societies have made considerable headway since World War II in enhancing economic and financial stability. Automatic fiscal stabilizers have moderated cyclical fluctuations. Deposit insurance has all but eliminated bank runs and banking panics. Central banks have recognized and acted upon the need to backstop payments systems. But, in the international domain, there has been less progress. All this is to say that policymakers have not yet succeeded in coming to terms with the growth of international financial markets.

# II Capital Account Liberalization

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# 3 Capital Account Liberalization: What Do the Cross-Country Studies Tell Us?

## 3.1 Introduction

Capital account liberalization, it is fair to say, remains one of the most controversial and least understood policies of our day. One reason is that different theoretical perspectives have very different implications for the desirability of liberalizing capital flows. Models of perfect markets suggest that international capital movements benefit both borrowers and lenders. Because international investment is intertemporal trade, trade between periods and trade between countries have precisely analogous welfare effects. The case for free capital mobility is thus the same as the case for free trade, but for the subscripts of the model.[1] Or, to put the point another way, the case for international financial liberalization is the same as the case for domestic financial liberalization. If domestic financial markets can be, and increasingly are, counted on to deliver an efficient allocation of resources, why cannot the same be assumed of international financial markets?

The answer, another influential strand of thought contends, is that this efficient-markets paradigm is fundamentally misleading when applied to capital flows. Limits on capital movements are a distortion. It is an implication of the theory of the second best that removing one distortion need not be welfare enhancing when other distortions are present. There are any number of constellations of distortions, especially in developing countries, for which this is plausibly the case. If the capital account is liberalized while import-competing industries are still protected, capital may flow into sectors in which the country has a comparative disadvantage, with immiserizing effects (Brecher and Díaz-Alejandro 1977). If a downwardly inflexible real wage, à la Lewis, causes too many resources to be

devoted to capital-intensive activities, then a capital inflow may further aggravate this misallocation, again reducing the incomes and welfare of domestic residents (Brecher 1983). If information asymmetries are endemic to financial markets and transactions, then there is no reason to assume that financial liberalization, either domestic or international, will be welfare improving (Stiglitz 2000). And even if information asymmetries in domestic markets are judged insufficiently severe to undermine the case for domestic financial liberalization, the same may not be true of international financial liberalization to the extent that international financial transactions take place among agents separated by greater physical and cultural distance. Insofar as these problems are most severe when the transactions in question involve developing countries, where the capacity to assemble and process information relevant to financial transactions is least advanced, there can be no presumption that capital will flow into uses where its marginal product exceeds its opportunity cost.

But are restrictions on capital movements any better? Capital controls shelter financial intermediaries from foreign competition. They weaken the market discipline felt by policymakers. They vest additional power with bureaucrats who may be even less capable than markets at delivering efficient resource allocation, and open the door to rent seeking and resource dissipation by interest groups seeking privileged access to foreign capital.

Although there is theoretical support for both positions, the unfortunate fact is that the evidence on them does not speak clearly. It is not simply quarrels among theorists that have rendered capital account liberalization controversial, in other words, but that attempts to move beyond anecdote and assertion to systematic empirical analysis have not yielded conclusive results.

The question is why. Have the questions been formulated poorly? Are the methods flawed? Or are the data not up to the task? A critical review of the literature is the obvious first step toward answering these questions. The challenge for such a review is that the literature on capital mobility is large and varied. Whereas some studies approach the phenomenon from a macroeconomic point of view, others take a firmly microeconomic perspective. Whereas some focus on the effects of capital account liberalization, others focus on the causes—that is to say, on the political economy of the decision to liberalize. Any survey of this extensive and varied terrain requires a focus. In

what follows, I focus on cross-country studies of the causes and effects of capital account liberalization, because this is where the big questions are asked and because it is where an attempt is made to reach conclusions of general applicability to developing countries.[2]

### 3.2 Measuring Capital Account Liberalization

A first reason why studies of capital account liberalization do not speak clearly is the difficulty of measuring the policy. In this section I consider three approaches to the problem: measures based on statute, measures based on actual flows, and measures based on asset prices.

Efforts to identify the presence or absence of capital account restrictions on the basis of statute typically build on the data published by the International Monetary Fund in its *Exchange Arrangements and Exchange Restrictions* annual.[3] Most studies focus on restrictions on payments for capital transactions (line E2 of the table in question). When capital account liberalization is related to a measure of economic performance such as GDP growth over a period of years, the annual observations are transformed into a variable measuring the proportion of years when the country had restrictions in place. Some investigators supplement this information with the Fund's measure of restrictions on payments for current transactions, along with, in some cases, its measures of surrender or repatriation requirements for export proceeds, separate exchange rates for some or all capital transactions and/or some or all invisibles, and bilateral payments arrangements with members and nonmembers.[4]

These data have limitations.[5] The category "restrictions on payments for capital transactions" available before 1996, for example, refers exclusively to resident-owned funds and may not reflect restrictions on capital transfers by nonresidents. In addition, drawing a line between measures affecting the current and capital accounts is problematic. The category "separate exchange rate(s) for some or all capital transactions," for instance, includes measures affecting "some or all invisibles," which may include payments on current as well as capital accounts. Bilateral payments arrangements with members and nonmembers include not just the maintenance of separate exchange rates for capital transactions, which are directly relevant to a consideration of capital account liberalization, but also the use of one unitary rate for transactions with one country and a

different unitary rate for transactions with another country, where the second kind of multiple rate is often used to discriminate among transactions on current as well as capital accounts.

Although the presence of current account restrictions, export-surrender requirements, bilateral payments arrangements, and separate exchange rates may convey information on the scope of efforts to deter the evasion of capital controls, such deterrence is not their sole or even main purpose. Moreover, current account restrictions are likely to have other important effects that the unwary investigator may conflate with their impact on capital mobility. They influence merchandise trade. They limit opportunities for repatriating interest and principal. And insofar as they tend to be imposed by countries suffering from serious policy imbalances, their "effects" will reflect the influence of these deeper policy problems as much as those of the capital controls themselves.[6]

Most studies "solve" the problem of measuring the intensity of controls by ignoring it—that is to say, they settle for constructing a zero/one dummy for the presence or absence of controls. Quinn (1997) attempts to go further. For 56 countries over the period 1950–1994 and an additional eight countries starting in 1954, Quinn distinguishes seven categories of statutory measures. Four are current account restrictions, two are capital account restrictions, and one attempts to capture international agreements such as OECD membership constraining the ability of a country to restrict exchange and capital flows. For each of these categories, Quinn codes the intensity of controls on a two-point scale (where values increase at half-point increments from zero to 0.5, 1, 1.5, 2, with zero denoting most intense and 2 denoting no restriction). This produces an index of current and capital account restrictions that ranges from zero to 14 and an index of capital account restrictions that varies from zero to 4.[7] Not surprisingly, Quinn's index has proven wildly popular and has been used by a number of subsequent investigators.[8]

The difficulty of deriving measures of the policy regime from information on statute and policy has led investigators to experiment with alternatives. Kraay (1998) and Swank (1998) use actual capital inflows and outflows as a percentage of GDP as a measure of the freedom of capital movements. The problem, as these investigators are aware, is that actual inflows and outflows will be affected by a range of policies and circumstances—the stance of monetary, fiscal, and exchange rate policies; the global economic and financial cli-

mate; and political circumstances, to name three—and not merely by restrictions on capital flows. Hence, this measure is unlikely to be an informative indicator of the capital account regime.[9]

Bekaert (1995) and Ahearne, Griever, and Warnock (2000) use one minus the ratio of the market capitalizations of the International Finance Corporation's Investable and Global Indices. The former consists of those stocks (or portions of stocks) in the latter deemed to be available to foreign investors. Thus, one minus the ratio of the two can be interpreted as a measure of the intensity of foreign ownership restrictions. The limitation of this measure, obviously, is that it captures only restrictions on equity inflows.[10]

A variety of authors have used the correlation of stock market returns across countries as a measure of the international integration of securities markets. Unfortunately, the correlation of raw returns says little about the integration of markets, because returns will vary as a function of the characteristics of the underlying assets, which will depend in turn on the characteristics and condition of the entities issuing the claims. Thus, Bekaert (1995), in a study representative of the genre, first regresses national returns in excess of the U.S. interest rate on five instrumental variables (lagged local and U.S. excess returns, local and U.S. dividend yields, and a transformation of the U.S. interest rate, variations in which might create reasons why the excess returns on different markets might differ) to derive expected returns, before then computing the correlation of the latter with expected returns in the United States as a measure of market integration.[11] Clearly, the resulting measure of market integration is only as good as the model used to generate the expected returns.[12] Some markets appear more integrated, according to these studies, than one would expect on the basis of the statutory restrictions governments place on foreign ownership of domestic securities. That it is hard to know whether the contrast reflects the limited effectiveness of (and therefore misleading picture painted by) the statutes on the books or problems with one or more of the assumptions needed to derive expected returns points up the limitation of the approach.

Other authors use onshore-offshore interest differentials and deviations from covered interest parity to measure capital mobility.[13] Unlike stock market returns, which must be purged of premia and discounts associated with the distinctive characteristics of the entities issuing them before they can be used to gauge market integration, short-term interest rates can be analyzed without first

transforming them in model-contingent ways.[14] However, interest differentials tend to be available only for a limited number of countries and years—specifically for countries important enough to have well-developed offshore markets and sufficiently advanced financially to have well-developed currency forward markets. That industrial and emerging markets with these characteristics are not representative of the larger population of developing countries renders problematic any attempt to draw broad generalizations from studies using these asset-based measures.[15]

Onshore-offshore interest differentials also have the inconvenient property of widening when there is an incentive for capital to move, for fear of a crisis for example, while remaining narrower at other times. To put the point another way, differentials reflect not just the stringency of statutory controls but their interaction with ancillary policies and circumstances, making it difficult to separate out the influence of the former.

This observation points up a limitation of virtually all studies of capital controls. Controls tend to be imposed and removed as part of a larger package of policy measures.[16] Clearly, it is important when studying the connection of capital account restrictions to economic growth, investment, and financial depth to control for the other elements of the reform package. Alas, this is easier said than done; trade openness, financial depth, institutional development and the like may be no easier to measure in an economically meaningful way than the presence or absence of capital controls. Developing adequate measures of capital account restrictions is a particular problem for the literature on the causes and effects of capital controls, but the more general problem of adequately capturing the economic, financial, and political characteristics of economies, which impinges on all cross-country empirical work of this sort, should not be overlooked.

### 3.3 Who Uses Controls? Who Liberalizes and Why?

A large literature addresses the circumstances under which capital accounts are opened and the circumstances under which restrictions are retained. Perhaps the single most robust regularity in this literature is the negative association between per capita incomes and the presence of controls. Per capita income is typically interpreted in this context as a measure of economic development: the more developed the country, the more likely it will be to have removed restrictions

on capital flows. The observation that all of today's high-income countries have removed their controls is consonant with the view that capital account liberalization is a corollary of economic development and maturation.

But why is this the case? Is it that the more advanced development of institutions and markets in the high-income countries means that these countries can better accommodate capital account liberalization—that well-developed markets and institutions shift the balance toward benefits and away from costs? Is it that these countries' well-developed political systems create avenues through which those who oppose restraints on their civil liberties—including their financial liberties—can make that opposition felt? Explaining why restrictions on international financial flows are more prevalent in some countries than others and why, in particular, they are less prevalent in the high-income countries is at the center of the literature on the political economy of controls.

A specific development-related rationale for controls—on capital outflows in particular—is that they can usefully channel domestic saving into domestic investment in countries where the underdevelopment of markets and institutions would otherwise result in a suboptimal supply of finance for investment. Thus, Garrett, Guisinger, and Sorens (2000) find that there is a particular tendency to restrict capital account transactions in countries where domestic savings are scarce, and that this effect is strongest for developing countries, where the premium on mobilizing savings for domestic investment purposes is presumably the greatest.

Another strand of work pursues the association of controls with the exchange rate regime. It is widely recognized that capital mobility increases the difficulty of operating a currency peg. Countries committed to pegging—China and Malaysia spring to mind—may therefore support that policy with restrictions on capital flows. Consistent with this view, contributors to the cross-country empirical literature generally find that countries with pegged exchange rates are less likely to have an open capital account (Leblang 1997; Milesi-Ferretti 1998; Bernhard and Leblang 1999; Leblang 1999; Garrett, Guisinger, and Sorens 2000).[17]

But it is not clear what should be regarded as endogenous and exogenous in this analysis. Does their willingness to adopt a more flexible exchange rate determine the readiness of some countries to remove controls? Or do increases in capital mobility, associated

perhaps with the removal of capital controls, lead to the adoption of a more flexible exchange rate, either voluntarily or as the result of a crisis? One suspects that causality runs both ways, making it difficult to interpret an ordinary least squares regression coefficient on the exchange rate. As will become apparent, this difficulty of pinning down the direction of causality is a chronic problem in the literature on capital account liberalization (and a theme of this survey).

Another line of thought portrays capital controls as instruments used by governments for revenue-related purposes. Controls limit the ability of residents to shift into foreign assets in order to avoid the inflation tax on domestic money balances (Alesina and Tabellini 1989). They permit the authorities to raise reserve requirements on domestic financial institutions and thereby reduce their debt servicing costs without eroding the inflation tax base (Drazen 1989).[18] This perspective suggests that controls are likely to be used where the domestic financial system is tightly regulated and reserve requirements can be used to compel financial institutions to hold public-sector liabilities. Consistent with this prediction, Leblang (1997) finds that governments less reliant on seigniorage are less likely to have capital controls. A further implication is that controls are less likely to be used where the inflation tax is not available because the central bank is independent and monetary policy is controlled by a conservative board. Epstein and Schor (1992), Alesina, Grilli, and Milesi-Ferretti (1994), Quinn and Inclán (1997), Milesi-Ferretti (1998), and Bai and Wei (2000) all find that countries with more independent central banks are less likely to utilize controls.

But does this pattern reflect the implications of central bank independence and domestic financial liberalization for the availability of inflation tax revenues, as these authors argue, or a common omitted factor—laissez faire ideology, for example—associated with financial liberalization, central bank independence, and capital decontrol alike? Some investigators have sought to distinguish among these alternatives by adding the political orientation of the government as a further determinant of the propensity to utilize controls. Once one controls for ideology, any surviving correlation between central bank independence and domestic financial liberalization on the one hand and capital account liberalization on the other will, they argue, reflect the implications of the former for the seignorage revenues promised by the latter. Although findings regarding the effect of the government's ideological orientation are mixed, the effect of central

bank independence in particular survives this extension, consistent with the implications of the seigniorage-centered approach.[19]

A number of investigators pursuing this line have found democracy to be positively associated with capital account liberalization (see, for example, Quinn 2000; Garrett, Guisinger, and Sorens 2000). This may reflect the role of democracy as a mechanism for resolving the social conflicts that otherwise force resort to financial repression and the inflation tax (Garrett, Guisinger, and Sorens 2000). More generally, democracy gives rise to the increasing recognition of rights, including the international economic rights of residents, who have a greater ability to press for the removal of restrictions on their investment options (Dailami 2000).

Several recent studies (Simmons and Elkins 2000; Garrett, Guisinger, and Sorens 2000) suggest that "policy contagion" plays a role in the decision to open the capital account. Countries are more likely to liberalize when members of their peer group have done so, holding constant other determinants of the decision. The pattern can be interpreted in terms of policy emulation (governments are influenced by the initiatives of their neighbors) and signaling (when one's competitors have liberalized portfolio flows, it becomes harder to retain controls and remain an attractive destination for foreign direct investment).

But are such interpretations justified? It is a common problem in the literature on contagion, financial and other, that the simultaneity of policy initiatives in different countries may reflect not the direct influence of events in one country on those in other countries but simply the tendency of decision makers to respond in like fashion to economic and political events not adequately controlled for in the analysis.[20] Simmons and Elkins address this possibility by defining a country's economic neighbors as those that compete with it for foreign investment (in the case of capital account restrictions) and those that compete with it in export markets (in the case of current account restrictions). These more sophisticated proxies for policy contagion matter even when crude measures of commonly omitted factors (such as the share of countries in the same region that have liberalized their capital accounts, for example) are also included in the specification.

These findings go a good way toward explaining the recent trend toward capital account liberalization. Financial repression has given way to the deregulation of domestic financial institutions and

markets in a growing number of countries. Governments and central banks have been abandoning currency pegs in favor of greater exchange rate flexibility. The 1980s and 1990s were decades of democratization in much of the developing world. As these developments led some countries to liberalize, the trend gathered momentum as suggested by the literature on policy contagion. Together these forces lent considerable impetus to the process of capital account liberalization.[21]

Before researchers congratulate themselves for their success and close up shop, it is worth noting certain other explanations that have been denied the same systematic attention. For example, capital controls may have become less attractive because information and communications technologies have grown more sophisticated, rendering controls more porous and their effective application more distortionary (Eichengreen and Mussa et al. 1998). The technical progress in question is hard to measure. A time trend intended to capture secular improvements in information and communications technologies would be contaminated by a variety of other omitted factors that also change over time. As is the case all too often in empirical economics, there may have been a tendency to focus on factors that are readily measured and quantified to the neglect of others that are more difficult to capture.

### 3.4 Capital Mobility and Growth

The most widely cited study of the correlation of capital account liberalization with growth is Rodrik 1998b. Using data for roughly one hundred industrial and developing countries in the period 1975–1989, Rodrik regresses the growth of GDP per capita on the share of years when the capital account was free of restriction (as measured by the binary indicator constructed by the IMF), controlling for determinants suggested by the empirical growth literature (initial income per capita, secondary school enrollment, quality of government, and regional dummies for East Asia, Latin America, and sub-Saharan Africa). He finds no association between capital account openness and growth, and questions whether capital flows favor economic development.

Given the currency of this article among economists, it is striking that the leading study of the question in political science reaches the opposite conclusion. For 64 countries over the period 1960–1989, Quinn (1997) reports a positive correlation between the change in his

capital account openness indicator and growth. That correlation is robust and statistically significant at standard confidence levels.

What explains the contrast is not clear. One difference that may matter is that Quinn's study starts earlier. Consequently, growth in his sample period is not dominated to the same extent by the "lost decade" of the 1980s (when there were virtually no capital flows to emerging markets to stimulate growth). That the period considered by Quinn starts earlier may mean that his sample includes more observations in which countries liberalized FDI inflows, with positive effects on growth, and fewer observations where they liberalized short-term portfolio flows, the effects of which may have been more mixed. In addition, Quinn's list of independent variables is longer, and he looks at the change in capital account openness rather than the level. Edwards (2001) emphasizes that Quinn's measure of capital account liberalization is more nuanced and presumably informative. For example, Quinn's measure conveys information about whether capital account opening was partial or across the board, whereas the standard IMF measure does not.[22] Also important may be that Quinn's country sample is different, in that he considers fewer low-income developing countries. There are reasons to think that the effects of capital account liberalization vary with financial and institutional development. Removing capital controls may be welfare and efficiency enhancing only when serious imperfections in the information and contracting environment are absent; as noted in section 3.1 above, this is an implication of the theory of the second best. Portfolio capital inflows stimulate growth, this argument goes, only when markets have developed to the point where they can allocate finance efficiently and when the contracting environment is such that agents must live with the consequences of their investment decisions. The Asian crisis encouraged the belief that countries opening their economies to international financial transactions benefit only if they first strengthen their markets and institutions; thus, we should expect a positive impact on growth only if prudential supervision is first upgraded, the moral hazard created by an excessively generous financial safety net is limited, corporate governance and creditor rights are strengthened, and transparent auditing and accounting standards and equitable bankruptcy and insolvency procedures are adopted.

Although these institutional prerequisites are difficult to measure, there is a presumption that they are most advanced in high-income countries. Edwards (2001) supports this view: using Quinn's measure

of the intensity of capital account restrictions, he finds that liberalization boosts growth in high-income countries but slows it in low-income countries.[23] He shows further that the significance of capital controls evaporates when the IMF index used by Rodrik is substituted for Quinn's more differentiated measure. Thus, it is tempting to think that the absence of an effect in earlier studies is a statistical artifact. There is also some suggestion that capital account liberalization is more beneficial in more financially and institutionally developed economies.[24]

But do these apparent differences between high- and low-income countries really reflect their different stages of financial and institutional development? Kraay (1998) attempts to test directly the hypothesis that the effects of capital account liberalization depend on the strength of the financial system, the effectiveness of prudential supervision and regulation, and the quality of other policies and institutions.[25] The results are not encouraging: the interaction of the quality of policy and institutions with financial openness is almost never positive and significant, and it is sometimes significantly negative.[26] Arteta, Eichengreen, and Wyplosz (chapter 4 in this volume) similarly interact the level of capital account openness with the liquid liabilities of the financial system as a measure of financial depth, and with *International Country Risk Guide's* index of law and order as a measure of institutional development. Again, the results are largely negative; there is little evidence that the growth effects of capital account openness are shaped in robust and predictable ways by a country's level of financial and institutional development.

More important for shaping the effects of capital account liberalization, these authors suggest, is the sequencing of reforms. Countries that first complete the process of macroeconomic stabilization, allowing them to remove exchange controls and other distortions on the current account side, enjoy stronger growth effects of capital account openness. Although some of the qualitative literature similarly suggests that sequencing is an important determinant of the effects of capital account opening, systematic cross-country empirical analysis of the issue has barely begun. (In other words, there do not appear to be other "large-n" studies such as that of Arteta, Eichengreen, and Wyplosz that address this question.)

One way of unraveling the mystery of why the growth effects of capital account liberalization do not seem to vary as expected with institutional and financial development is to determine whether

these results are sensitive to the particular measures of policies and institutions used. Here, it will be evident, work is already underway. Another is to pin down the mechanisms and/or channels through which capital account liberalization affects the economy. It is to exemplars of this second approach that we now turn.

### 3.5 Channels Linking Capital Account Liberalization with Growth

The cross-country growth literature points to a number of factors that plausibly intermediate between capital account liberalization and growth. Investment, financial development, and the stability of macroeconomic policy, among other variables, have been shown to be positively related to an economy's rate of growth (see, inter alia, Levine and Renelt 1992; Levine 1997; Barro 1997). All of these variables create channels through which capital account liberalization can potentially exercise an effect. Studying the impact of capital account policy on these intermediate variables is thus a way of inferring its implications for growth. In this section I focus on the two channels that have received the most attention: the impact of capital account policies on investment, and their impact on the depth and development of financial markets.

There is no shortage of attempts to analyze the connections between capital account policies and investment. Rodrik (1998b) relates the investment/GDP ratio to the IMF's measure of capital account openness, finding no trace of an effect. Kraay (1998) similarly finds no impact on gross domestic investment as a share of GDP, using the IMF index, the Quinn index, and gross inflows and outflows as alternative measures of financial openness. He then considers the possibility that capital account openness positively affects investment only in countries where risk-adjusted returns exceed the world average—that is, where liberalization will cause capital to flow in rather than out. Using the average balance on the financial account of the balance of payments as a proxy for risk-adjusted returns, he reports a positive impact on investment when this variable is interacted with capital account openness. However, the coefficient in question differs significantly from zero for only for one of Kraay's three measures of capital account openness.[27]

Because the evidence on investment does not speak clearly, it is logical to strip another layer off the onion and consider variables

such as real interest rates and financial depth—that is to say, factors on which investment plausibly depends. Governments have used capital controls in support of administrative measures designed to keep interest rates low with the express purpose of stimulating investment. A substantial number of studies confirm that capital controls are associated with lower real interest rates (see, e.g., Alesina, Grilli, and Milesi-Ferretti 1994; Grilli and Milesi-Ferretti 1995; Bordo and Eichengreen 1998; and Wyplosz 1999b). But whether there are benefits for growth is a separate question. The literature on financial repression—especially the recent literature—is skeptical that interest rate ceilings, even if they reduce the cost of investment, succeed in nurturing growth. Although artificially low real rates reduce the required return on investment, they hinder financial development, which presumably increases the efficiency of investment as well as financing and otherwise facilitating experimentation with new technologies.[28]

Klein and Olivei (1999) find that capital account openness stimulates financial depth (measured, alternatively, as the change in the ratios of liquid liabilities to GDP, claims on the nonfinancial private sector relative to GDP, and deposit money bank domestic assets relative to the sum of these and central bank domestic assets). But the correlation between capital account openness and financial deepening is limited to the OECD countries; the relationship dissolves when these countries are excluded from the sample. Thus, where authors like Kraay and Arteta, Eichengreen, and Wyplosz find little evidence that an open capital account does more to stimulate growth in high-income countries,[29] Klein and Olivei conclude that it may still do more in the advanced industrial countries to stimulate certain inputs into growth—specifically, well-developed financial markets. That the effect is indirect (an open capital account encourages financial development, which in turn encourages growth) and contingent, presumably, on a range of intervening factors may be why it has been so difficult to document a direct link from the capital account to growth that varies between high- and low-income countries.

But not all investigators agree that the influence of capital account liberalization on financial development is limited to high-income countries. Levine and Zervos (1998) find for 16 developing countries that stock markets become larger and more liquid after the capital account is opened. To be sure, their study focuses on a different aspect of financial development, namely, stock markets rather than

bank intermediation. But why the evidence for different financial markets is apparently contradictory is not clear. It could be that Levine and Zervos's 16 countries—selected on the grounds that they had functioning stock markets—were already relatively advanced financially, so that capital account liberalization could then have a positive and powerful impact on their further deepening and development. Alternatively, it could be that banking systems typically are already relatively well developed when capital accounts are opened, so that the main effect of liberalization is on stock markets whose development is still at an earlier stage. Sorting through this controversy may require more sophisticated measures of capital account liberalization, because whether liberalization favors the development of banks or securities markets plausibly depends on how liberalization proceeds—on whether restrictions on offshore borrowing by banks are relaxed first, as in Korea, or measures limiting foreign investment in domestic securities markets are relaxed earlier, as in Malaysia. Implementing such distinctions will also require measures of the development of the information and contracting environment, as asymmetric information and poor contract enforcement are thought to favor banks over securities markets.[30]

Another set of studies builds on the observation that controls are disproportionately utilized by countries with chronic macroeconomic imbalances (see, e.g., Alesina, Grilli, and Milesi-Ferretti 1994; Grilli and Milesi-Ferretti 1995; Wyplosz 1999b; and Garrett 1995, 1998, 2000). The motivation is presumably to limit capital flight and contain the threat from these imbalances for the stability of financial markets.[31] By now it will be clear that not a few studies advancing such conclusions have identification problems. Although countries suffering from chronic macroeconomic imbalances are more likely to resort to controls, governments and central banks enjoying the additional policy autonomy that controls confer may indulge in more expansionary policies. That so few studies have addressed this identification problem may reflect the difficulty of finding plausible instruments for the endogenous variables.

One response taken by those concerned with the impact of controls on the public finances has been to move from the budget balance to its components—the expenditure versus the tax sides and different categories of taxes and spending—where the causality running from controls to budgetary outcomes is presumably easier to identify. Garrett and Mitchell (2001) find that public spending is

lower when the capital account is open, which they interpret as capital mobility applying fiscal discipline.[32] Garrett (2000) finds that this effect is specific to the exchange rate regime: that governments come under less pressure to limit spending when the exchange rate is allowed to float, but that the combination of fixed rates and an open capital account has a strong disciplining effect.

A particular mystery is the impact of capital account liberalization on capital taxation (taxes on profits and other returns to capital). The idea that capital account liberalization, which increases the effective elasticity of supply of capital, should put downward pressure on the rate of capital taxation is one of the most fundamental corollaries of the theory of public finance. But the evidence to this effect is surprisingly weak. Quinn (1997), Swank (1998), Garrett (2000), and Garrett and Mitchell (2000) all find that rates of capital taxation are unchanged or even higher in countries with open capital accounts. Because most countries with open capital accounts are relatively high income, it may simply be that they have large public sectors (by Wagner's Law) and high tax rates. But Quinn, Swank, Garrett, and others go to considerable lengths to control for income and other country characteristics that may independently influence the level of capital taxation, and none of their extensions make this finding go away. This, clearly, is a puzzle requiring further study.

Finally, a number of authors, motivated by the association of short-term foreign debt with crises and, in particular, by the perception that debt runs played a role in many of the episodes of serious turbulence in emerging markets in recent years, have asked whether controls can be used to lengthen the maturity structure of foreign obligations.[33] Using data for a cross-section of countries, Montiel and Reinhart (1999) find that controls succeed in reducing the share of portfolio and short-term capital flows in total inflows, while increasing the share of foreign direct investment and leaving the overall volume of capital inflows unchanged. This generalizes the conclusions of detailed studies for Chile, many of which conclude that the country's holding period tax on capital inflows reduced the volume of short-term inflows but in a way that was fully compensated for by increases in long-term flows. (In other words, the controls affected only the maturity structure and not the level of the flows.[34]) Montiel and Reinhart find that this effect is general, evident not only in Chile but in a number of other emerging markets pursuing similar policies.

Controls à la Chile with the potential to reduce the risk of currency and financial crises have their advocates in the scholarly and official communities. But is this advocacy justified? Answering this question requires determining whether controls in fact reduce crisis risk, the issue to which I now turn.

### 3.6 Effects of Liberalization: Crises

The currency and banking crises of the 1990s did much to encourage the belief that capital account liberalization raises the risk of financial instability. The relaxation of capital controls in Europe following the implementation of the Single European Act made the realignment of the Exchange Rate Mechanism currencies more difficult, allowing competitiveness problems to build up, exposing governments and central banks to speculative pressures, and culminating in the crisis of 1992 (Eichengreen and Wyplosz 1993). Capital account liberalization was implicated in Asia's crisis insofar as the selective opening of capital accounts allowed banks to respond to the moral hazard created by government guarantees and to lever up their bets (Furman and Stiglitz 1998). China's success in insulating itself from this instability by the use of capital controls is widely seen as the exception that proves the rule.[35] These assertions are controversial; scholars continue to debate the causes of the European and Asian crises and the role of capital flows. But it is curious, given the intensity of the debate, how few cross-country studies have sought to systematically weigh the evidence.

One reason may be that problems of reverse causality are severe in this context. Countries experiencing financial turbulence may impose or reinforce controls, as Malaysia did following the outbreak of the Asian crisis. Or they may relax their controls in an effort to restore investor confidence, as did Thailand in January 1998 and South Korea several months later. The absence of controls may or may not heighten crisis risk, but the fact that crisis risk sometimes prompts changes in the capital account regime makes it hard to distinguish cause from effect.

In fact, the cross-country evidence generally suggests, contrary to the intuition described at the top of this section, that the presence of controls *heightens* currency crisis risk. Glick and Huchison (2000) combine data on the presence or absence of controls at the end of one year (from the relevant tables from the IMF's *Exchange Arrangements*

*and Exchange Restrictions*) with data on the occurrence of currency crises in the next. In both bivariate and multivariate analyses they find a *positive* correlation between capital controls and crises. Leblang (1999) uses the narrative accounts in *Exchange Arrangements and Exchange Restrictions* to code changes in capital controls monthly; he too finds that the presence of controls is associated with an increased probability of currency crises. He then goes on to analyze whether the presence of controls influences the likelihood that governments and central banks will succeed in defending the currency against attack, and finds some evidence to this effect.

An interpretation, following Bertolini and Drazen (1997a, b) and Drazen (1997), is that countries maintaining or imposing controls send a negative signal to the markets. Investors may suspect a country that resorts to controls of reluctance to commit to the rigorous course of fiscal and monetary treatment required for maintenaining stability. They may worry that a government inclined to resort to controls will be particularly willing to compromise investor rights. Either way, the signal may incite investors to flee and, if the control regime is less than water-tight, enable them to do just that.

But have these authors identified the direction of causality? If governments impose controls in anticipation of looming financial problems, as certainly can be the case, then timing cannot identify the direction of causality.[36] And, even more than in other contexts, there is reason to question the conclusions of an analysis that lumps all controls together. Controls of different degrees of intensity may vary in their effectiveness in containing threats to currency stability, whereas different *types* of controls and different *forms* of liberalization may have different implications for financial stability. Liberalizing banks' access to offshore funding but not also permitting foreign access to domestic equity and bond markets may be more destabilizing than doing the reverse; it may cause foreign funds to flow in through the banking system, the weakest link in the financial chain. This is a common conclusion from Korea's crisis, that country having liberalized offshore bank funding before permitting foreign access to its securities markets. Even if inflow controls can reduce crisis risk by preventing banks and firms from becoming excessively dependent on short-term foreign debt, outflow controls, except of the most draconian sort, may be incapable of restraining capital flight if panic breaks out.[37]

In addition, different controls may send different signals. Inflow controls à la Chile can be justified as prudential measures—as a way of reinforcing regulations designed to ensure the stability of the financial system (Eichengreen and Mussa et al. 1998). They thus may be perceived as a signal that the authorities take seriously their commitment to currency and banking stability. Outflow controls, in contrast, may only suggest that the authorities are desperate. Using data for a sample of 15 developing countries, Rossi (1999) finds that the presence of outflow controls heightens the risk of currency crises but that inflow controls reduce it. Outflow controls similarly are associated with an increased risk of banking crises, whereas inflow controls have no discernible effect.

### 3.7 From Research to Policy, and from Policy to Research

Turning from research to policy, one arguably finds a greater degree of consensus on the lessons of international experience. That the G-7 countries all have open capital accounts is regarded as a telling point. For those who emphasize this fact, capital account liberalization is just another manifestation of the policies of financial deregulation that countries adopt as they develop economically and institutionally, and specifically as they acquire the capacity to operate market-led financial systems. In other words, the relaxation of statutory restrictions on international financial transactions and the growth of cross-border financial flows reflect the same forces that encourage the removal of repressive domestic financial regulations and that facilitate reliance on domestic financial markets to guide resource allocation. The same arguments suggesting that domestic financial deepening and development enhance the efficiency of investment, facilitate experimentation with new technologies, and encourage growth and efficiency generally similarly support the presumption that international portfolio diversification and cross-border portfolio investment should encourage efficiency and growth. Capital account liberalization can be counterproductive, to be sure, if it takes place before severe policy-related distortions have been removed and before domestic markets, institutions, and the administrative capacity of the prudential authorities have developed to the point where one can be confident that foreign finance will be channeled in productive directions. This qualification may be

too frequently neglected, as the unconditional advocacy of capital account liberalization heard in the mid 1990s and the Asian crisis that quickly followed remind us to our chagrin, but this caveat too is now a part of the conventional wisdom.

But if caveats like this one complicate the journey, the destination, from all appearances, remains the same. Officials and their advisors may differ on precisely when and how to liberalize international financial transactions so as to best insure that capital inflows are channeled in productive directions, in other words, but there is little support for refusing to liberalize or (Malaysia in 1998–1999 notwithstanding) for reversing previous liberalization measures.

Given the breadth of support apparently commanded by this synthesis, the lack of empirical substantiation of its fundamental tenets is worrisome. If the evidence is really not there, then it is high time to rethink the conventional wisdom. Given these stakes, research with immediate promise for solving the key empirical puzzles should have priority. Empiricists need to better distinguish different kinds of controls—on inflows versus outflows, and on transactions involving banks on the one hand and securities markets on the other. They need to develop more informative measures of those aspects of the legal, contracting, and information environments that plausibly shape the effects of capital account liberalization. They need to construct better indicators of the other policy initiatives with which capital account liberalization is sequenced.

These extensions can be undertaken in the context of existing macro-oriented cross-country research. Admittedly, operationalizing them presumes a not inconsiderable investment in data, constructed in ways that are consistent across countries and over time. The call for more and better data is standard fare in surveys like this one; here, however, is a case where it warrants its place of prominence.

But could it be that the problem is with the framework and not with the data and methods? The literature on capital account liberalization has been written by macroeconomists, for macroeconomists, with an emphasis on the macroeconomics of growth and crisis. Perhaps the microeconomic level offers more definitive evidence of the effects of policies toward the capital account. A growing body of firm-level evidence and analysis, surveyed by Karolyi (1998), suggests that this may be the case. Some examples from this rapidly expanding literature may be helpful by illustrating the kind of questions asked and answers found. For example, Tandon (1994) shows

that firms offering bonds on international markets achieve a reduction in the required rate of return on their equity. Smith and Sofianos (1997) show that firms listing abroad experience an increase in trading volume, consistent with the argument that financial integration leads to greater liquidity and hence a lower cost of capital. Lins, Strikland, and Zenner (2000) show that firms from emerging markets listing in the United States are able to relax capital constraints—that is, the cash-flow sensitivity of their investment declines—whereas no such change is evident for firms from industrial countries, where capital constraints are presumably less.

Still more remains to be learned by adopting this microeconomic perspective. That said, answering the big questions such as how growth and crises are affected by capital account liberalization will ultimately require mapping the findings of these microeconomic studies back into the macroeconomic framework adopted by the researchers whose work has been the focus of this survey.

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# 4 When Does Capital Account Liberalization Help More than It Hurts?

with Carlos Arteta and Charles Wyplosz

## 4.1 Introduction

The literature on the effects of capital mobility falls under two headings, reflecting the traditional divide between the two branches of international economics. Although work on the effects of capital movements in models of the real economy is well advanced, the same cannot be said of research in international finance on the effects of capital account liberalization and international capital flows.

There are two explanations for the contrast, one having to do with theory, the other reflecting the limitations of existing empirics. On the theoretical side, there are reasons to think that the imperfect nature of the information environment does more to complicate the effects—and consequently the analysis—of financial than nonfinancial transactions. Information asymmetries are endemic in financial markets. In particular, it is unrealistic to assume that agents on both sides of a financial transaction have the same information.[1] This is especially true of international financial transactions, in whose case information flows must travel additional physical and cultural distance. These imperfections in the information environment are a distortion in whose presence inward foreign financial investment can be welfare reducing. But the difficulty of characterizing the information asymmetry and therefore the incidence of the distortion means that there is no consensus on precisely when and where such immiserizing effects may take place.

In contrast, the limited conditions under which the transfer or accumulation of capital in a real trade model is immiserizing are well understood. Brecher and Díaz-Alejandro (1977) have pointed to import tariffs, whereas Bhagwati and Brecher (1991) have modeled the effects of rigid real wages, both of which can lead foreign capital to

flow into the wrong sector, with immiserizing effects. The transparency of this analysis leaves less controversy about the effects of capital mobility in models of the real economy.

The other explanation for the contrast, and the one we pursue in this paper, is that empirical studies of the effects of foreign direct investment (and, for that matter, trade in goods and services) have reached more definitive conclusions than those on portfolio capital flows. There is now a substantial body of evidence that openness to foreign direct investment is positively associated with growth. Foreign direct investment is a conduit for the transfer of technological and organizational knowledge, suggesting that countries that welcome inward FDI should have higher levels of total factor productivity and enjoy faster economic growth.[2] In contrast, studies of the effects of financial capital flows are less conclusive. In part, this reflects the difficulty of measuring a multidimensional phenomenon like financial openness in an economically meaningful way. In part, it reflects the sensitivity of findings to the countries and periods considered (as we document below).

A pair of recent studies by Rodrik (1998b) and Edwards (2001) summarizes this controversy. Rodrik finds no correlation between capital account liberalization and growth and comes down against the presumption that opening an economy to financial capital flows has favorable effects. Substituting a more nuanced and presumably informative measure of capital account liberalization, Edwards, in contrast, reports a strong positive effect of capital account liberalization, one, however, limited mainly to high-income countries.

In this paper, we seek to push this literature forward another step by scrutinizing the robustness of these results and addressing their implicit interpretation. We focus on the following questions. Is there really a positive association of capital account liberalization with growth when the former is measured in an economically meaningful way? Is it robust? Is it evident only in certain times and places? If it is limited to high-income economies, does this reflect their more advanced stage of financial and institutional development, which mitigates the domestic distortions that cause capital account liberalization to have weak or even perverse effects in the developing world? Or do the effects of capital account liberalization hinge to a greater extent on the way it is sequenced with other policy reforms?

To anticipate our conclusions, although we find some evidence of a positive association between capital account liberalization and

growth, the evidence is decidedly fragile. The effects vary with time, with how capital account liberalization is measured, and with how the relationship is estimated. In our view, the evidence is insufficiently robust to support unconditional policy recommendations.

The evidence that the effects of capital account liberalization are stronger in high-income countries is similarly fragile. There is some evidence that the positive growth effects of liberalization are stronger in countries with strong institutions, as measured by standard indicators of the rule of law, but only weak evidence that the benefits grow with a country's financial depth and development.

More important than a country's stage of financial development, we find, is the sequencing of reforms. Capital account liberalization appears to have positive effects on growth only in countries that have already opened more generally. But there are significant prerequisites for opening, most obviously a consensus in favor of reducing tariff and nontariff barriers and an ability to eliminate macroeconomic imbalances in whose presence freeing up current account transactions is not possible. Which of these prerequisites turns out to matter may come as a surprise.

## 4.2 Basic Results

In this section we scrutinize the claim that the effects of capital account liberalization differ between high- and low-income economies—and, specifically, that they are positive in the former but not the latter.

Our point of departure is Edwards's model. Edwards regresses economic growth in the 1980s (approximately the same period Rodrik considers) on the decennial average investment rate, years of schooling completed by 1965 (as a measure of human capital), the log of real GDP per capita in 1965 (as a measure of the scope for catch-up), and Quinn's index of capital account openness. He reports that this measure of capital account openness has a positive and generally significant effect on growth. Moreover, when capital account openness is entered both on its own and interacted with per capita incomes, the first coefficient is negative and the second positive.[3] The inflection point where the effect of capital account openness becomes positive coincides with the per capita incomes achieved by the 1980s by such relatively advanced emerging markets as Hong Kong, Israel, Mexico, Singapore, and Venezuela.

Four aspects of Edwards's data and specification are worthy of comment. First, although he uses annual data spanning the 1980s for his other variables, Edwards has Quinn's measure of capital account openness for only 1973 and 1988.[4] The 1973 value is arguably too early to have a first-order effect on growth in the 1980s, whereas the 1988 value is arguably too late.[5] Similarly, the difference in the level of openness in 1973 and 1988 may tell us how policies toward the capital account changed in the 1970s and 1980s, but these two snapshots are equally compatible with the possibility that the change took place before the beginning of the sample period or at its end, two scenarios that presumably imply different effects.[6]

Second, Edwards weights his observations by GDP per capita in 1985. We worry that placing an especially heavy weight on rich countries with well-developed institutions biases the case in favor of finding a link between capital account liberalization and growth, because these are the countries in which such an effect is most plausibly present.[7]

Third, Edwards instruments his measure of capital account liberalization with a vector of concurrent and lagged economic, financial, and geographical variables. Although we are sympathetic to the idea that policies toward the capital account may be affected by as well as affect growth, useful instruments—variables that are exogenous but also correlated with capital account liberalization—are hard to come by. In particular, we are skeptical that geographic variables are usefully correlated with capital account liberalization (although previous work shows that they importantly influence the level of income and/or the rate of growth), and we would question whether the economic and financial variables invoked in this context are properly regarded as exogenous with respect to the policy.[8]

Fourth, neither Edwards nor other contributors to this literature include competing measures of economic openness and the macroeconomic policy regime. Typically, countries that open the capital account also open their economies to other transactions (for example, they will have reduced tariff and nontariff barriers to trade). In the absence of measures of these other policies, it is not obvious that the index of capital account openness is picking up the effects of financial openness as opposed to the openness of, say, the trade account. Similarly, governments may wait to open the capital account until they have first succeeded in eliminating macroeconomic imbalances that would precipitate capital flight through newly opened channels;

a positive effect of capital account liberalization on growth may reflect the growth-friendly effects of macroeconomic stabilization, in other words, rather than international financial policies per se.

We show some "Edwards regressions" in table 4.1 (single equation estimates for the 1980s, with and without weights, using the 1988 level of the Quinn index and, also following Edwards, the change in Quinn's index between 1973 and 1988).[9] The controls—the investment ratio, human capital, 1965 per capita GDP—are consistently significant and have their anticipated signs. In the unweighted least squares regressions, both the level of capital account openness in 1988 and its change between 1973 and 1988 enter with positive coefficients, but only the latter differs from zero at the 95 percent level.[10] In the weighted least squares regressions, the converse is true: the level of capital account openness differs from zero at the 95 percent confidence level, but the change does not. There is some evidence, then, of a positive association between capital account liberalization and growth, although it is decidedly fragile.

Following Edwards, we re-estimated these equations, substituting the binary measure of capital account restrictions based on information in the IMF's *Exchange Arrangements and Exchange Restrictions* annual, constructing this variable as the share of years in the sample period when the capital account was open. As in his analysis, none of the coefficients on this variable approached significance at conventional confidence levels.[11] This is support for Edwards's first point, that the growth effects of capital account liberalization are more evident when the latter is proxied by the (presumably more informative) Quinn measure.

When we interact the Quinn measure with per capita GDP in 1980 (that being the start of Edwards's sample period), we find little support for the notion that capital account liberalization has different effects in high- and low-income countries. In the unweighted least squares regressions (columns 1–4 of table 4.1), the coefficient on the interaction of the Quinn index and 1980 per capita GDP is positive and significantly different from zero at the 95 percent confidence level, as if the effects of liberalization are larger in high-income countries.[12] But we find no such effect in the weighted least squares regressions or when we measure capital account liberalization as the change in the Quinn index between 1973 and 1988. When we adopt this last specification, the pattern of coefficients instead suggests *smaller* growth effects of liberalization in high-income countries.[13] A

**Table 4.1**
Basic Regressions (Dependent Variable: Average Growth Rate of GDP per Capita, 1980–1989)

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Investment ratio, 1980–1989 average | 0.192*** (4.44) | 0.183*** (5.03) | 0.176*** (4.44) | 0.182*** (4.96) |
| Human capital, 1965 | 0.720** (2.54) | 0.735** (2.15) | 0.587** (2.03) | 0.776** (2.26) |
| Log GDP per capita, 1965 | −2.911*** (−3.41) | −2.665*** (3.30) | −3.719*** (−4.25) | −2.588*** (−3.14) |
| Level Quinn's Index, 1988 | 0.599 (1.48) | — | −0.081 (−0.17) | — |
| Interaction level Quinn 1988* 1980 GDP per capita | — | — | 0.001*** (2.98) | — |
| Difference Quinn's Index, 1973–1988 | — | 0.600** (2.28) | — | 1.034** (2.60) |
| Interaction diff. Quinn 1973–1988* 1980 GDP per capita | — | — | — | −0.001 (−1.24) |
| Constant | 15.587*** (2.87) | 15.027*** (2.84) | 22.790*** (4.01) | 14.389** (2.66) |
| Observations | 61 | 61 | 61 | 61 |
| $R^2$ | 0.52 | 0.52 | 0.57 | 0.52 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Columns 1–4 are unweighted. Columns 5–8 are weighted by GDP per capita in 1985.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

joint test of the significance of the capital account openness measure measured in changes and the corresponding interaction term (not reported) allows us to reject the null that both coefficients are zero in both column 8 (the weighted least squares estimates) and in column 4 (the OLS estimates). But, to repeat, the pattern of signs is inconsistent with the notion that liberalization has negative effects in low-income countries and positive effects in high-income ones.[14]

Edwards obtains more precise coefficients on the relationship between capital account liberalization and growth, both entered linearly and interacted with per capita GDP, when using instrumental variables. Though his estimates of the nonlinear effect differ from ours not just by the use of instruments but also by being estimated as a system of two equations (where capital account liberalization affects both aggregate and TFP growth), we were led to wonder whether differences between our results and his are driven by the

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Investment ratio, 1980–1989 average | 0.160*** (4.46) | 0.171*** (5.47) | 0.155*** (4.44) | 0.167*** (5.01) |
| Human capital, 1965 | 0.500** (2.52) | 0.579** (2.24) | 0.481** (2.34) | 0.621** (2.35) |
| Log GDP per capita, 1965 | −2.487*** (−3.29) | −2.015*** (−3.06) | −2.784*** (−3.55) | 1.888*** (−2.88) |
| Level Quinn's Index, 1988 | 1.005** (2.35) | — | 0.742 (1.28) | — |
| Interaction level Quinn 1988* 1980 GDP per capita | — | — | 0.001 (0.84) | — |
| Difference Quinn's Index, 1973–1988 | — | 0.280 (0.91) | — | 1.204** (2.26) |
| Interaction diff. Quinn 1973–1988* 1980 GDP per capita | — | — | — | −0.001* (−1.81) |
| Constant | 13.009*** (2.77) | 11.109** (2.59) | 15.723*** (3.03) | 10.073** (2.40) |
| Observations | 61 | 61 | 61 | 61 |
| $R^2$ | 0.53 | 0.44 | 0.53 | 0.46 |

use of instrumental variables. We therefore re-estimated the equations in table 4.1 using two alternative sets of instruments. We first used the Hall-Jones (1999) instrument set (distance from the equator, a dummy variable for whether the country is landlocked, a dummy variable for whether it is an island, the share of the population speaking English, and the share of the population speaking a major European language). None of the measures of capital account liberalization—its level or change, entered by itself or interacted with per capita GDP—entered with a coefficient that approached significance at standard confidence levels.[15] Although these instruments are plausibly exogenous, either they are not usefully correlated with capital account liberalization or the latter in fact has no independent impact on growth.

The second set of instruments is our attempt to replicate those used by Edwards: whether the capital account was open or closed in 1973, the ratio of liquid liabilities to GDP in 1970 and 1975, distance to the equator, and a dummy variable for OECD countries.[16] The results, in table 4.2, differ sharply from before. The coefficient on the

**Table 4.2**
Two-Stage Least Squares Regressions (Dependent Variable: Average Growth Rate of GDP per Capita, 1980–1989)

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Investment ratio, 1980–1989 average | 0.173*** (3.58) | 0.179*** (5.17) | 0.130** (2.35) | 0.177*** (5.19) |
| Human capital, 1965 | 0.681** (2.31) | 0.710* (1.84) | 0.379 (1.08) | 0.674 (1.61) |
| Log GDP per capita, 1965 | −2.897*** (−2.83) | −2.712*** (−2.94) | −5.326*** (−2.89) | −2.716*** (−2.90) |
| Level Quinn's Index, 1988 | 0.802 (1.48) | — | −1.815 (−1.60) | — |
| Interaction level Quinn 1988 × 1980 GDP per capita | — | — | 0.001** (2.06) | — |
| Difference Quinn's Index, 1973–1988 | — | 0.798 (1.59) | — | 0.411 (0.31) |
| Interaction diff. Quinn 1973–1988 × 1980 GDP per capita | — | — | — | 0.001 (0.33) |
| Constant | 15.447** (2.39) | 15.472** (2.58) | 38.050** (2.64) | 15.605** (2.58) |
| Observations | 52 | 52 | 52 | 52 |
| $R^2$ | 0.51 | 0.50 | 0.32 | 0.49 |

*Notes:* 2SLS regressions. t-statistics derived using robust standard errors in parentheses.
Instruments are liquid liabilities in 1970 and 1975, distance to the equator, OECD dummy and Quinn's index in 1973.
Columns 1–4 are unweighted. Columns 5–8 are weighted by GDP per capita in 1985.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

Quinn index in 1988 is still positive when entered on its own, albeit somewhat less well defined than in table 4.1. However, when the interaction of capital account openness and per capita GDP is added, the coefficient on the level of the Quinn index turns negative (though insignificant), whereas the interaction term is positive and significantly different from zero at the 95 percent confidence level. This is very close to Edwards's result. However, this pattern obtains only when we enter capital account openness in levels (rather than changes between 1973 and 1988) and only when we estimate by unweighted least squares (as opposed to applying per capita GDP weights). It is sensitive to the choice of instrumental variables. For example, the one coefficient on the interaction term that was previously significantly positive goes to zero when either financial

| | 5 | 6 | 7 | 8 |
|---|---|---|---|---|
| Investment ratio, 1980–1989 average | 0.159*** (4.44) | 0.176*** (6.08) | 0.153*** (4.13) | 0.174*** (5.21) |
| Human capital, 1965 | 0.453** (2.27) | 0.520* (1.84) | 0.432** (2.12) | 0.611* (1.85) |
| Log GDP per capita, 1965 | −2.265** (−2.63) | −1.752** (−2.59) | −2.781 (−1.63) | −1.643** (−2.54) |
| Level Quinn's Index, 1988 | 1.088* (1.89) | — | 0.465 (0.30) | — |
| Interaction level Quinn 1988 × 1980 GDP per capita | — | — | 0.001 (0.41) | — |
| Difference Quinn's Index, 1973–1988 | — | 0.354 (0.85) | — | 2.203 (1.36) |
| Interaction diff. Quinn 1973–1988 × 1980 GDP per capita | — | — | — | −0.001 (−1.14) |
| Constant | 11.067** (2.12) | 8.921** (2.13) | 16.087 (1.11) | 7.860** (2.04) |
| Observations | 52 | 52 | 52 | 52 |
| $R^2$ | 0.51 | 0.47 | 0.51 | 0.46 |

depth or lagged openness (or, for that matter, both) is dropped from the instrument list but the other instrumental variables are retained.[17]

Thus, we confirm that an analysis of developing and industrial country experience in the 1980s yields somewhat more favorable results for the association of capital account openness and growth when capital account policies are measured using Quinn's index rather than the IMF measure. The evidence that this effect is stronger in high-income countries turns out to be extremely sensitive to specification and estimation.

### 4.3 Sensitivity Analysis

In this section, we subject these results to two forms of sensitivity analysis. First, we adjust the timing of the dependent and independent variables in order to better identify the effects of capital account policies. Second, we compare the effects of capital account liberalization in different periods.

**Table 4.3**
Growth Regressions for Alternative Periods (Dependent Variable: Average Growth Rate of GDP per Capita during Relevant Period)

| | 1<br>1973–<br>1981 | 2<br>1982–<br>1987 | 3<br>1988–<br>1992 | 4<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.207***<br>(4.81) | 0.179***<br>(3.27) | 0.278***<br>(4.14) | 0.223***<br>(6.46) |
| Human capital, beginning of period | 0.209<br>(1.06) | 0.349<br>(1.60) | −0.478*<br>(−1.73) | 0.087<br>(0.63) |
| Log GDP per capita, beginning of period | −2.329***<br>(−3.41) | −0.986<br>(−1.20) | −1.113<br>(−1.09) | −1.546***<br>(−3.12) |
| Quinn's Index, beginning of period | 0.264<br>(0.94) | 0.095<br>(0.29) | 1.131*<br>(1.98) | 0.487**<br>(2.17) |
| Interaction Quinn* GDP per capita, beginning of period | — | — | — | — |
| Dummy for 1973–1981 | — | — | — | 0.436<br>(0.87) |
| Dummy for 1982–1987 | — | — | — | −0.739<br>(−1.43) |
| Constant | 15.663***<br>(3.82) | 3.311<br>(0.63) | 5.873<br>(0.91) | 8.608***<br>(2.75) |
| Observations | 62 | 62 | 60 | 184 |
| $R^2$ | 0.34 | 0.29 | 0.27 | 0.26 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

Recall that Edwards uses Quinn's measure of capital account openness in 1973 and 1988. If capital account liberalization has a significant impact on growth, this should be most evident in the immediately succeeding years. Having analyzed growth in the 1980s as a way of rendering our results as comparable as possible to those of Edwards and other investigators, we now focus on the effects of capital account liberalization in the years immediately following those for which we have Quinn's capital account restrictions data: 1973 and 1988. The obvious stopping point for the period starting in 1973 is 1981, the eve of the Mexican debt crisis and the "lost decade" of the 1980s, when capital flows were subdued and their growth effects were plausibly different. Our second cross section (starting in 1988) ends in 1992, because that is when our data, drawn from the Penn World Tables Mark 5.6a, end.[18] This leaves a gap in the mid

| | 5<br>1973–<br>1981 | 6<br>1982–<br>1987 | 7<br>1988–<br>1992 | 8<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.209***<br>(4.47) | 0.189***<br>(3.44) | 0.276***<br>(4.15) | 0.226***<br>(6.40) |
| Human capital, beginning of period | 0.203<br>(1.03) | 0.233<br>(0.99) | −0.420<br>(−1.50) | 0.059<br>(0.42) |
| Log GDP per capita, beginning of period | −2.363***<br>(−3.11) | −1.646*<br>(−2.00) | −0.845<br>(−0.63) | −1.718***<br>(−3.11) |
| Quinn's Index, beginning of period | 0.246<br>(0.66) | −0.444<br>(−1.23) | 1.380**<br>(2.15) | 0.365<br>(1.40) |
| Interaction Quinn* GDP per capita, beginning of period | 0.001<br>(0.13) | 0.001*<br>(1.99) | −0.001<br>(−0.55) | 0.001<br>(0.79) |
| Dummy for 1973–1981 | — | — | — | 0.468<br>(0.92) |
| Dummy for 1982–1987 | — | — | — | −0.704<br>(−1.34) |
| Constant | 15.932***<br>(3.31) | 9.150*<br>(1.70) | 3.303<br>(0.34) | 10.071***<br>(2.75) |
| Observations | 62 | 62 | 60 | 184 |
| $R^2$ | 0.34 | 0.33 | 0.27 | 0.27 |

1980s. Fortunately, we were also able to obtain Quinn's measure of capital account openness for 1982.[19] Thus, we can analyze three cross sections covering the periods 1973–1981, 1982–1987, and 1988–1992. We also pool the three cross sections. The pooled results will reassure readers worried that conditions during one or more of our periods were special ("1982–1987 is unrepresentative because it is dominated by the debt crisis," for example). Aggregating across periods limits the danger that our results are driven by period-specific effects.

The results are in table 4.3. In the first four columns, we enter capital account openness in levels; in the second four, we interact it with per capita GDP.[20] Given the questions about instrumentation raised in the last section, we estimate the equations by ordinary least squares.

The results remain generally plausible.[21] When entered exclusively in levels, the Quinn measure of financial openness is positively

associated with growth in all three periods, but only in the third of these, 1988–1992, is the effect significant at anything approaching conventional confidence levels. The coefficient is smallest in the period starting in 1982, when capital flows were depressed by the debt crisis, and largest in the post-1987 period, the year of the Brady Plan, after which large scale portfolio capital flows resumed. But when we pool the three cross sections (adding fixed effects to differentiate the subperiods), the coefficient on capital account liberalization differs from zero at the 95 percent confidence level. This is the strongest evidence so far of a positive association of capital account liberalization and growth, although it is clear that this result is heavily driven by one of our cross sections.

But there is still scant evidence of a stronger growth effect in high-income countries. We obtain a significant positive coefficient on the interaction term only for the post-1982 years. Perhaps capital account liberalization worked its magic more powerfully on high-income countries in these years. Alternatively, it may simply be that high-income (OECD) countries with open capital accounts were less affected by the debt crisis of the 1980s than developing countries with open capital accounts that had grown heavily dependent on foreign borrowing. Whether this in fact tells us anything about the differential effects of capital account liberalization in different developing countries is unclear.

In the pooled sample, the coefficient on the interaction term is indistinguishable from zero. However, the coefficient on capital account liberalization in levels continues to enter positively and differs from zero at the 90 percent confidence level. Again, however, this result appears to be driven by the strong positive association in the post-1987 period.

Thus, more data and appropriate timing of the variables continue to provide indications of a positive association of capital account liberalization with growth. However, that effect is robust only for the most recent period, that is to say, for the post–Brady Plan years. There is less evidence for earlier periods, whether these are the years of syndicated bank lending to developing countries or of the developing country debt crisis. Moreover, we find little support for the view that capital account liberalization has more favorable effects in high- and middle-income emerging markets than in poorer developing countries.

## 4.4 Do These Patterns Reflect Stages of Financial and Institutional Development?

We now ask whether the different effects of capital account liberalization in high- and low-income countries in fact reflect their different stages of financial and institutional development. To this end, we interact Quinn's index not with per capita GDP but with financial depth (proxied by the ratio of liquid liabilities to GDP) and institutional strength (the *International Country Risk Guide's* index of law and order).[22]

The results are in table 4.4, the first four columns for financial depth (post-1973, post-1982, post-1988, and pooled, reading left to right), the last four for law and order. Those for financial depth are unpromising: none of the coefficients in question are significant individually or as a pair.[23] The results for the interaction between capital account openness and rule of law are more promising. In the first subperiod (1973–1981), we obtain a negative coefficient on capital account openness in levels and a positive coefficient on the interaction term; the latter differs from zero at the 95 percent confidence level. The interpretation is that capital account liberalization has no effect in countries with weak contract and law enforcement but a positive effect in those where it is stronger. The results for the second subperiod (1982–1987) are more striking still: both terms again enter with the expected signs, and both now differ from zero at conventional confidence levels.[24] According to this column at least, capital account liberalization hinders growth when a country rates low on the law and order index but helps when it rates high.[25] In comparison, the results for the most recent subperiod (1988–1992) are disappointing: neither coefficient enters with its expected sign, and neither differs significantly from zero at standard confidence levels.[26]

The results for the pooled sample reflect these contrasting subsample results. The coefficient on the level of Quinn openness is zero, but the coefficient on the interaction term is positive and significant at the 90 (but not the 95 percent) confidence level.

Thus, we find scant support for the hypothesis that the effects of capital account liberalization reflect a country's stage of financial development. There is more support for the idea that the effects vary with the effectiveness of law and order, but the evidence is not overwhelming.

**Table 4.4**
Role of Financial and Institutional Development (Dependent Variable: Average Growth Rate of GDP per Capita during Relevant Period)

| | 1<br>1973–<br>1981 | 2<br>1982–<br>1987 | 3<br>1988–<br>1992 | 4<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.189***<br>(4.55) | 0.185***<br>(3.01) | 0.304***<br>(3.92) | 0.225***<br>(6.06) |
| Human capital, beginning of period | 0.209<br>(0.98) | 0.264<br>(1.49) | −0.508*<br>(−1.69) | 0.049<br>(0.36) |
| Log GDP per capita, beginning of period | −2.488***<br>(−3.22) | −0.784<br>(−1.04) | −1.123<br>(−1.03) | −1.594***<br>(−3.19) |
| Quinn's Index, beginning of period | 0.342<br>(1.15) | −0.285<br>(−0.85) | 1.142*<br>(1.75) | 0.343<br>(1.29) |
| Interaction Quinn* Financial Depth, beginning of period | 0.003<br>(0.57) | 0.002<br>(0.56) | −0.002<br>(−0.36) | 0.002<br>(0.60) |
| Interaction Quinn* Law and Order, beginning of period | — | — | — | — |
| Dummy for 1973–1981 | — | — | — | 0.421<br>(0.82) |
| Dummy for 1982–1987 | — | — | — | −0.690<br>(−1.33) |
| Constant | 16.881***<br>(3.49) | 2.508<br>(0.51) | 5.859<br>(0.83) | 9.212***<br>(2.86) |
| Observations | 55 | 58 | 58 | 171 |
| $R^2$ | 0.43 | 0.35 | 0.28 | 0.29 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

## 4.5 Sequencing

It could be that we are not capturing the full impact of capital account liberalization on growth because we are not controlling for efforts to coordinate external financial opening with other liberalization measures. There is a large literature on sequencing that suggests that capital account liberalization initiated before the current account is opened can have strongly distortionary effects (see McKinnon 1991). If trade barriers continue to protect an uneconomical import-competing sector, foreign capital will flow there, attracted by rents and artificially inflated profits. Because the country has no comparative advantage in those activities, actually devoting more resources to import-competing production can be growth and welfare reduc-

| | 5<br>1973–<br>1981 | 6<br>1982–<br>1987 | 7<br>1988–<br>1992 | 8<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.199***<br>(5.16) | 0.162**<br>(2.66) | 0.279***<br>(4.04) | 0.214***<br>(5.92) |
| Human capital, beginning of period | 0.112<br>(0.62) | 0.250<br>(1.15) | −0.471<br>(−1.55) | 0.024<br>(0.17) |
| Log GDP per capita, beginning of period | −2.692***<br>(−3.66) | −1.569*<br>(−1.88) | −1.070<br>(−0.95) | −1.882***<br>(−3.73) |
| Quinn's Index, beginning of period | −0.273<br>(−0.75) | −0.817**<br>(−2.04) | 1.194*<br>(1.70) | 0.005<br>(0.02) |
| Interaction Quinn* Financial Depth, beginning of period | — | — | — | — |
| Interaction Quinn* Law and Order, beginning of period | 0.171**<br>(2.12) | 0.250**<br>(2.44) | −0.016<br>(−0.11) | 0.137**<br>(2.18) |
| Dummy for 1973–1981 | — | — | — | 0.369<br>(0.74) |
| Dummy for 1982–1987 | — | — | — | −0.769<br>(−1.48) |
| Constant | 19.053***<br>(3.94) | 8.896<br>(1.62) | 5.450<br>(0.68) | 11.833***<br>(3.51) |
| Observations | 62 | 62 | 60 | 184 |
| $R^2$ | 0.39 | 0.35 | 0.27 | 0.28 |

ing. In particular, the cost of the resources that the country utilizes to service the foreign finance may exceed the cost of capital, reducing domestic incomes as well as starving other sectors of inputs to growth (Brecher and Díaz-Alejandro 1977). Similarly, the literature on the sequencing of financial liberalization measures cautions that it can be counterproductive to open the international accounts before eliminating domestic macroeconomic imbalances; the main effect will then be to provide avenues for capital flight.[27] If financial markets are repressed, capital account liberalization allows savers to flee the local low-interest rate environment in favor of higher returns abroad. For all these reasons, capital account liberalization when macroeconomic policy is seriously out of balance is a recipe for disaster.

To capture these qualifications, we added the interaction between capital account openness, as measured by Quinn, and nonfinancial

**Table 4.5**
Role of Sequencing (Dependent Variable: Average Growth Rate of GDP per Capita during Relevant Period)

| | 1<br>1973–<br>1981 | 2<br>1982–<br>1987 | 3<br>1988–<br>1992 | 4<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.176***<br>(4.15) | 0.103*<br>(1.68) | 0.232***<br>(3.11) | 0.173***<br>(4.53) |
| Human capital, beginning of period | 0.113<br>(0.58) | 0.272<br>(1.33) | −0.556*<br>(−1.93) | −0.002<br>(−0.01) |
| Log GDP per capita, beginning of period | −2.382***<br>(−3.39) | −1.149<br>(−1.38) | −1.339<br>(−1.34) | −1.759***<br>(−3.56) |
| Quinn's Index, beginning of period | 0.194<br>(0.55) | −0.361<br>(−1.17) | 0.455<br>(0.61) | 0.224<br>(0.85) |
| Interaction Quinn* SW Open Index | 0.458<br>(1.67) | 0.919***<br>(3.54) | 0.917*<br>(1.81) | 0.720***<br>(3.45) |
| SW Open Index, beginning of period | — | — | — | — |
| Dummy for 1973 | — | — | — | 0.690<br>(1.40) |
| Dummy for 1982 | — | — | — | −0.533<br>(−1.04) |
| Constant | 16.872***<br>(3.95) | 6.305<br>(1.17) | 9.186<br>(1.47) | 11.310***<br>(3.69) |
| Observations | 60 | 60 | 59 | 179 |
| $R^2$ | 0.41 | 0.36 | 0.31 | 0.32 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

openness, as measured by Sachs and Warner (1995).[28] This is analogous to our earlier tests of the idea that the effects of capital account openness are contingent on financial depth and institutional development, but now the hypothesis is that they are contingent on the absence of trade and macroeconomic distortions. The Sachs-Warner index classifies a country as open if none of the five following criteria holds: the country had average tariff rates higher than 40 percent, its nontariff barriers covered on average more than 40 percent of imports, it had a socialist economic system, the state had a monopoly of major exports, and its black market premium exceeded 20 percent. The first four criteria should allow us to test the notion that capital mobility is counterproductive for an economy whose trade is highly restricted and distorted.[29] The fifth is indicative of macroeconomic

| | 5<br>1973–<br>1981 | 6<br>1982–<br>1987 | 7<br>1988–<br>1992 | 8<br>Pooled |
|---|---|---|---|---|
| Investment ratio, period average | 0.146***<br>(3.00) | 0.094<br>(1.49) | 0.218***<br>(2.81) | 0.154***<br>(3.74) |
| Human capital, beginning of period | 0.123<br>(0.63) | 0.260<br>(1.34) | −0.529*<br>(−1.97) | −0.001<br>(−0.01) |
| Log GDP per capita, beginning of period | −2.325***<br>(−3.40) | −1.156<br>(−1.40) | −1.284<br>(−1.24) | −1.719***<br>(−3.53) |
| Quinn's Index, beginning of period | 0.366<br>(0.93) | −0.128<br>(−0.36) | 1.049<br>(1.38) | 0.509*<br>(1.82) |
| Interaction Quinn* SW Open Index | −0.134<br>(−0.22) | 0.469<br>(0.90) | −0.386<br>(−0.37) | −0.001<br>(−0.01) |
| SW Open Index, beginning of period | 1.754<br>(1.37) | 1.197<br>(0.78) | 3.441<br>(1.20) | 2.020*<br>(1.83) |
| Dummy for 1973 | — | — | — | 0.677<br>(1.39) |
| Dummy for 1982 | — | — | — | −0.542<br>(−1.07) |
| Constant | 16.487***<br>(4.00) | 6.115<br>(1.16) | 7.614<br>(1.11) | 10.679***<br>(3.54) |
| Observations | 60 | 60 | 59 | 179 |
| $R^2$ | 0.43 | 0.37 | 0.33 | 0.33 |

policies and conditions inconsistent with a country's administered exchange rate; it should allow us to test the hypothesis that capital account liberalization is counterproductive if implemented before a country eliminates macroeconomic imbalances.

The results are in table 4.5, columns 1–4. The specification is analogous to that of table 4.3 but for the addition of the interaction of the Sachs-Warner dummy with Quinn openness. We find a strong positive effect of this interaction term, almost irrespective of period.[30] In the pooled sample, it differs from zero at the 99 percent confidence level. This suggests that capital account openness stimulates growth when a country has eliminated major trade distortions and macroeconomic imbalances, but not otherwise.

We undertook some sensitivity analyses of this finding. We estimated the equations by weighted as well as unweighted least squares. We used Edwards' instrumental variables. We searched for and dropped outliers. We added the interaction between financial

depth and financial openness and the interaction between law and order and financial openness as in table 4.4, above. None of these changes weakened the result.

The one change that made a difference was adding Sachs-Warner openness in levels. We show the result of doing so in columns 5–8 of table 4.5. The three openness measures (Sachs-Warner openness, Quinn capital account openness, and their interaction) are highly correlated, creating problems of multicolinearity. Only in the pooled sample is there much hope of distinguishing their effects. There, Sachs-Warner openness and Quinn openness both have (positive) coefficients that differ from zero at the 90 percent confidence level, whereas their interaction is insignificant. This points less to the importance of sequencing than to separate, non-interdependent effects on growth of both Sachs-Warner and capital account openness. But multicolinearity makes it difficult to know which interpretation is correct. Although the relevant F-test allows us to reject the null that the levels of both Sachs-Warner openness and Quinn openness are zero, consistent with the separate, non-interdependent-effects interpretation, it also allows us to reject the null that Quinn openness and the interaction of Sachs-Warner openness with Quinn openness are both zero, consistent with the sequencing interpretation.

It turns out that we can get a better handle on which interpretation is more plausible by analyzing whether the absence of a favorable impact on growth in countries that are closed according to the Sachs-Warner measure reflects distortionary trade policies or distortionary macroeconomic policies. We do so by breaking Sachs-Warner openness into its two principal components, one reflecting the prevalence of tariff and nontariff barriers (distortionary trade policies), and the other reflecting the size of the black market premium (an indicator of macroeconomic imbalances).[31] If it is the interaction term involving the black market premium that matters, then we can say that eliminating macroeconomic imbalances is the essential prerequisite for capital account liberalization to have positive growth effects, à la McKinnon. If, on the other hand, it is the interaction involving tariff and nontariff barriers that is significant and important, we can say that eliminating trade-related distortions is key, à la Brecher and Díaz-Alejandro.[32]

We measured tariff and nontariff barriers using the data of Barro and Lee (1994), which Sachs and Warner conveniently also utilized.[33] For the black market premium, we constructed three alter-

native measures. First, we created a dummy variable that equaled unity if the black market premium was less than 20 percent.[34] Although this follows Sachs and Warner as closely as possible, it does not use all the available information. We therefore also defined an alternative measure, 100 percent minus the black market premium.[35] Although this contains more information, the results obtained when using it are more likely to be dominated by a handful of extreme observations. This led us to create a third version of the variable, which truncated 100 percent minus the black market premium at zero on the downside.[36]

It turns out that it is the interaction term between capital account openness and the black market premium that most consistently matters. Columns 1–3 of table 4.6 display pooled regressions using the three alternative measures of the premium. The interaction with the black market premium is positive, and its coefficient is significantly greater than zero at the 90 percent confidence level, regardless of how that premium is defined and measured. The evidence that trade openness is a prerequisite for capital account openness to stimulate growth is less robust; although the coefficient on the interaction with Barro and Lee's trade openness measure is consistently positive, it approaches significance at conventional confidence levels in only one of the three regressions.[37]

Again, we attempted to confirm the robustness of this finding. We added interaction terms involving financial depth and law and order, as in table 4.4. We ran regressions using weighted as well as unweighted observations. In each instance, the results were essentially unchanged. The one sensitivity analysis that mattered was adding Sachs-Warner openness in levels. The results are in the last three columns of table 4.6. Evidently, the two measures of external policy with the most robust, consistent effects on growth are (1) Sachs-Warner openness, and (2) the interaction of the black market premium with capital account openness. In other words, there is evidence, as before, that countries that open externally in the sense of Sachs and Warner grow faster, other things equal. In addition, however, countries that open the capital account also grow faster *but only if they first eliminate any large black market premium.* Capital account openness has favorable effects, it would appear, only when macroeconomic imbalances leading to inconsistencies between the administered exchange rate and other policies have first been removed.

**Table 4.6**
Role of Trade Distortions and the Black Market Premium (Dependent Variable: Average Growth Rate of GDP per Capita during Relevant Period)

| | 1<br>Pooled | 2<br>Pooled | 3<br>Pooled |
|---|---|---|---|
| Investment ratio, period average | 0.235***<br>(6.30) | 0.239***<br>(6.50) | 0.226***<br>(6.17) |
| Human capital, beginning of period | −0.059<br>(−0.35) | −0.059<br>(−0.36) | −0.068<br>(−0.40) |
| Log GDP per capita, beginning of period | −1.884***<br>(−3.30) | −1.978***<br>(−3.49) | −1.819***<br>(−3.12) |
| Quinn's Index, beginning of period | −0.214<br>(−0.49) | 0.138<br>(0.42) | −0.963<br>(−1.40) |
| Interaction Quinn* Barro-Lee trade openness | 0.324<br>(1.14) | 0.522**<br>(2.01) | 0.288<br>(1.10) |
| Interaction Quinn* Black Market Premium 1 | 0.546*<br>(1.69) | — | — |
| Interaction Quinn* Black Market Premium 2 | — | 0.064**<br>(2.52) | — |
| Interaction Quinn* Black Market Premium 3 | — | — | 1.257**<br>(1.99) |
| SW Open Index, beginning of period | — | — | — |
| Dummy for 1973 | 0.124<br>(0.22) | 0.259<br>(0.46) | −0.003<br>(−0.01) |
| Dummy for 1982 | −0.773<br>(−1.30) | −0.675<br>(−1.11) | −0.881<br>(−1.52) |
| Constant | 12.159***<br>(3.41) | 12.562***<br>(3.53) | 12.206***<br>(3.37) |
| Observations | 141 | 141 | 141 |
| $R^2$ | 0.34 | 0.34 | 0.36 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

| | 4<br>Pooled | 5<br>Pooled | 6<br>Pooled |
|---|---|---|---|
| Investment ratio, period average | 0.182***<br>(3.74) | 0.189***<br>(3.96) | 0.181***<br>(3.77) |
| Human capital, beginning of period | −0.120<br>(−0.73) | −0.119<br>(−0.72) | −0.123<br>(−0.73) |
| Log GDP per capita, beginning of period | −1.686***<br>(−2.90) | −1.775***<br>(−3.06) | −1.652***<br>(−2.79) |
| Quinn's Index, beginning of period | −0.158<br>(−0.37) | 0.182<br>(0.56) | −0.777<br>(−1.12) |
| Interaction Quinn* Barro-Lee trade openness | 0.055<br>(0.19) | 0.251<br>(0.94) | 0.068<br>(0.26) |
| Interaction Quinn* Black Market Premium 1 | 0.520<br>(1.64) | — | — |
| Interaction Quinn* Black Market Premium 2 | — | 0.056**<br>(2.50) | — |
| Interaction Quinn* Black Market Premium 3 | — | — | 1.091*<br>(1.71) |
| SW Open Index, beginning of period | 1.644**<br>(2.22) | 1.597**<br>(2.14) | 1.468**<br>(2.02) |
| Dummy for 1973 | 0.268<br>(0.48) | 0.397<br>(0.72) | 0.159<br>(0.29) |
| Dummy for 1982 | −0.728<br>(−1.25) | −0.640<br>(−1.08) | −0.822<br>(−1.45) |
| Constant | 11.291***<br>(3.20) | 11.637***<br>(3.28) | 11.390***<br>(3.17) |
| Observations | 141 | 141 | 141 |
| $R^2$ | 0.37 | 0.37 | 0.38 |

Table 4.7 reports a selection of subperiod results.[38] These show that the positive effect of capital account openness on growth, *contingent on the absence of a large black market premium,* is driven by the 1982–1987 subperiod. In addition, previously (in tables 4.3–5), the coefficient on capital account openness in levels was either positive or zero. There was no evidence, in other words, that capital account openness was *bad* for growth in countries with underdeveloped financial markets, weak institutions, severe macroeconomic imbalances, or closed current accounts. Now the coefficient on the level of Quinn's index is strongly negative in 1982–1987, as if countries with significant trade distortions and large black market premia grew

**Table 4.7**
Role of Trade Distortions and the Black Market Premium, Subperiod Estimates (Dependent Variable: Average Growth Rate of GDP per Capita during Relevant Period)

| | 1<br>1973–<br>1981 | 2<br>1982–<br>1987 | 3<br>1988–<br>1992 |
|---|---|---|---|
| Investment ratio, period average | 0.241***<br>(5.53) | 0.193***<br>(3.36) | 0.289***<br>(3.83) |
| Human capital, beginning of period | 0.212<br>(0.96) | 0.103<br>(0.48) | −0.649*<br>(−1.79) |
| Log GDP per capita, beginning of period | −3.116***<br>(−3.69) | −0.834<br>(−1.04) | −1.429<br>(−1.21) |
| Quinn's Index, beginning of period | 0.537<br>(0.90) | −1.867***<br>(−3.00) | 0.533<br>(0.73) |
| Interaction Quinn* Barro-Lee trade openness | 0.359<br>(0.89) | 0.532<br>(1.25) | 0.243<br>(0.41) |
| Interaction Quinn* Black Market Premium 1 | −0.284<br>(−0.54) | 1.016**<br>(2.46) | 0.610<br>(1.05) |
| SW Open Index, beginning of period | — | — | — |
| Constant | 20.889***<br>(4.03) | 4.754<br>(0.90) | 9.085<br>(1.24) |
| Observations | 47 | 47 | 47 |
| $R^2$ | 0.46 | 0.46 | 0.34 |

*Notes:* OLS regressions. t-statistics derived using robust standard errors in parentheses.
Significance at 10%, 5%, and 1% denoted by *, **, and *** respectively.

more slowly if they had ill advisedly opened their capital accounts. That this effect is most evident in the debt crisis years 1982–1987 may be telling us that countries that poorly sequenced capital account liberalization suffered the most devastating effects of the curtailment of capital flows; they suffered a severe debt overhang and an intractable transfer problem when the debt crisis struck. It may be that improper sequencing does not actually damage growth so long as international capital markets are flush with funds, but that it can result in serious damage if lending suddenly dries up.

## 4.6 Conclusion

Economic theory creates a strong presumption that capital account liberalization has favorable effects on growth. Yet the accidents and disappointments suffered by countries liberalizing their international

| | 4<br>1973–<br>1981 | 5<br>1982–<br>1987 | 6<br>1988–<br>1992 |
|---|---|---|---|
| Investment ratio, period average | 0.201***<br>(3.23) | 0.133*<br>(1.99) | 0.249**<br>(2.72) |
| Human capital, beginning of period | 0.161<br>(0.71) | 0.018<br>(0.08) | −0.649*<br>(−1.86) |
| Log GDP per capita, beginning of period | −2.904***<br>(−3.20) | −0.749<br>(−0.94) | −1.255<br>(−1.05) |
| Quinn's Index, beginning of period | 0.556<br>(0.96) | −1.614**<br>(−2.47) | 0.548<br>(0.73) |
| Interaction Quinn* Barro-Lee trade openness | 0.219<br>(0.51) | 0.139<br>(0.27) | −0.012<br>(−0.02) |
| Interaction Quinn* Black Market Premium 1 | −0.319<br>(−0.61) | 1.136**<br>(2.66) | 0.475<br>(0.90) |
| SW Open Index, beginning of period | 0.948<br>(1.04) | 1.560<br>(1.69) | 1.736<br>(1.10) |
| Constant | 19.997***<br>(3.71) | 4.766<br>(0.91) | 8.036<br>(1.10) |
| Observations | 47 | 47 | 47 |
| $R^2$ | 0.47 | 0.49 | 0.37 |

financial transactions remind us that reality is more complex than theory. The quest for guidance is not helped by the fact that the data do not speak loudly. Some analysts reject the hypothesis that there is a positive association between capital account liberalization and growth, whereas others report evidence of a favorable effect.

The idea that the effects of capital account liberalization are conditioned by a country's stage of financial and institutional development similarly has intuitive appeal. Not only are there good theoretical reasons to think that this might be the case, but it could be the failure of previous investigators to incorporate this idea that accounts for the weak and inconsistent results of their econometric studies. Yet our tests of the hypothesis are only weakly supportive. We find no evidence that the effects of capital account liberalization vary with financial depth, but somewhat more evidence that its effects vary with the rule of law.

In contrast, we find somewhat more evidence of a correlation between capital account liberalization and growth when we allow

the effect to vary with other dimensions of openness. There are two interpretations of this finding, one in terms of the sequencing of trade and financial liberalization, the other in terms of the need to eliminate major macroeconomic imbalances before opening the capital account. By and large, our results support the second interpretation. Whereas trade openness has a positive impact on growth, the effect of capital account openness is not *contingent* on openness to trade. Rather, it is *contingent* on the absence of a large black market premium—that is to say, on the absence of macroeconomic imbalances. In the presence of such imbalances, capital account liberalization is as likely to hurt as to help.

If we are right, ours is the first systematic, cross-country statistical evidence that the sequencing of reforms shapes the effects of capital account liberalization. But our analysis also suggests that this result may be period-specific: the evidence that sequencing matters is more robust in the 1980s than in the 1970s or 1990s. If this investigation has taught us one thing, it is not to oversell such results. Considerable additional analysis is required to establish the generality of such findings.

## Data Appendix

Our sample includes the following 61 countries and territories: Argentina, Australia, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Finland, France, Germany, Ghana, Greece, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jordan, South Korea, Liberia, Malaysia, Mexico, Myanmar, The Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Singapore, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Syrian Arab Republic, Thailand, Tunisia, Turkey, United Kingdom, United States, Uruguay, and Venezuela.

## Dependent Variable

*Rate of growth of real GDP per capita*, defined as the first difference of the log of real GDP per capita in constant dollars at 1985 international prices. *Source:* Penn World Tables, Mark 5.6a.

## Controls

• *Real investment share of GDP* (%) at 1985 international prices. The variables used in the regressions are averages of this variable over particular periods of time, as noted in the text and tables. *Source:* Penn World Tables, Mark 5.6a.

• *Average years of schooling* of the population over 15 years of age. This variable is available quinquennially for the years 1960–1990. For tables 4.1 and 4.2, the 1965 value was used. For the other tables, the values for 1970 (for the 1973 cross-section), 1980 (for the 1982 cross-section), and 1985 (for the 1988 cross-section) were used. (Given lack of 1970 data for Egypt, the value for 1975 was used in the 1973 cross-section for this country.). *Source:* Barro-Lee data set (see Barro and Lee 1996).

• *Log of GDP per capita* in constant dollars (chain index) at 1985 international prices. The value for 1965 is used in tables 4.1 and 4.2. In the other tables, the value for the beginning of the corresponding period was used. *Source:* Penn World Tables, Mark 5.6a.

## Financial and Institutional Development

• *Financial depth*, defined as the ratio of liquid liabilities to GDP (%). Values at the beginning of the period were used. *Source:* Beck, Demirgüç-Kunt, and Levine 1999.

• *Law and order index*, which ranges from zero to six, where a higher value represents a better institutional framework. *Source:* PRS Group (various years). Because this index starts only in 1984, we use the 1984 value for 1973 and 1981.

## Financial Openness

• *Quinn index*, which ranges from zero to four in increments of 0.5, where a higher value represents a more open capital account. Values for 1973, 1982, and 1988 are available. The value for 1988 and the difference between the 1973 and 1988 values were used in tables 4.1 and 4.2. In the other tables, the value for the beginning of the corresponding period was used. *Source:* personal correspondence with Dennis Quinn.

• *IMF capital account openness dummy*, constructed from line E2 ("restrictions on payments for capital transactions") of the IMF *Annual Report of Exchange Arrangements and Exchange Restrictions*, various issues. The variable used was the share of years in the sample period when the capital account was open. *Source:* IMF.

## Non-Financial Openness

• *Sachs-Warner openness dummy*, defined as a binary variable equal to one if *none* of the five following criteria holds: the country had average tariff rates higher than 40 percent, its nontariff barriers covered on average more than 40 percent of imports, it had a socialist economic system, the state had a monopoly of major exports, and its black market premium exceeded 20 percent. *Source:* Sachs and Warner 1995, via personal correspondence with Andrew Warner.

• *Barro-Lee trade openness dummy*, defined as binary variable equal to one if a country did not have average tariff rates higher than 40 percent and its

nontariff barriers did not cover on average more than 40 percent of imports. *Source:* Barro and Lee 1994.

• *Black market premium*, defined as percent premium over the official exchange rate. *Source:* personal correspondence with Andrew Warner.

### Instruments

• *Liquid liabities to GDP* (as defined above), for 1970 and 1975. *Source:* Beck, Demirgüç-Kunt, and Levine 1999.

• *Distance to the equator*. *Source:* Hall and Jones 1999.

• *OECD membership dummy*. *Source: World Development Indicators*, World Bank.

• *Language variables*, corresponding to: (1) the fraction of the population speaking English, and (2) the fraction of the population speaking one of the major languages of Western Europe: English, French, German, Portuguese, or Spanish. *Source:* Hall and Jones 1999.

• *Landlocked nation dummy*. *Source:* Andrew Rose's Web site.

• *Island nation dummy*. *Source:* Andrew Rose's Web site.

# III Crises

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# 5 Exchange Market Mayhem: The Antecedents and Aftermath of Speculative Attacks

with Andrew Rose and Charles Wyplosz

## 5.1 Introduction

The exchange rate is the chink in the armor of modern-day macroeconomic policymakers. Be it Italy and the United Kingdom in 1992, France in 1993, Mexico in 1994, or Spain in 1995, speculative pressures and the dire consequences of the policy responses required to defend the exchange rate can bring a government's entire macroeconomic strategy tumbling down. Speculative attacks have forced countries such as Sweden, which in 1992 raised central bank lending rates to 500 percent in a futile attempt to defend its currency peg, to concede and radically reorient their policies. Countries such as Mexico, which attempted to devalue in advance of a crisis, have destroyed investor confidence, provoked capital flight, and ignited a financial market meltdown. Even the United States, a relatively large closed economy committed to a policy of benign neglect, was forced in 1994–1995 to consider sacrificing other policy goals on the altar of the exchange rate when the dollar declined precipitously against the yen. Without realizing it, many observers have derived an impossibility theorem: neither pegging like Sweden, nor occasionally realigning like Mexico and the EMS countries, nor floating like the United States is a tolerable option. Policymakers seem to retain no acceptable international monetary alternative.

The more optimistic view is that countries experiencing severe exchange market difficulties are not drawn at random from the underlying population. Those whose pegged rates are attacked, whose realignments destroy rather than strengthen investor confidence, and whose floating rates are buffeted by exchange market turbulence, are countries that recklessly pursue inappropriate policies and thereby bring exchange market difficulties upon themselves. Thus, speculative

attacks on the Italian lira, British pound, and Spanish peseta in 1992 have been attributed to inadequately restrictive monetary and fiscal policies.[1] Mexico's difficulties were anticipated, at least in some circles, by observers who warned that the stability of the peso was threatened by excessive inflation and unsustainable current account deficits.[2] The weakness of the dollar has been blamed on low domestic savings and on the Fed's having waited too long to raise interest rates. By implication, governments can escape exchange market difficulties if they only avoid policy mistakes. Sinners are justly punished by financial markets, and foreign exchange market difficulties are simply a reflection of policies gone awry.

If unsustainable fundamentals are responsible for speculative attacks, then eliminating the latter is straightforward once the former have been identified. One objective of this chapter is to see whether there is indeed a set of economic fundamentals that are sensibly and consistently linked to speculative attacks. We consider a wide array of variables in our search for "early warning" signs of trouble brewing.[3] But not all speculative attacks may be warranted by fundamental forces. If some attacks are self-fulfilling—that is, if some of the "innocent" are slaughtered, while not all of the "guilty" suffer—then policy prescriptions become much more difficult.

Our goal in this chapter is to provide a guide for the perplexed policymaker. Are there significant differences in the observed behavior of economic and political variables in periods leading up to episodes of exchange market crises, we ask, relative to placid periods? Are there economic and political actions that policymakers must forgo to avoid exposing their currencies to speculative attack? Are there significant differences in the post-attack behavior of economic and political variables depending on whether the authorities respond by defending, devaluing, or floating the currency? How, in short, should policymakers manage turbulence in foreign exchange markets?

To understand our answers, it is essential to grasp the distinction between actual realignments (i.e., devaluations) of pegged exchange rates and currency crises. A realignment may be orderly—the authorities may undertake it without being forced to by the markets—or it may be disorderly, accompanied and provoked by a speculative attack featuring massive sales of domestic currency for foreign exchange. A crisis, in contrast, necessarily entails a speculative attack

that causes the exchange rate to depreciate or forces the authorities to defend it by radically raising interest rates or expending reserves. Not all crises lead to devaluations, decisions to float the currency, or other changes in exchange rate regimes. In other words, the authorities may succeed in fending off the attack. Thus crises, devaluations, and flotations are overlapping but distinct sets of foreign exchange market events.

We find that devaluations generally occur after a period of expansionary monetary policy. These expansionary policies lead to price and wage inflation, deteriorating international competitiveness, and weak external accounts. They tend to occur when unemployment is high, as if the government is attempting to stimulate an economy in which unemployment has political and economic costs. But the policy of stimulus leads to a loss of reserves, which jeopardizes exchange rate stability. There are some signs that governments are cognizant of this development and shift policy in a more restrictive direction to stem the loss of reserves. But in episodes that culminate in devaluation, those restrictive steps prove inadequate. Reserves continue to decline, eventually forcing the government to devalue the exchange rate. When devaluation finally occurs, it is the occasion for retrenchment on the monetary and fiscal fronts, intended to ensure that the new level of the exchange rate is sustainable. As a result, the boost to competitiveness is effective in restoring balance to the external accounts.

Not all devaluations are preceded by speculative attacks, however; and not all attacks are successful. There is no presumption, in other words, that actual *devaluations* resemble exchange rate *crises*. In contrast to devaluations, which can be orderly, crises—some of which lead to devaluations, but others of which are successfully repelled or cause the authorities to abandon their policy of pegging the exchange rate entirely—are accompanied by different behavior of policy variables, as the label for these episodes itself connotes. It is more difficult to generalize about crises than about devaluations, but there are signs that they too are preceded by loose money and inflation. But, in contrast to the run-up to devaluations, there is little sign of government attempts to rein in its expansionary policy as the looming threat to the exchange rate develops. Foreign exchange market intervention is sterilized. There is little evidence of slowing rates of money and credit growth, and there are fewer signs of monetary and

fiscal retrenchment in the wake of the attack. Exchange rate changes that take place in response to crises are often disorderly. More often than not, they do not lead to the establishment of new parities that are clearly sustainable.

This failure of governments to adapt policy in a manner consistent with their stated exchange rate targets is, not surprisingly, at the heart of many currency crises. This points to the need to study political constraints on economic policy formulation. Hence, in addition to analyzing the behavior of macroeconomic variables, we consider political conditions directly. We ask whether speculative attacks are more likely to occur before or after elections and whether left- or right-wing governments are more susceptible to their effects. We ask whether political variables explain the incidence of speculative attacks after controlling for macroeconomic policies. Are economic indicators a sufficient statistic to warn of impending currency crises, in other words, or do political variables have additional explanatory power? Indeed, how easy is it to predict currency crises at all?

Monetary policy is loose before both actual realignments and currency crises; there are early warning signs of pending speculative attacks. However, the same cannot be said of regime transitions such as exchange rate flotations, which are difficult to distinguish systematically from periods of tranquility. Because it is difficult to know whether a fixed exchange rate under attack will be devalued or floated (or for that matter, successfully defended), *there do not appear to be clear early warning signals that precede changes in exchange rate regimes*. This is especially true because there are few significant differences in the behavior of these variables when we divide crises into successful and unsuccessful attacks.

That there is uncertainty about when and where speculative attacks occur is intuitively plausible. Policymakers—and market participants—are often taken by surprise by the outbreak of a crisis. After all, if crises were readily avoidable, why would we continue to observe so many episodes that severely damage the standing of politicians and governments? That the timing of crises is hard to predict is consistent with the conclusions of Rose and Svensson (1994) that macroeconomic fundamentals are of little use for explaining the credibility of EMS parities, and of Eichengreen and Wyplosz (1993) that fundamentals did not obviously predict the timing of the 1992 attack on the EMS.

From a policy point of view, our findings reinforce the feeling that there exist no easy solutions to the exchange rate dilemma. There are no unambiguous early warning signals of impending crisis.

Governments that follow traditional conservative policies cannot be assured of insulation from speculative attacks; there are no clearly "right" policies. It would appear that exchange rates can be, and repeatedly are, severely strained and destabilized by speculative pressures even in the absence of clear imbalances in macroeconomic fundamentals.[4]

The chapter is organized as follows. Section 5.2 reviews what the literature in economics has to say about the causes and consequences of speculative attacks. Section 5.3 provides a brief description of the data. The heart of our paper is section 5.4, in which we use graphical techniques to explore the behavior of macroeconomic data around devaluations, flotations, speculative attacks, and a variety of other exchange rate events. Section 5.5 provides a more formal statistical treatment. Section 5.6 draws out the policy implications.

## 5.2 Literature

In this section, we review what the literature in economics has to say about the causes and consequences of speculative attacks. Following a review of the standard approach, we focus on the literature that postdates the 1992 EMS crisis and highlights non-standard channels through which speculative pressure can be transmitted to the foreign exchange market.

### The Traditional Approach

The standard approach to balance of payments crises follows Krugman (1979).[5] The authorities peg the exchange rate until their reserves are exhausted, at which point they float the currency. With the government pegging the relative rate of return (in Krugman's model, the exchange rate), investors hold domestic and foreign assets in fixed proportions. When they rebalance their portfolios by selling an incipient excess supply of domestic assets for foreign exchange, the central bank is forced to intervene, using reserves to prop up the exchange rate.

Krugman assumed that government budget deficits were at the root of speculative attacks on pegged currencies. In his model, all

budget deficits are financed with domestic credit. Because investors exchange only a portion of the incremental supply of domestic credit (portfolio proportions remaining constant), the shadow exchange rate (which would prevail in the event that the pegging policy is abandoned) depreciates gradually over time. When it equals the current exchange rate, investors attack the peg, depleting remaining reserves, for to do otherwise would make available arbitrage profits and imply market inefficiency.

The empirical implication is that we should observe expansionary fiscal and monetary policies prior to speculative attacks. Such policies should be accompanied by the steady erosion of reserves.

Krugman's model has been extended to incorporate deviations from purchasing power parity (so that pre-attack fiscal expansions are accompanied by increasingly overvalued real exchange rates, rising real wages, growing relative unit labor costs, and current account deficits); capital controls (which lengthen the period of time for which a currency peg can be maintained given the stance of monetary and fiscal policies); uncertainty about monetary and fiscal policies (the greater the uncertainty, the faster reserves will be depleted, because the probability of a burst in domestic credit creation that causes the shadow exchange rate to depreciate below the current rate correspondingly increases); and portfolio optimization by investors (in which case the assumption that domestic and foreign assets are held in fixed proportions prior to the attack can be relaxed, implying accelerating losses of central bank reserves as investors hedge against currency risk).[6] These extensions suggest additional regularities that should be evident in the run-up to attacks: overvalued real rates, higher real wages, rising relative unit labor costs, significant policy uncertainty, current account deficits, and accelerating reserve losses. In our empirical work, we search for these regularities.

Krugman's formulation carries over to crawling pegs and managed floats, under which the authorities do not peg the level of the currency but commit to an intervention strategy framed as a path for the exchange rate.[7] Thus, the same general model can be used and the same empirical predictions derived for attacks on a variety of exchange rate arrangements. Again, the implication is that countries that suffer exchange rate instability and/or rapid depletion of their reserves should be those whose policy is excessively expansionary and uncertain, in which the real exchange rate indicates overvalua-

tion, and where the absence of capital controls allows the markets to capitalize on the consequences.

For a few countries with histories of high inflation (Mexico and Chile in the 1970s; France and Italy in the early 1980s), the predictions of these models broadly fit the facts.[8] Yet there are also cases in which monetary and fiscal imbalances are not clearly apparent in the period leading up to crises. Eichengreen and Wyplosz (1993) argue this for countries affected by the ERM crisis in 1992, for example.[9] Rose and Svensson (1994) show that, for a variety of European currencies, measures of realignment expectations (interest differentials purged of the effect of expected exchange rate movements within the band) are little affected by the prior and contemporaneous movement of the economic fundamentals to which the traditional theoretical models point.[10]

**Recent Theoretical Developments**

These observations prompted the development of a subsequent generation of theoretical models whose assumptions and predictions depart from those of the canonical Krugman model. An example is Ozkan and Sutherland's (1994) model of the ERM crisis. In that model, there may be no evidence of monetary and fiscal imbalances in the period preceding the crisis. In contrast to Krugman's assumptions, the authorities may be following macro policies consistent with the indefinite maintenance of the prevailing currency peg. Assuming the continued pursuit of those policies, there is no reason to anticipate the eventual exhaustion of international reserves. But if those policies are associated with high and rising unemployment (perhaps for reasons beyond the authorities' control, including reasons originating outside the country), a government whose survival probability is negatively affected by unemployment and that can reduce unemployment by shifting to more expansionary policies may be induced to abandon the currency peg. Anticipating this eventuality, speculators attack in advance of the policy shift. Thus, where the Krugman model focuses on the determinants of external balance, the Ozkan-Sutherland model focuses instead on the decisions of governments concerned with internal balance and constrained by the exchange rate in their choice of policy response.

In this formulation, the crisis need not be preceded by expansionary monetary and fiscal policies or by the imminent exhaustion of reserves. Rather, one should observe rising unemployment and

other domestic economic developments of concern to the authorities. These predictions are consistent with European experience in 1992–93, when speculative attacks coincided with a deepening recession that aggravated existing levels of unemployment. Caramazza (1993) and Drazen and Masson (1994) consider data for France, finding that unemployment positively affected realignment expectations ever since 1987, a result Thomas (1994) confirms. Masson (1995) studies the United Kingdom and similarly concludes that persistent high unemployment increased the perceived probability that the government would abandon the sterling parity. To shed light on such issues, we look at a variety of measures of political variables jointly with labor market conditions in our empirical work.

The Ozkan-Sutherland model, in which events abroad can raise domestic unemployment and induce an optimizing government to abandon the currency peg, provides one channel through which developments external to a country can provoke a currency crisis. Gerlach and Smets (1995) introduce others. In their model, a speculative attack that leads to devaluation by one country may threaten the competitiveness of a trading partner. This argument has been invoked for Ireland and Portugal in 1993, whose positions were said to be undermined by the depreciation of the pound sterling and the Spanish peseta, respectively.[11] The empirical implications of their analysis again differ from those of the Krugman model. Here, there may be no evidence of budget deficits, rapid monetization, overvaluation, current account deficits, or reserve losses in the period leading up to the attack. But once the neighboring country devalues, observers revise their assessment of the likely future evolution of these variables and attack the other currency as well; an infectious contagion of exchange rate crises may break out. As in the Ozkan-Sutherland framework, the attack may precede rather than follow imbalances in domestic fiscal policies and current accounts, although the Ozkan-Sutherland and Gerlach-Smets models provide different predictions about which other variables (unemployment in the first case, a successful attack on a major trading partner in the second) behave distinctively in the pre-attack period. We document the extent of contagion below in our empirical work.[12]

Another channel is information effects, in whose presence the collapse of one currency may convey information about the collapse of a second. Eichengreen and Wyplosz (1993) describe how speculative

attacks that drove a subset of European Community countries out of the ERM in 1992, by dimming the prospects for early monetary unification, conveyed information about the readiness of other countries to defend their currency pegs. We might then expect evidence of monetary and fiscal imbalances in a particular country in the period leading to a wave of speculative attacks.

Yet another possibility is that there exist multiple equilibria in foreign exchange markets and that the collapse of one currency coordinates expectations so as to shift the market from one equilibrium to another. Flood and Garber (1984b) and Obstfeld (1986) first linked multiple equilibria to speculative attacks.[13] In their models, multiple equilibria exist in the foreign exchange market because of the contingent nature of the macro policy rule. In the absence of an attack, monetary and fiscal policies are in balance, and nothing precludes the indefinite maintenance of the prevailing peg. If and only if the currency is attacked, however, will the authorities switch to more accommodating monetary and fiscal policies consistent with a lower level for the exchange rate. Thus, speculative attacks can be self-fulfilling. One of our objectives in this chapter is to examine the actual behavior of monetary and fiscal variables to search for evidence of such policy switches.[14]

In the early multiple-equilibrium models of Flood-Garber and Obstfeld, the assumption of a contingent policy process (of a monetary policy that shifts in a more expansionary direction only in the event of an attack) was *ad hoc*. Obstfeld (1994) and Bensaid and Jeanne (1994) add the relevant micro foundations. Bensaid and Jeanne appeal to the Barro-Gordon (1983) model, assuming that an increase in the unemployment rate raises the costs to the government of continuing to pursue policies of price stability.[15] When the public observes unemployment, it revises upward its forecast of the probability that the authorities will deviate in order to reflate the economy; this in turn requires the authorities to raise the discount rate to defend the currency, which only serves to aggravate the unemployment problem.

This positive feedback has two implications. One is that a small rise in unemployment can provoke a crisis, because that rise in unemployment will require the adoption of policies that aggravate the initial problem in a vicious spiral, and the markets can be expected to anticipate the operation of that negative feedback. The other is that speculative attacks can be *self-fulfilling*. If speculators, for what-

ever reason, lose confidence in the official commitment to defend the currency peg, the government will be forced to raise interest rates. This will create actual or expected unemployment and thereby further undermine confidence in the government's commitment to pursue policies of price stability, requiring further interest rate hikes, further aggravating unemployment, and so on, until the currency collapses. If this process is sufficiently swift, periods of speculative pressure may look indistinguishable from periods of tranquility in the data.[16]

The question for models with multiple equilibria, as Grilli (1986) emphasizes, is what coordinates the expectations and actions of market participants. So long as speculators do not attack, the exchange rate can be maintained forever, but if many traders sell the currency simultaneously, the peg collapses. A single large trader in the foreign exchange market can collapse the peg at any time; but if there are a large number of small, credit-constrained traders, they must move simultaneously to mobilize an attack of a magnitude sufficient to shift the system from one equilibrium to another. Gerlach and Smets suggest that traders may use prominent events, such as turbulence in foreign exchange markets and successful attacks on other countries, as focal points for coordinating their actions. This may explain why ratification referenda on the Maastricht Treaty seemed to be associated with speculative attacks on EMS currencies.[17] Empirically, if the coordinating devices that trigger speculative attacks differ over time, speculative attacks may look idiosyncratic rather than similar; we may also expect to see the clustering of attacks over time (instances of the phenomenon known as contagion).

For a given set of macroeconomic fundamentals, it is equally possible for an attack to occur or not depending on how market participants expect one another to react, and how they expect governments to react to their reactions. Strategic behavior by traders and government thus determines the incidence of speculative attacks. In the same way that a devaluation in a neighboring country can serve as a focal point for inducing speculative sales, so intervention can serve as a focal point for encouraging speculators to withdraw from the market.[18] One can equally well imagine, however, that intervention might encourage bear speculation if currency traders have reason to believe that the costs of intervention rise with its magnitude. Assume, for example, that the authorities defend the currency by rais-

ing the interest rate, but that the marginal cost to the government of raising the rate rises as the rate scales higher levels. Then speculative sales met by interest rate increases may cause currency traders to revise downward their estimate of the government's capacity to defend the currency further, and encourage them to commit additional resources to its attack.[19]

Chen (1995) models these dynamics in a world inhabited by a single central bank and a single Soros-like speculator.[20] The flow costs of currency sales by the speculator and intervention by the government are assumed to increase with their respective magnitudes. The benefits to each depend on the level of the exchange rate, whose movement depends on the ratio of speculative sales to intervention. Solving for the subgame perfect equilibrium, Chen shows that there can exist a stable zone around the middle of a currency's fluctuation band within which it is in the interest of neither the trader nor the government to enter the foreign exchange market. But an accumulation of small shocks that pushes the currency out of that zone and toward the edge of its band may induce the trader to initiate speculative sales. Intuitively, shocks have already done part of the work of pushing the currency out of its band without requiring the trader to incur costs. The government, in other words, is forced to engage in costly intervention to limit the effect of those shocks. The trader, having acquired a cost advantage relative to the government, may conclude that it is advantageous to force the issue. In this model, small shocks that shift the exchange rate within the band may set off large speculative attacks. These predictions are consistent with recent evidence that the position of the exchange rate within the band is a strong indicator of market expectations of realignment (Caramazza 1993; Chen and Giovannini 1993; Cukierman et al. 1993; Rose and Svensson 1994; Thomas 1994).

One can approach this problem from the viewpoint of strategic behavior among governments as well. Mélitz (1994) provides a model of a strategic game between two governments that use interest rate policy to support their currencies and achieve other objectives. Country A may wish to reduce its interest rate and be able to do so without destabilizing its exchange rate if Country B responds in kind. But if Country B fails to respond, Country A's interest rate reduction may provoke an attack on its currency. This model is compatible with those described above that are driven by information revelation: the interest rate reduction by Country A,

by failing to elicit a sympathetic response by Country B, reveals information about the latter's commitment to supporting Country A's exchange rate. Again, the attack on Country A's currency can occur in the absence of obvious imbalances in macroeconomic fundamentals.[21]

This recent research highlights the possibility that political variables, rather than narrowly macroeconomic ones, play a critical role in speculative attacks. It implies, for example, that left-wing governments may be more inclined than their right-wing counterparts to abandon a currency peg in response to rising unemployment.[22] Governments with small parliamentary majorities may be particularly susceptible to pressure to abandon the prevailing currency peg in response to additional unemployment (because, for example, they are most likely to fall as a result of a vote of no confidence by their unemployment-averse constituency if joblessness rises). Even controlling for the size of the governing majority, governments with short expected life spans may be more likely to abandon a currency peg in response to additional unemployment (because short-lived governments benefit less from an enhanced reputation for defending the parity in the future and suffer more from unemployment now). Crises may occur before elections if their chances of victory are uncertain (Rogoff and Sibert 1988) or after changes in government if the markets are uncertain of the new cabinet's commitment to defending the currency. But although considerable attention has been paid to how such variables affect inflation rates, budget deficits, and public debts (see, inter alia, Grilli et al. 1991; Roubini and Sachs 1989a), little if any work has been done to date on the political determinants of currency crises.

Much the same is true of the opposite direction of causality. Political variables can be affected by and affect exchange market outcomes. Cooper's famous 1971 study found that currency devaluation was a leading indicator that an incumbent finance minister would be removed from office. More generally, exchange market turmoil is frequently interpreted as an indication of the government's macroeconomic incompetence and as a leading indicator of an impending electoral defeat. But whether such relationships hold systematically has yet to be studied.

The literature says relatively little about what can be done to contain market pressures. One exception is Ozkan and Sutherland (1995), who analyze the effects of capital controls in a model of an

optimizing government seeking to maintain an exchange rate peg. Controls, by reducing the impact of foreign interest rates—and foreign exchange market transactions generally—on domestic interest rates, can directly affect the policymaker's decision of whether to abandon the currency peg. In addition to this direct effect, there is an indirect effect operating through expectations: currency traders realize that the presence of controls encourages the government to continue defending the currency peg, and this discourages them from attacking it.

**Empirical Work**

The questions that we consider are among the most basic in international macroeconomics. It is therefore striking that we possess little systematic empirical analysis on which to base policy advice. There is a literature on the effects of currency devaluation (Cooper 1971; Kamin 1988; Edwards 1989, 1993), but most of the episodes it considers are drawn from earlier periods in which financial markets were less well developed and capital controls were pervasive. None of these studies takes into account the authorities' choice among devaluing, floating, and widening their currency bands in response to an attack, much less the efficacy of the alternative responses. Most importantly, these studies focus on exchange rate changes per se rather than currency crises: that is to say, they include exchange rate changes not preceded by speculative attacks, and exclude attacks that were successfully repelled. For our purposes, this is a source of selectivity bias in whose presence inferences about the consequences of speculative attacks may be misleading.

The literature on the causes of currency crises is even spottier. A few studies (Blanco and Garber 1986; Cumby and van Wijnbergen 1989) have asked whether attacks on particular currencies (e.g., the Mexican peso in the 1970s, the Argentine peso in the 1980s) can be explained by lax monetary and fiscal policies, as predicted by standard macroeconomic models. But aside from our own previous work (Eichengreen et al. 1994), we know of no recent studies that compare the evolution of macroeconomic variables in a period leading up to speculative attacks and in a control group of tranquil, non-attack periods.

In this chapter, we extend that previous work and draw out its policy implications. We examine a panel of 20 industrial countries since the restoration of current account convertibility at the

beginning of 1959. Where our previous study considered only periods when exchange rates were pegged within pre-announced bands, here we analyze the causes and consequences of turbulence affecting both pegged and floating rates. By considering a wider variety of economic variables, including labor market variables such as employment, unemployment, and wages, we more clearly distinguish among different explanations for speculative attacks.

We also consider political conditions directly. We ask whether speculative attacks are more likely to occur before or after elections and government changes, whether they are more likely to be directed at unstable or minority governments, and whether left- or right-wing governments are more susceptible to their effects. We ask how much political variables contribute to explaining the incidence of speculative attacks after controlling for macroeconomic policies. Are economic indicators a sufficient statistic to warn of impending currency crises, or do political variables have additional explanatory power?

Our previous papers were essentially static, limited to the periods around crises. In contrast, here we analyze both the prelude and aftermath of attacks. We ask how the post-crisis development of macroeconomic and political variables is affected both by the pre-attack behavior of those variables and by policymakers' response to the crisis. Where our earlier work took a univariate approach to analyzing the data (comparing the behavior of individual variables, one at a time, during speculative attacks and periods of exchange market tranquility), here we embed our analysis in a multivariate, multinomial framework. We ask whether it is possible to discern differences in the joint behavior of groups of economic and political factors across a variety of different exchange rate episodes. We emphasize that devaluations, decisions to float (or fix) the exchange rate, decisions to widen the band, and success in repelling attacks are all alternatives, and analyze them jointly. We study the behavior of macroeconomic and political variables in both the run-up to and the aftermath of various developments in financial markets—devaluations, flotations, unsuccessful attacks, and so forth—in an integrated fashion.

**Recapitulation**

The theoretical literature on speculative attacks analyzes channels through which economic and political variables at home and abroad

can provoke crises in foreign exchange markets. It provides a variety of predictions of how economic and political variables should behave in the period leading up to crises. Similarly, theoretical models of depreciation and realignment offer predictions of how exchange rate changes should affect real and nominal variables as a function of structural parameters such as the rigidity of real and nominal wages. There are gaps in the theoretical literature: for example, the decision that a government faces when choosing whether to devalue or float its currency has not yet been tackled.[23] But the imbalance between theory and evidence in the literature is striking. In contrast to the panoply of theoretical models made available by the economics profession, evidence on the empirical importance of the factors on which theorists focus is partial and conflicting in the case of economic variables and essentially non-existent in the case of political ones. There is no consensus on whether speculative attacks are all alike, and whether different types of speculative attacks resemble one another. In the remainder of this chapter, we set about rectifying these deficiencies.

## 5.3 Data

Any attempt systematically to study events and crises in foreign exchange markets must start by compiling a list of such episodes. We used the IMF's annual report on *Exchange Arrangements and Exchange Restrictions (EAER)* to compile a list of officially declared devaluations and revaluations, decisions to float and fix the exchange rate, instances when a fluctuation band was widened, and other significant changes in exchange arrangements. We refer to these as foreign exchange market "events," in contrast to a separate category (introduced below) called exchange market "crises." Crises include unsuccessful speculative attacks and exclude changes in exchange rate arrangements not preceded by or associated with significant exchange market pressure; they overlap with events. We went through *EAER* for each year, beginning with 1959, tabulating and categorizing the events for each country in our sample. The tables at the end of *EAER* also provide us with binary indicators of the presence of capital controls.

Our macroeconomic variables were mainly taken from standard IMF sources. Our political variables were constructed from various issues of Keesing's *Record of World Events* and Banks's *Political*

*Handbook of the World*, except for indicators of regime strength that were constructed following Roubini and Sachs (1989b).[24]

Any empirical analysis of issues in exchange rate economics requires one to choose the "center" or "reference" country against which the exchange rate and other relative magnitudes are measured. We use Germany (for example, the exchange rate is defined as the price of a DM). Within the EMS, this choice is clear. For the Bretton Woods period, when par values were declared against the dollar, perhaps the United States should occupy this position. But the dollar was a weak currency for portions of the 1960s and was subjected to attacks in 1971 and 1973. If the response to attacks is different in strong and weak currency countries because, for example, the costs of lowering interest rates are not the mirror image of the costs of raising them, there is an argument for using a center country with a consistently strong currency. For this reason, we use Germany as the reference country throughout.[25]

Before proceeding, a number of caveats are in order. First, published changes in international reserves are a very imperfect guide to the magnitude of foreign exchange market intervention. Monetary authorities sometimes report only the gross foreign assets of the central bank. But because it is standard operating procedure to arrange for stand-by credits in foreign currency, the authorities may intervene by drawing on credit lines without having to sell any of their reported foreign assets. Even countries that provide data on foreign liabilities omit a number of operations that are typically undertaken during periods of speculative pressure, such as off-balance-sheet transactions like swaps and forward market intervention.

Even when published data are accurate, intervention by foreign central banks can be hard to detect. In the ERM, interventions are compulsory at the margins of the currency grid. It is always the case that two (or more) currencies reach their margins simultaneously; thus, compulsory interventions are undertaken simultaneously by two (or more) central banks. Insofar as we analyze changes in the reserves of each country relative to changes in German reserves and Germany is a strong-currency country throughout our sample, we are likely to pick up much of this foreign intervention. However, intervention undertaken by third countries will not be detected, as would the case if The Netherlands intervened to support the Italian lira. There is also the problem of attributing Germany's interventions

to a particular country. German intervention in support of the Italian lira could produce a large percentage rise in German reserves relative to those of The Netherlands, seemingly signaling an attack on the guilder in a period when Dutch reserves were rising. Only proprietary central bank data on exchange market intervention would solve this problem. Reassuringly, work by Weber (1994) shows that the IMF series we use are broadly similar to proprietary intervention data.

In addition, quarterly observations may not be of a sufficiently fine periodicity to identify every speculative attack, especially unsuccessful ones. Pressure against pegged currencies can mount and be repelled through interest rate increases or foreign exchange market intervention within the month. If an attack is launched and repelled in a matter of days, the average behavior of interest rates and international reserves over the quarter may not reveal the intensity and frequency of speculative pressures.

Finally, changes in capital controls may affect the meaning of interest differential and reserve changes. When controls are in place, the authorities may keep the interest rate on the domestic money market virtually unchanged, while defending the parity with sterilized purchases on the foreign exchange market. The problems this creates for our analysis could be circumvented through the use of offshore interest rates; in practice, these are available for only a few countries, and even then only recently. An alternative is to use the imperfect data that are available on capital controls to contrast the behavior of interest rates, reserves, and other variables in periods when controls were present and absent; we pursue this in Eichengreen et al. 1994.

## 5.4 The Story in Pictures

We begin our search for regularities by plotting the data. Figures 5.1–5.5 show the movements of various macroeconomic variables around different exchange rate "episodes" (we use the term to denote both events and crises). The five figures portray, respectively: devaluations, revaluations, exchange rate flotations, exchange rate fixings, and other exchange rate regime events (changes in band width, exchange rate unification, transitions to crawling pegs, and so forth).

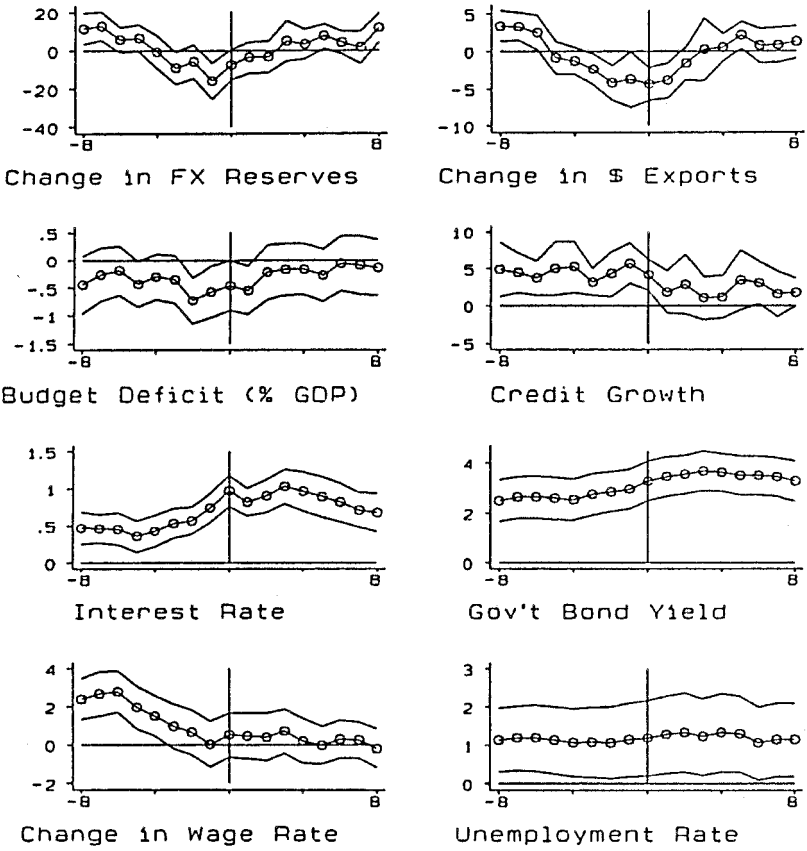


**Figure 5.1**
Devaluations
*Source:* See text.
*Notes:* Movements 8 quarters before and after (81) devaluations. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

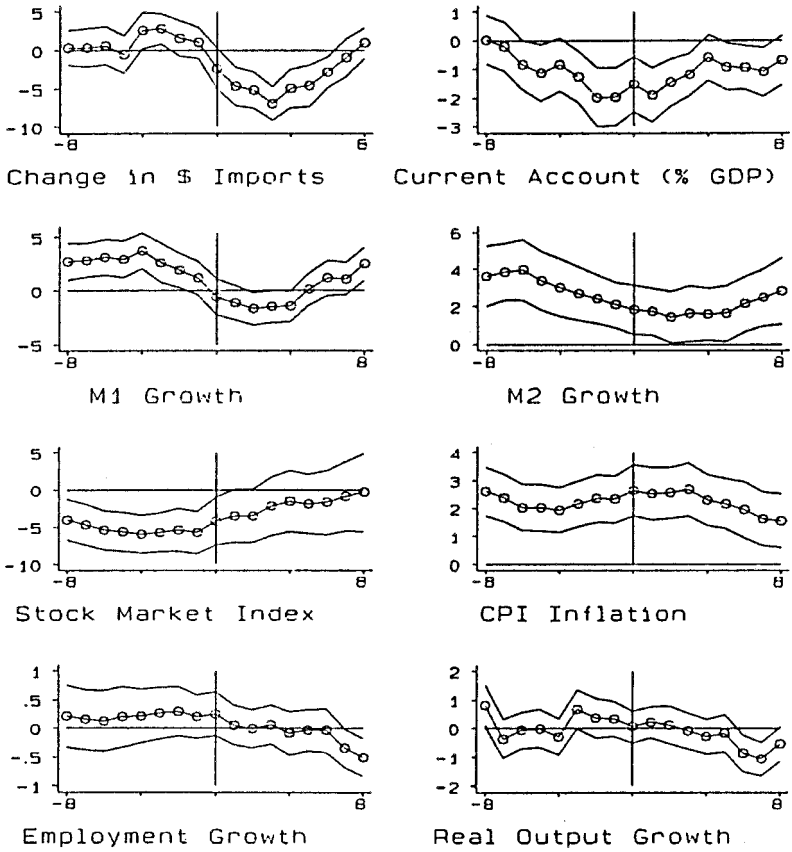


**Figure 5.1** (continued)

Each of the figures contains 16 panels. Each of these small graphs illustrates the behavior of a single variable for a four-year window around the time of devaluations (in the case of figure 5.1), comparing its behavior with that of a control group of country/period observations in which no exchange rate episode occurred. The top-left panel, for example, shows the behavior of foreign exchange reserves (in annualized percentage changes, relative to Germany), beginning eight quarters before devaluation, continuing through the actual event (marked with a vertical line), and ending eight quarters after devaluation. We show the deviation of this variable from its value during "typical" periods of tranquility (interludes in which no events or crises occur).[26]

Average values are plotted in the panels; a band of plus and minus two standard deviations is also provided to illustrate the extent of variation.

**Realignments**

The patterns in figure 5.1 make intuitive sense. Reading across the first row, we see a steady loss of foreign exchange reserves for several quarters prior to devaluations associated with persistent weakness in the external accounts. The dollar value of exports falls in the period leading up to devaluations, by about 5 percent (compared to the observations for periods of tranquility that comprise our control group). Import growth is also higher prior to devaluations than during periods of tranquility. Unsurprisingly, the current account deficit is about 2 percent of GDP higher around devaluations than in periods of tranquility.

Following devaluations, these patterns are reversed. Reserve losses slow and end after two post-devaluation quarters. Exports recover within a year to typical values; the turnaround in imports and the current account takes longer (perhaps due to the reasons traditionally cited in the literature on the "J-curve").

The second row shows that devaluing countries run larger deficits (relative to Germany) than do countries in the control group, although the two standard deviation bands suggest that this differential is barely significant statistically. Domestic credit and money grow faster prior to devaluations than in tranquil periods; those growth rate differentials decline (at least temporarily) after devaluation, inconsistent with the self-fulfilling attack model.[27] Thus, intervention in support of the exchange rate appears to be sterilized during the early run-up to devaluations; M1 growth remains fast despite reserve losses. However, as reserve losses mount, money growth slows, suggesting that sterilization is less and less complete as the devaluation approaches. The real effective exchange rate is overvalued prior to the devaluation; competitiveness improves with devaluation and stays higher for a couple of years.

The third and fourth rows document the response of domestic markets. The rate of consumer price inflation bears the expected relationship to money growth: it is faster, by two or three percentage points per quarter, in countries about to devalue than in the control group. This behavior is mirrored, though to a lesser degree, in the

behavior of wage inflation and the long-term bond yield. Short-term interest rates are higher than in the control group for the two years leading up to devaluation, as if a positive probability is attached to the change in the exchange rate. As the event gets closer and probabilities of devaluation are refined, the interest rate rises significantly in anticipation of the coming devaluation.[28] Stock prices are significantly lower in the period leading up to devaluation, presumably reflecting these higher interest rates. Neither short nor long-term interest rates decline substantially afterwards. This suggests that devaluation has credibility costs, and that markets expect further attacks.[29] It is as if markets realize that inflation is likely to remain significantly higher in post-devaluation countries than in the control group cases for a while, and demand appropriate compensation. But the inflation differential is larger than the interest rate differential, suggesting a post-devaluation fall in real interest rates. Devaluation is good for expectations of profitability: stock prices rise in the wake of the event. Because prices rise significantly faster than wages, a decline in the real wage may be the source of the expected profitability implicit in higher stock prices.

The final row looks at the labor market and output. Unemployment is higher in the years surrounding devaluations, even though real wages are falling. Following the parity change, employment and output growth slow down quite markedly after a year and a half.

Overall, these patterns suggest that countries devalue mostly in response to external imbalances (falling reserves, current account imbalances, poor competitiveness), although there are also internal imbalances (high unemployment). The external imbalances are associated with expansionary monetary policies, but the roots of monetary expansion do not obviously lie in the fiscal domain. Governments appear to react well to devaluations, tightening monetary and fiscal policies in order to lock in competitiveness gains.

Although macroeconomic variables can be useful for predicting what countries are likely to devalue, they are less useful for predicting the precise timing of the event (which has been the focus of much of the theoretical literature). There are only a few sharply defined dynamic patterns in the run-up to devaluations. For instance, although the unemployment rate is a percentage point higher around devaluations, the differential does not change significantly during the years prior to the event.

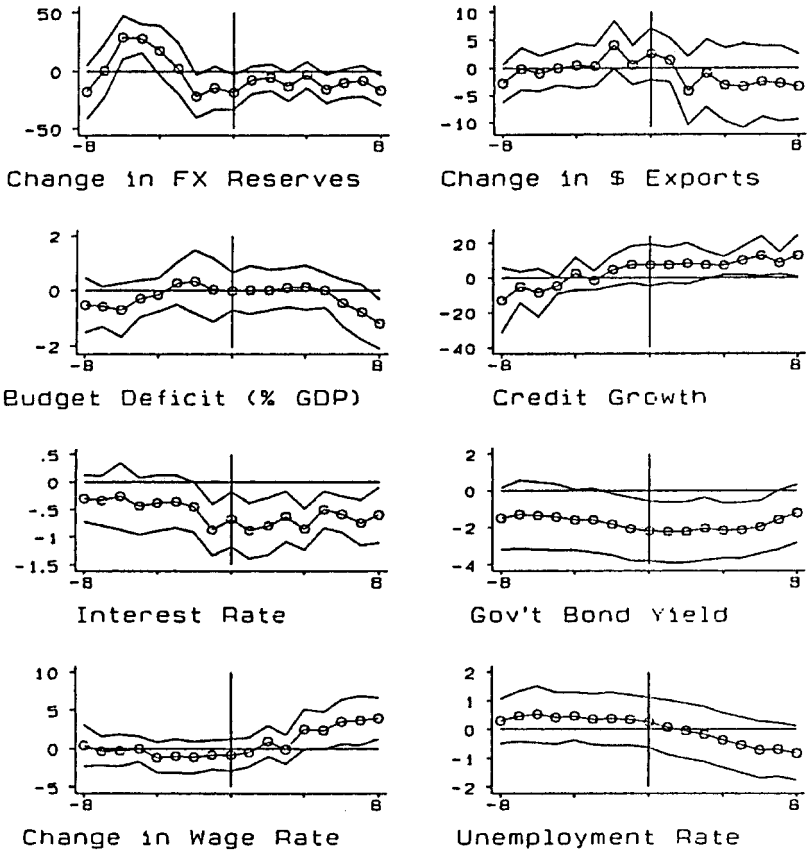


**Figure 5.2**
Revaluations
*Source:* See text.
*Notes:* Movements 8 quarters before and after (20) revaluations. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

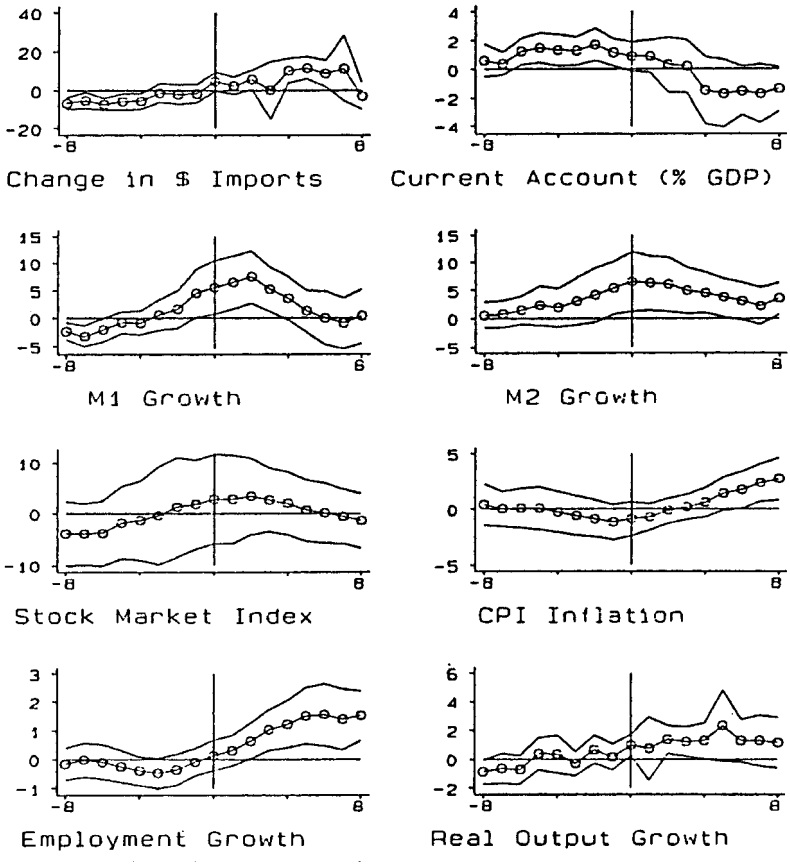


**Figure 5.2** (continued)

Figure 5.2 is the analog to figure 5.1 for the case of *re*valuations (scales vary across figures). Most patterns are mirror images of figure 5.1. The growth of foreign exchange reserves is faster prior to revaluations than in the control group and no different afterwards. Exports grow faster and imports more slowly prior to revaluations (though not afterwards); this is mirrored in the behavior of the current account. There is little evidence that the reason why countries have strong external accounts in the period leading up to revaluation is that monetary and fiscal policies are tight. Money and credit growth, wage and price inflation, and short- and long-term interest rates tend to be lower in the revaluing countries than in periods of tranquility.

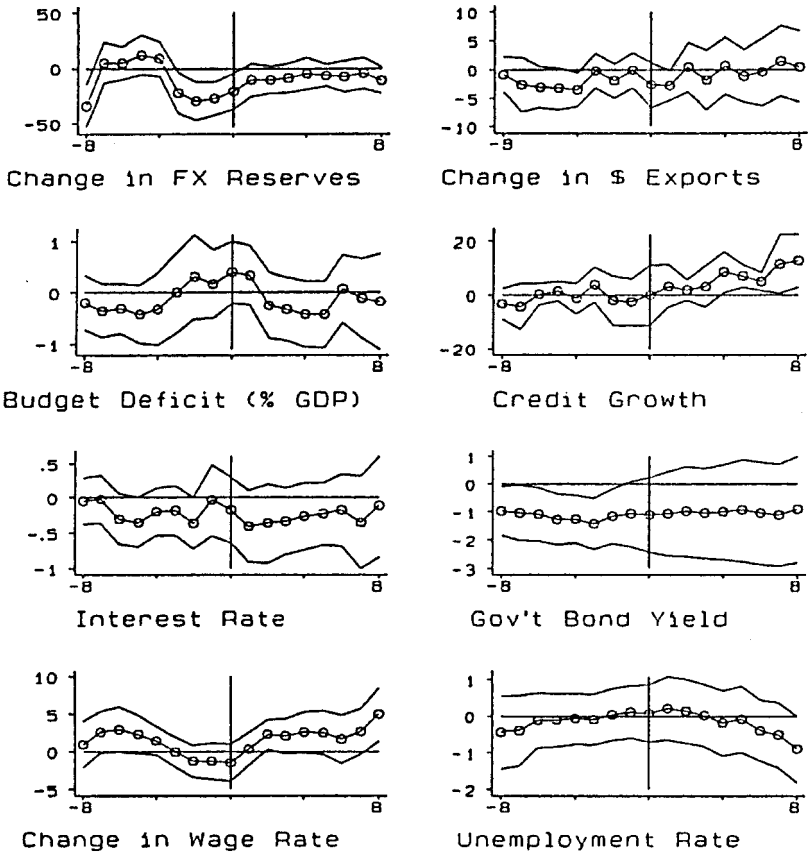


**Figure 5.3**
Flotations
*Source:* See text.
*Notes:* Movements 8 quarters before and after (33) flotations. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

To summarize, devaluations typically occur when unemployment is high, monetary policy is loose, inflation is rapid, and the external accounts are weak. Late attempts to moderate monetary policy precede but do not preclude devaluations. Once the devaluation has occurred, reserves flow back and external balance is restored, while monetary and fiscal policy tightens. In the case of revaluations, macroeconomic variables move in the opposite directions, but their movements are less dramatic.

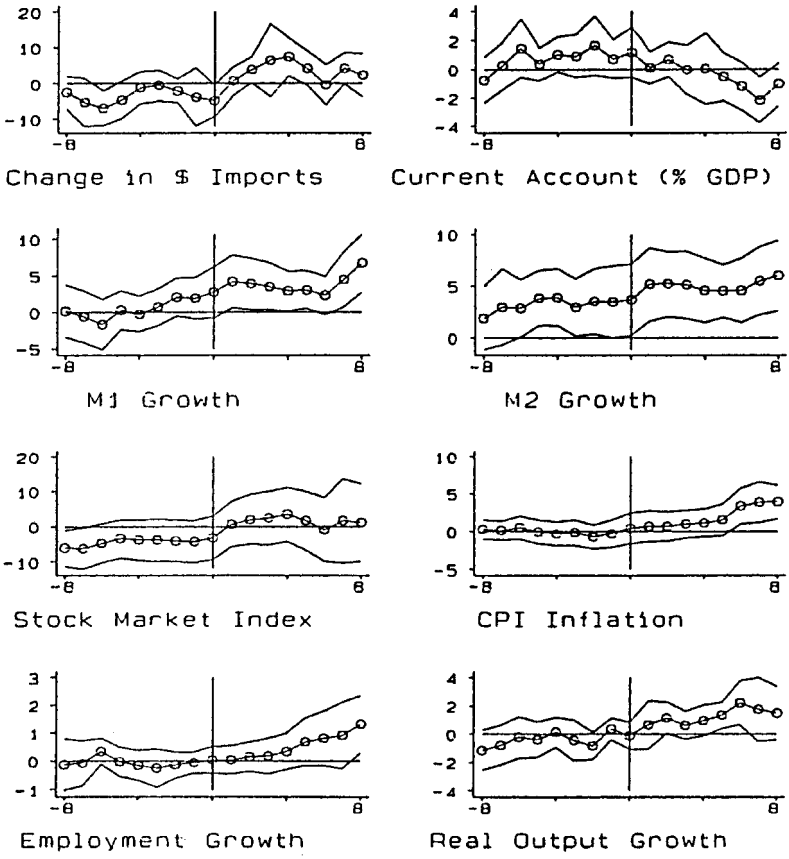


**Figure 5.3** (continued)

## Regime Transitions

Figures 5.3, 5.4, and 5.5 portray the movements of our variables around three sorts of regime transition: instances where the exchange rate was floated, when it was fixed, and other transitions (such as exchange rate unifications, changes in band-widths, and so forth).

Conventional wisdom is that fixed exchange rates are floated in response to weakness. One thinks of the ignominious departures of the pound and lira from the EMS in September 1992, and Sweden's abandonment of its unilateral peg two months later. It is also true, however, that the yen, guilder, and Deutschmark were floated out of the Bretton Woods System in response to strength. Although this

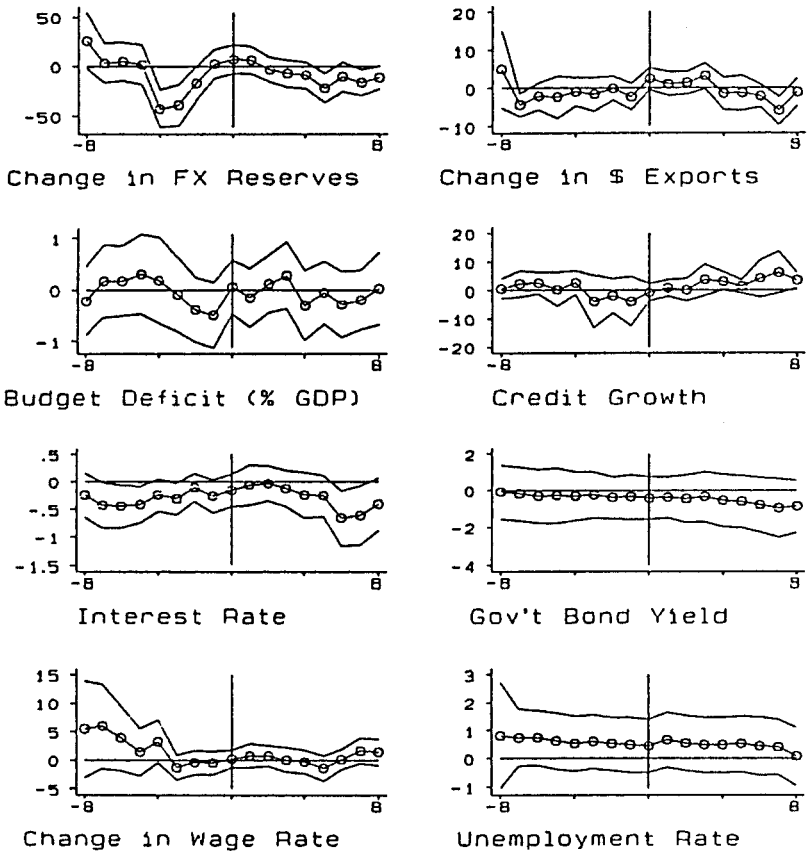


**Figure 5.4**
Fixings
*Source:* See text.
*Notes:* Movements 8 quarters before and after (33) fixings. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

conventional wisdom might lead one to expect that figure 5.3 should resemble figure 5.1, this is not the case. Indeed, there is little evidence of differences between the periods around flotations and tranquil periods.

Some of the movements around flotations in figure 5.3 seem sensible. For instance, reserves fall quickly (compared with periods of tranquility) prior to flotations, and money growth rises. But other movements are more difficult to interpret, such as the strong current account and below average long-term interest rates. Perhaps the

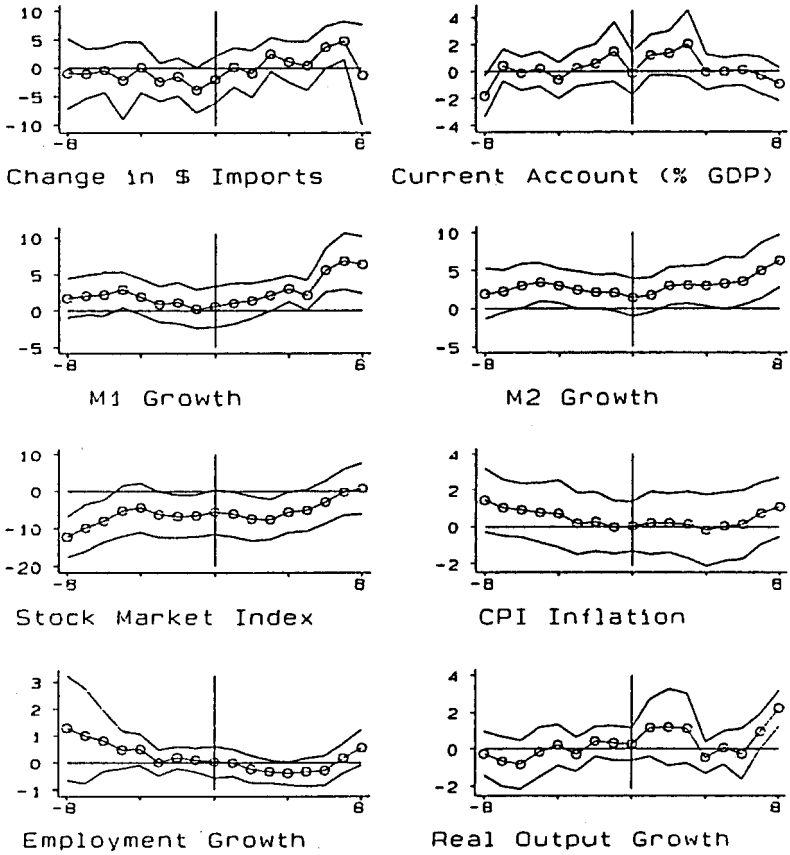


**Figure 5.4** (continued)

most striking feature of the figure is that most of the confidence intervals overlap the zero line, implying that the flotations cannot be distinguished from tranquil periods. This is true of inflation, wage growth, unemployment, and output growth. Flotations are idiosyncratic, with few typical co-movements characterizing either the run-up to or the aftermath of flotations. There are signs that policy is relaxed after flotations; money growth stays higher than that in tranquil times, whereas wage and price inflation picks up. Further, the real economy improves, as unemployment falls while output and employment growth rise. These effects need not be caused by any relaxation of policy; a flotation-induced depreciation can be expected to be inflationary and to improve competitiveness. But the long-term

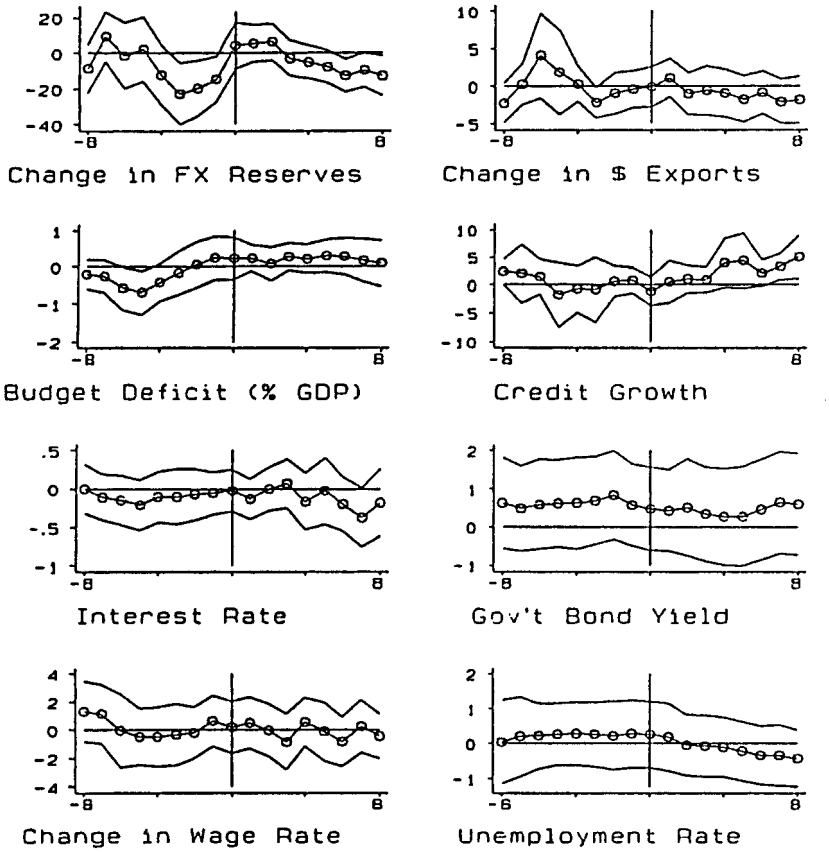


**Figure 5.5**
Other Changes in Exchange Rate Regimes
*Source:* See text.
*Notes:* Movements 8 quarters around (56) other events. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

interest rate does not rise in anticipation of an inflationary binge, despite the inevitable loss of credibility. Although the movement is quite weak, there is a deterioration of the budget.

Our negative result can be explained in a number of different ways. It may be that countries float their exchange rates for very different reasons, despite the common impression that countries are forced to float out of weakness.[30] Some flotations may not have systematic causes; they may be of the self-fulfilling variety, unjustified by fundamentals. Also, countries switch from a policy of fixed

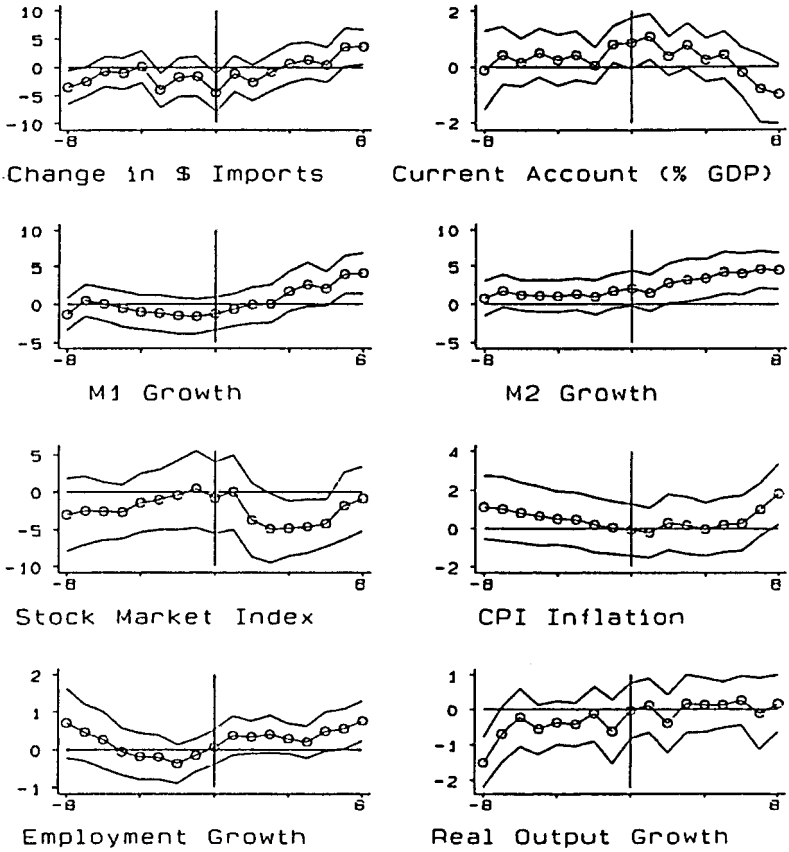


**Figure 5.5** (continued)

exchange rates toward alternatives that differ enormously, making the post-flotation heterogeneity perhaps unsurprising.[31] But it is similarly difficult to generalize about the macroeconomic causes and consequences of decisions to fix a previously floating rate (or to widen the band, or otherwise to change the exchange rate regime).

Fixing might be thought of as the final step in a process of policy discipline, the crowning of disinflation efforts. Indeed, over the two years preceding a fixing, we observe some evidence of declining wage and price inflation. Yet fixings are also preceded by reserve losses and unremarkable fiscal and monetary policies. Confidence intervals are wide, and few regularities distinguish either the run-up

to regime transitions or the period immediately following them. Although realignments seem to be fundamentally alike, transitions between exchange rate regimes are unpredictable and idiosyncratic.

Two conclusions follow. First, many regime transitions do not appear to be warranted by macroeconomic imbalances. Second, the speculative attacks that provoke them are not clearly justified by subsequent changes in the stance of policy provoked by the regime transition itself.[32]

It may be that our 33 flotations and fixings do not provide a sufficiently large sample to allow the data to discriminate between such events and tranquility, especially as some of these events are clearly linked and therefore do not provide independent observations (e.g., the floating of the lira and the pound in September 1992).[33] Alternatively, different transitions between exchange rate regimes may be undertaken for fundamentally different reasons. Markets seem to focus on different aspects of economic and political stability during different speculative attacks.[34]

**Exchange Rate Crises**

The preceding evidence is only indirectly informative about the causes and consequences of speculative attacks, because not all speculative attacks culminate in devaluations, revaluations, or decisions to float, fix, or widen the band. The currency may be supported by the expenditure of reserves by the central bank or by intervention by its foreign counterparts. Alternatively, the authorities may discourage bear speculation by raising interest rates and adopting other austerity policies. Nor are all decisions to devalue or float the exchange rate necessarily preceded by speculative attacks. "Events" and "crises" in the foreign exchange market, in our terminology, are not the same. The next step is therefore to identify exchange market crises and to provide an analysis that parallels our event analysis.

**Identifying Crises**

A speculative attack is a period of extreme pressure in the foreign exchange market. Ideally, a measure of this pressure should stem from a model of exchange rate determination (from which the policy actions needed to maintain the currency peg could also be derived). However, research has underscored the inadequacy of models linking macroeconomic variables to the exchange rate (Meese and Rogoff

1983 is the classic reference). To approach this question we therefore use a simple, if ad hoc, method to measure exchange market pressure, following earlier work by Girton and Roper (1977). *Speculative pressure* is measured as a weighted average of exchange rate changes, interest rate changes, and reserve changes, where all variables are measured relative to those prevailing in Germany, the reference country. Speculative attacks—*crises*—are defined as periods when this speculative pressure index reaches extreme values. Intuitively, an attack on a currency can lead to a loss of reserves, be rebuffed by a rise in domestic interest rates (and an associated contraction of domestic credit), or be accommodated by a depreciation or devaluation of the exchange rate. Our index will pick up events that entail large fluctuations in quarterly values. But not all events entail crises (e.g., orderly realignments), and not all crises are events (e.g., successful defenses).[35]

The question is how to weight the three components of the index of speculative pressure. The empirical literature provides little guidance. An unweighted average has the advantage of simplicity, but a look at the data reveals that the conditional volatility of percentage changes in reserves is several times the conditional volatility of the percentage change in the exchange rate, which is itself several times the percentage change in the interest differential. Movements in an unweighted average will therefore be heavily driven by reserve movements. An alternative is to weight the three components so that their conditional volatilities are equal. This is the measure on which we focus below.[36]

We refer to those quarters in which our index of speculative pressure was at least two standard deviations above the mean as an exchange market crisis. Sometimes two (or more) potential crises occur close together. To avoid counting the same crisis twice (or more), we exclude second (and subsequent) observations that occur within given proximity to the first crisis. Our initial window width is plus and minus two quarters.

Figure 5.6 shows the number of crises (and events) over time. Following the relatively placid 1960s, there is an up-tick in events in 1967, when the pound sterling was devalued. The number of crises stays up, reflecting turbulence in the market for other European currencies such as the French franc. The crisis in the Bretton Woods System in 1971 accounts for the peak in the number of events we

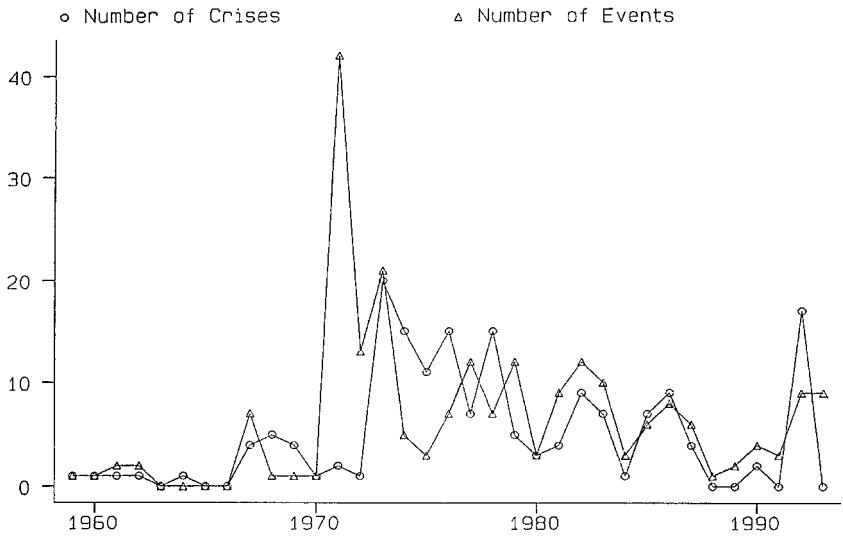


**Figure 5.6**
The Temporal Incidence of Exchange Rate Episodes

pick up in that year, but it is notable that we detect only a slight uptick in the number of crises (which can be interpreted as the crisis in 1971 being essentially a dollar crisis). The year 1973, in contrast, shows up as a more general crisis. The 1970s are characterized by more crises and events than the 1960s, although they settle down as the decade draws to a close. There are then simultaneous upswings in crises and events after 1980 (associated with global recession, the Volcker-Thatcher disinflations, and the earlier trials and tribulations of the European Monetary System), after 1985 (associated with the high dollar and the Plaza and Louvre Accords designed to bring it down), and after 1991 (associated with the crisis in the EMS). This clustering of crises (and events) is consistent with theories of speculative attacks and policy responses that entertain the possibility of contagious spillovers across countries.

## Regularities

We now analyze the behavior of macroeconomic variables around the crises identified using this technique. Ineluctably, more confidence can be attached to the preceding analysis of events than to the analysis of crises that follows. Events are based on concrete reports

of actual policy measures. In measuring crises, in contrast, we are forced to construct an index by imposing assumptions.

Figure 5.7 shows the evolution of the major macroeconomic variables in the eight quarters preceding and following crises; it is an analog to figures 5.1–5.5. There is an obvious temptation to compare crises (fig. 5.7) with devaluations (fig. 5.1) to see how much difference the categorization makes. The patterns are broadly similar, suggesting that crises have much in common with devaluations, although the patterns are weaker in the case of crises. (Given our definition of crises, it is no surprise that reserve losses, interest rate hikes, and real depreciations are more pronounced around speculative attacks.)

In order to make the differences between crises and devaluations easier to spot, figure 5.8 compares the two directly by subtracting the variables at times of devaluations from those at times of crises.

Devaluations follow excessively expansionary policies that lead to balance of payments deficits and overvalued exchange rates. Initially it is the current account that is in deficit, but as the time of realignment nears, the capital account also worsens. Partial sterilization over the final pre-devaluation quarters implies a tightening of monetary policy. Indeed, interest rates, both short and long term, rise markedly while stock prices fall. In contrast, crises respond to more recent and sharper monetary relaxation, with no last-minute attempt at correction despite deeper reserve losses, often in an economy displaying more inflationary symptoms, with endemic export and current account difficulties. In the run-up to the attack, credit keeps growing (whereas it declines before devaluations), suggesting that foreign exchange market intervention is fully sterilized. Interest rates do not rise; as a result they remain lower than before devaluation—another sign of the absence of serious attempts to defend the exchange rate. Prior to devaluations, stock prices fall, which can be explained by the rise in interest rates and by market expectations of monetary tightening. The same does not occur prior to a crisis, which is consistent with unchanged interest rates, but also suggests that the markets do not clearly foresee the attack or do not expect the attack to be followed by a tightening of monetary policy.

Further differences between devaluations and crises are also evident after the events have taken place. After devaluation, monetary policy becomes more restrictive; as a result, output and employment

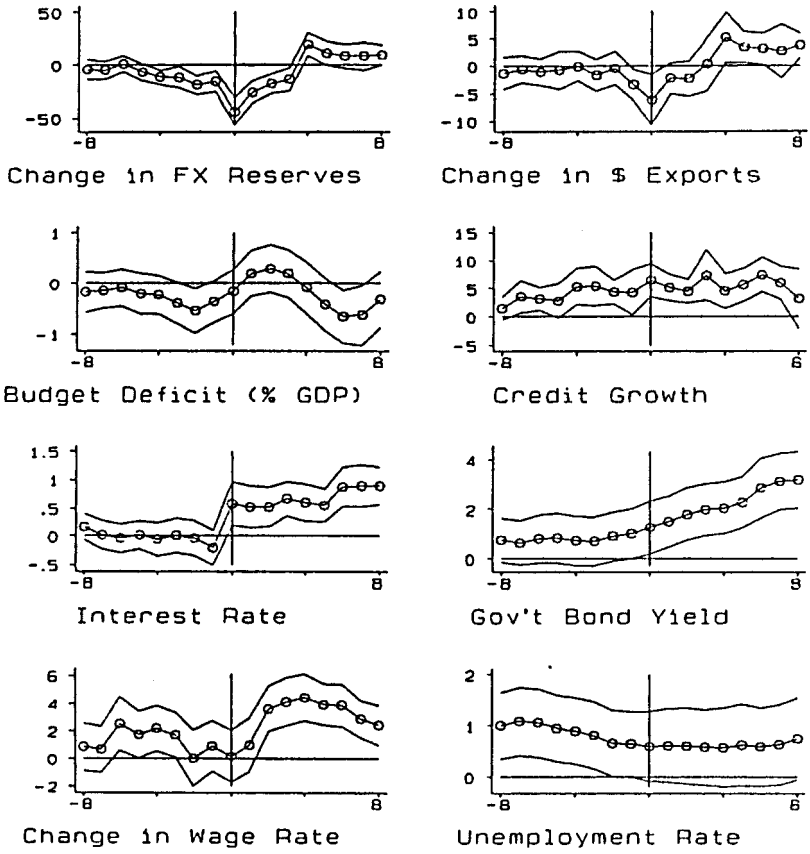


**Figure 5.7**
Crises
*Source:* See text.
*Notes:* Movements 8 quarters before and after (78) crises. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

growth weaken and external balance is quickly restored. In contrast, following a crisis there is little discernible slowdown in credit and money growth (certainly much less than after a devaluation). In both cases, interest rates remain high, although they are higher following devaluations. Indeed, policy restraint lingers after devaluations, whereas there are no signs of it following a crisis.

Thus the circumstances under which devaluations occur are best characterized as instances where policy corrections are needed due to relatively modest policy imbalances, and where the requisite adjustments can still take place in advance of the outbreak of

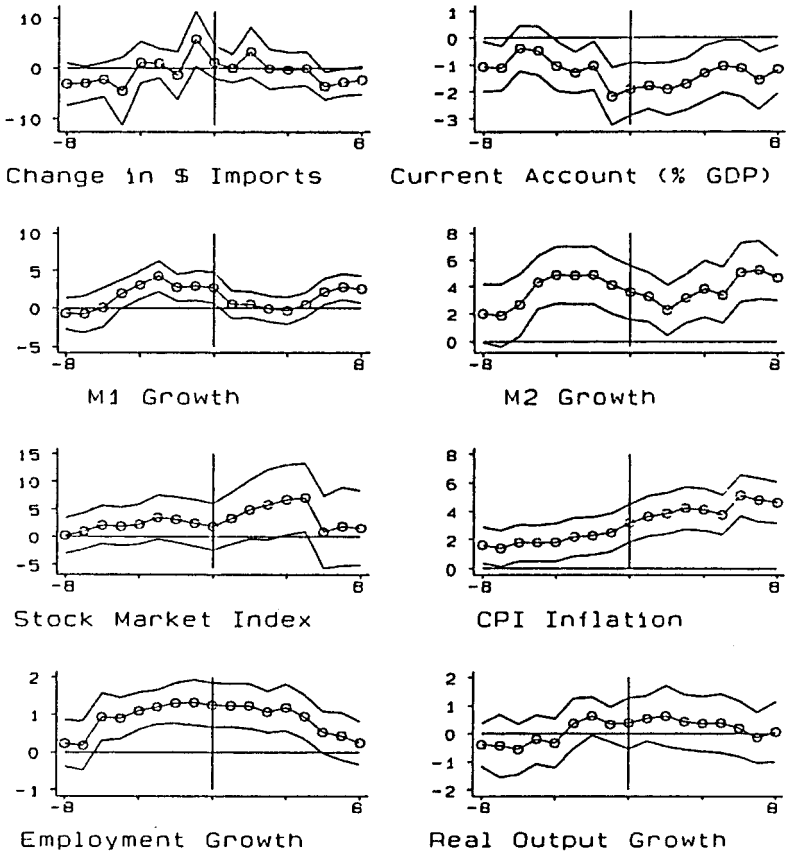


**Figure 5.7** (continued)

crisis. In contrast, crises occur when macroeconomic conditions are allowed to run faster and further out of control without any last-minute correction of policies, as if the requisite policy changes cannot be taken in time to head off the crisis itself.

The question therefore becomes why the necessary correction is not attempted in advance of the crisis. The answer lies in the economic and political cycle. Crises occur when unemployment is high and (as shown later) when political circumstances are unpropitious. These economic and political constraints are what prevent governments from reining in unsustainable policies, provoking the crisis.

We can shed further light on the distinction between crises and events by splitting our sample of crises into successful attacks and

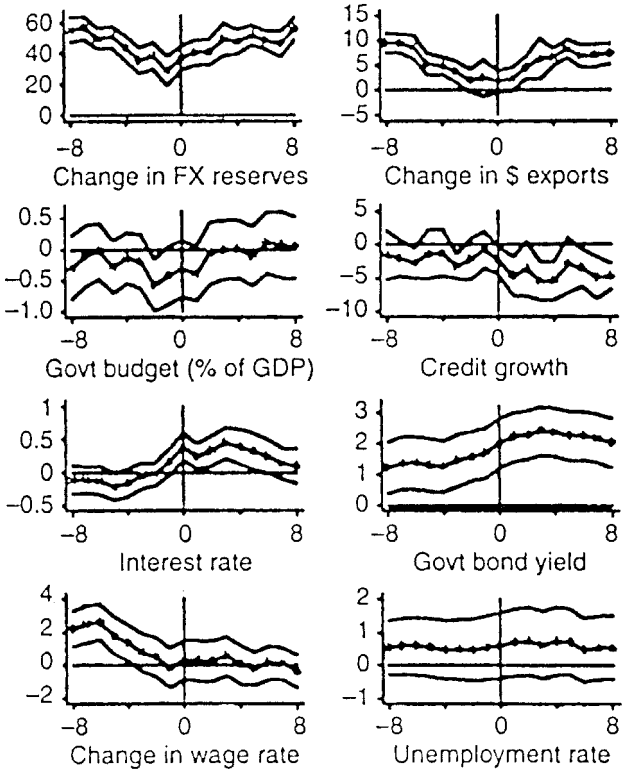


**Figure 5.8**
Devaluations minus Crises
*Source:* See text.
*Notes:* Movements 8 quarters before and after (81) devaluations. Deviation of differentials from crises; samples not comparable. Mean plus two standard deviation band.

successful defenses. We define the former as a crisis followed within a year by an event (e.g., a devaluation or flotation). Figure 5.9 provides a comparison between the two. It is an analog to figure 5.7, but compares successful attacks to successful defenses instead of comparing all crises to periods of tranquility.

There is no clear way of telling what makes attacks succeed or fail; most macroeconomic variables exhibit the same behavior before successful and failed attacks. One difference is that the growth of output and employment is slower and unemployment higher before successful attacks. External conditions do not vary substantially between successful and unsuccessful attacks; imports and the current

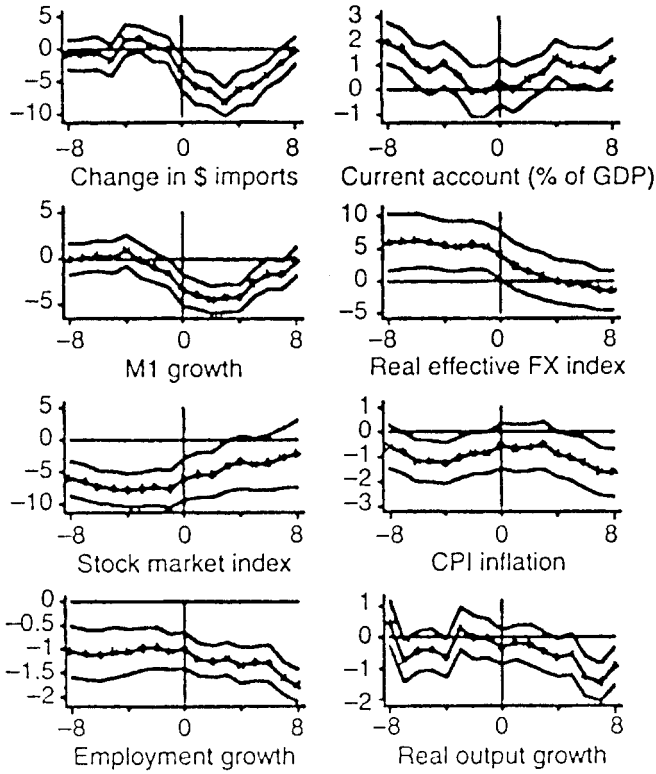


**Figure 5.8** (continued)

account are not significantly different between the two, even though exports, curiously, are stronger in the case of successful attacks, in spite of significant overvaluation of the exchange rate that the attack itself corrects. Perhaps the single most promising variable to tell successful attacks and defenses apart is the fiscal situation. Countries whose currencies are successfully attacked have larger and worsening budget deficits before attacks, although this does not show up in the monetary aggregates.

Interest rates and the budgetary position improve dramatically after the event, whereas money growth falls, as if the authorities learn their lesson and strive to improve credibility. Thus, there is little evidence that speculative attacks, whether self-fulfilling or not, prompt governments to ease fiscal and monetary policies. However, this does not prevent a general wage and price inflation that is

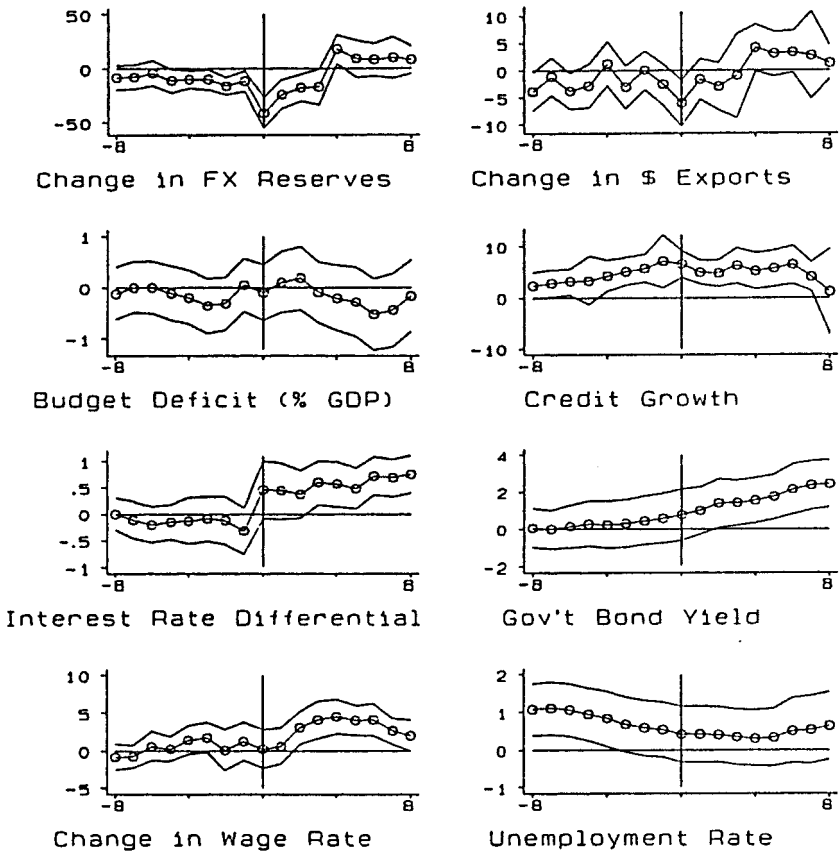


**Figure 5.9**
Successful Defenses
*Source:* See text.
*Notes:* Movements 8 quarters around (45) successful defenses. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

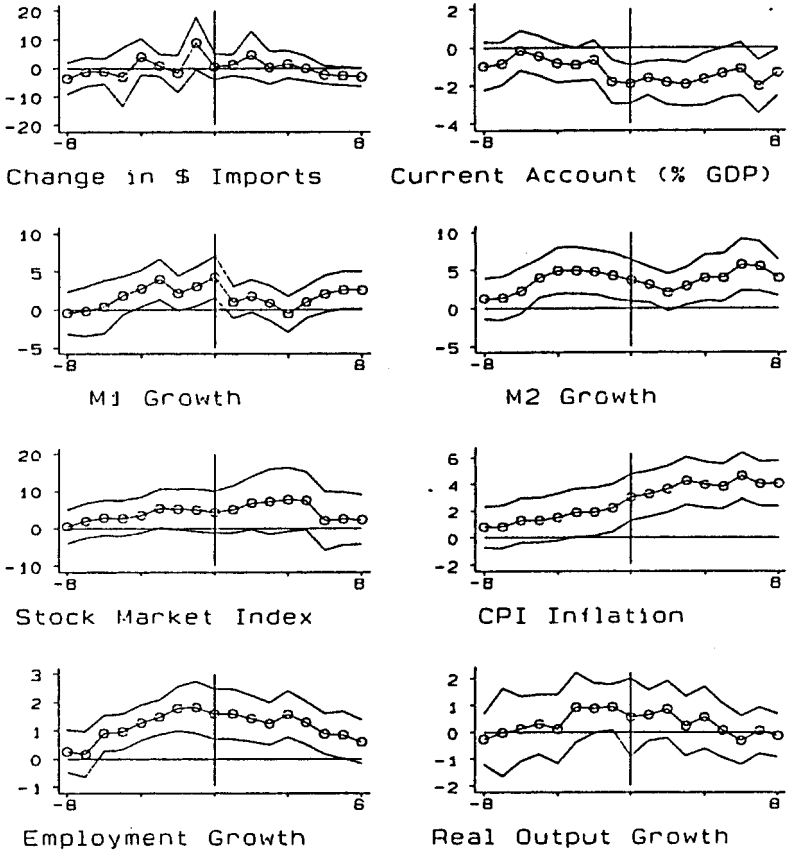


**Figure 5.9** (continued)

reflected in long-term interest rates. Successful attacks also take place in the context of a significantly weaker economy than successful defenses (as is to be expected from generally weak fiscal positions). Unemployment rates are higher and employment and output growth are lower before attacks that succeed. After successful attacks, a number of macroeconomic indicators improve sharply, including the budget, exports, and foreign exchange reserves.

All this suggests that governments are less able to defend themselves against speculative pressures during contractions. Governments seem to balance the exchange rate constraint against output and employment objectives.

These results do not provide much hope for identifying early signs of impending problems. The problems are threefold. First, the *ex ante* differences between successful attacks and successful defenses are generally domestic, whereas devaluations seem generally to be provoked by international imbalances. Second, differences are almost always statistically and economically insignificant, and move sluggishly over time (thereby giving few indications about the timing of speculative attacks). Third, although the obvious place to look for signs of difficulties is in financial markets, short- and long-term interest rates appear to be *ex ante* indistinguishable, not only between successful and unsuccessful attacks, but also between exchange rate crises and events and periods of tranquility.

**Sensitivity Analysis**

We study the robustness of our findings by examining a variety of perturbations to our methodology.

Our most important check consisted of dropping all non-ERM observations from our data set. The remaining observations correspond to more homogeneous and recent conditions for a group of countries with exchange rates limited to relatively narrow bands. This essentially limits our event analysis to devaluations, and has the additional advantage of excluding all floaters from the sample.

Figure 5.10 closely resembles its analogue, figure 5.1. Consistent with the standard view of EMS realignments, ERM devaluations were preceded by generally weak external positions: falling reserves, weak exports, high import growth, and current account deficits. Government budgets show larger deficits than those of tranquil countries; money and credit growth are similarly high. These expansionary policies are reflected in higher actual and expected inflation, high long-term interest rates, and depressed stock prices. The devaluations are partially expected, although interest rates rise sharply close to actual realignments. Further, realignments tend to take place in a weak internal environment of high unemployment and low employment growth.

Movements after the devaluations are also consistent with conventional wisdom. Monetary and fiscal policies appear to be tightened slowly after realignments, although both short- and long-term interest rate differentials persist in the face of imperfect credibility. Wage and price inflation gradually fall, and there is little effect on the

real economy. The authorities are rewarded for these actions with a booming stock market and reserve inflows. Thus, realignments appear to have had the intended effect of improving external positions.

We undertook a number of additional sensitivity analyses. For instance, we split our sample in different ways. We also normalized the data displayed in our graphics differently, comparing our variables around exchange rate events and crises (as always in differentials vis-à-vis Germany) to *country specific* periods of tranquility rather than to periods of tranquility drawn from the sample as a whole. We experimented with removing observations within a two-year window around exchange rate events, so as to avoid counting the same exchange rate episode twice, and two-quarter windows around periods of tranquility. None of these perturbations substantially changed the results.

Finally, we provide some evidence on the importance of capital controls. We divided our exchange rate episodes into those that were experienced with and without capital controls (as measured by the dummy variable in *EAER*). Figure 5.11 provides the evidence; it is the analog to figure 5.7, but it compares exchange rate crises during periods without capital controls to crises experienced during periods with controls, not all crises to tranquility. (We only have enough observations both with and without capital controls to compare currency crises.)

When capital is more mobile, money growth, long-term interest rates and price and wage inflation are lower before crises. Controls allow the authorities to bottle up more inflation before an attack is provoked. There is also significantly higher employment growth before crises when capital is unconstrained. Although many of the differences are statistically insignificant, this does confirm our previous work (Eichengreen et al. 1994), which shows that controls both allow more lax macroeconomic policy and increase the incidence of attacks.

**Recapitulation**

Countries that devalue experience problems of external balance in the period leading up to the event. Their trade deficits and reserve losses are associated with relatively expansionary monetary policies. In addition, the period leading up to devaluations is characterized by problems of internal balance, reflected in relatively high

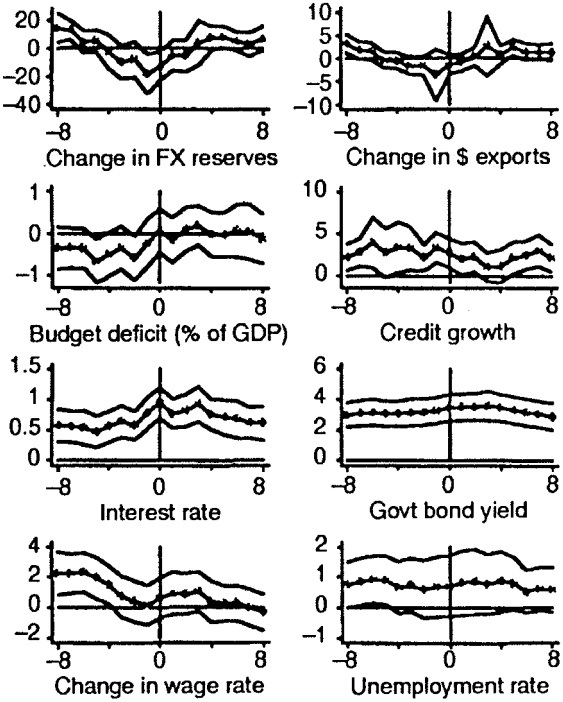


**Figure 5.10**
EMS Devaluations
*Source:* See text.
*Notes:* Movements 8 quarters before and after (50) devaluations. Deviation of differentials from tranquility; samples not comparable. Mean plus two standard deviation band.

levels of unemployment. The expansionary monetary stance may be partly motivated by these domestic problems. Revaluations are generally the mirror images of devaluations, and crises resemble devaluations.

However, evidence of systematic patterns surrounding other events in foreign exchange markets paints a very different picture. In contrast to realignments of fixed exchange rates, transitions between exchange rate regimes seem both unpredictable and idiosyncratic. Devaluations are fairly predictable; events such as flotations are not. Because it is not known *ex ante* how a government will react to any given speculative attack, our findings do not bode well for the development of "early warning" systems designed to detect pending problems in international financial markets. They are also consistent

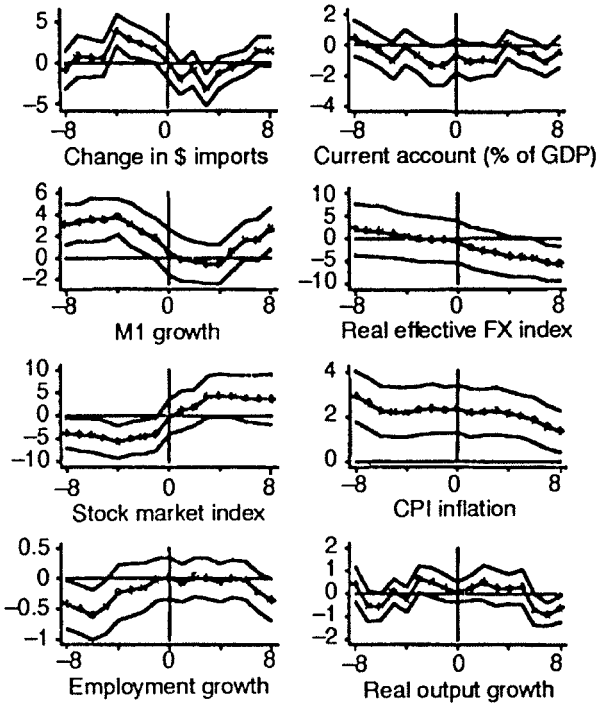


**Figure 5.10** (continued)

with the belief that many changes in exchange rate regimes are caused by attacks that, although successful, are not warranted by fundamentally unsustainable policies either before or after the transition.

Finally, it is important to note that we have not detected any link between lack of fiscal discipline and exchange market turbulence. One interpretation is that fiscal profligacy is simply not the source of speculative attacks and does not create the need to change the exchange rate. Another is that only money-financed deficits matter. Probably the most plausible interpretation is that, in our sample of mostly fiscally virtuous advanced economies, budget imbalances and debts have not played a major role in exchange rate travails, but that we might come to very different findings with a sample that also included episodes of high inflation in Latin America and elsewhere in the developing world. One of our earlier conclusions is that an exchange rate defense may be politically costly. Bringing these two observations together suggests a strategy for fiscally sound countries:

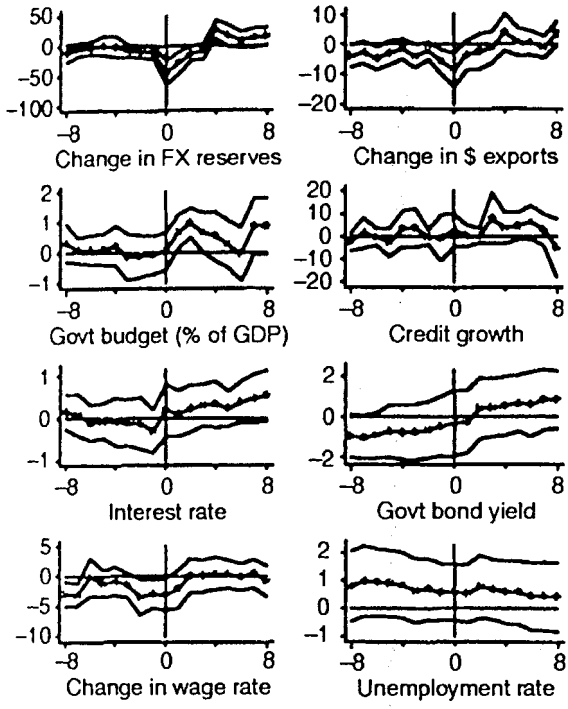


**Figure 5.11**
Crises without and with Capital Controls
*Source:* See text.
*Notes:* Movements 8 quarters before and after (31) crises. Comparisons of mobility to capital controls; samples not comparable. Mean plus two standard deviation band.

instead of relaxing monetary policy to avoid a politically costly slowdown, they may improve their chance of fending off speculative attacks by using expansionary fiscal policies so that high unemployment does not make defense too expensive.

## 5.5 Statistical Analysis

The presentation in section 5.4 relies upon graphical tools. Using the theoretical framework presented in section 5.2, we examined a number of macroeconomic variables to search for patterns in the period surrounding exchange rate events and crises. Nevertheless, this approach is intrinsically informal. In this section, we consider more rigorous statistical tests of the generalizations developed in section 5.4.

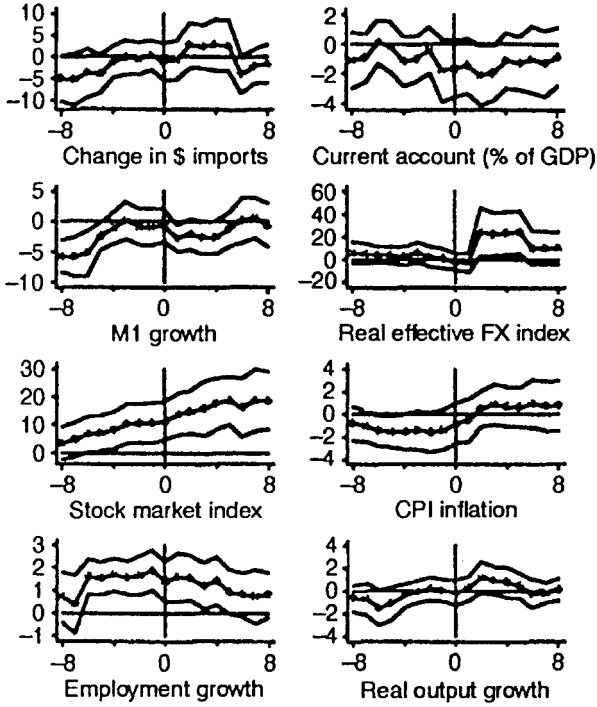


**Figure 5.11** (continued)

We undertake two types of statistical analysis. First, we introduce political variables and check to see if they are closely related to events and crises. Second, we replace the variable-by-variable approach with an analysis of the joint effects of the economic and political variables of interest (by estimating multivariate regression models).

### The Role of Politics

Table 5.1 presents information on a variety of political variables for our taxonomy of exchange rate episodes. Our sample contains seven columns corresponding to mutually exclusive and jointly exhaustive partitions. These are: devaluations, revaluations, exchange rate flotations, exchange rate fixings, other changes in exchange rate regime (such as changes in band-width), failed attacks (crises that do not coincide with one of the five events), and the complementary sample, which we think of as "tranquility."

**Table 5.1**
Political Events and Exchange Rate Episodes (number of episodes)

| | Tran-quility | Failed attack | De-valua-tion | Re-valua-tion | Flota-tion | Fixing | Other event |
|---|---|---|---|---|---|---|---|
| Sample | 2516 | 61 | 81 | 20 | 33 | 33 | 56 |
| Left-wing govt. | 79 | 4 | 8 | 2 | 0 | 2 | 3 |
| Elections | 177 | 6 | 8 | 2 | 0 | 3 | 4 |
| Change in govt. | 71 | 2 | 6 | 1 | 0 | 1 | 3 |
| Govt. victory | 118 | 3 | 3 | 1 | 0 | 3 | 2 |
| Past govt. victory | 462 | 10 | 12 | 3 | 8 | 3 | 7 |
| Future govt. victory | 448 | 7 | 17 | 5 | 4 | 10 | 13 |
| Govt defeat | 71 | 2 | 6 | 1 | 0 | 1 | 3 |
| Past govt. defeat | 271 | 6 | 20 | 8 | 4 | 5 | 9 |
| Future govt. defeat | 284 | 13 | 13 | 1 | 3 | 4 | 9 |
| New finance minister | 158 | 3 | 9 | 3 | 4 | 2 | 4 |
| Past new finance minister | 571 | 27 | 25 | 6 | 12 | 8 | 19 |
| New future finance minister | 581 | 25 | 24 | 3 | 12 | 12 | 16 |
| Capital controls | 512 | 21 | 11 | 2 | 4 | 2 | 8 |
| No controls | 1116 | 34 | 62 | 14 | 24 | 24 | 38 |

The rows provide tabulations of our variables across these episodes. We are searching for signs that political events are not randomly distributed across exchange rate episodes: for instance, that governments tend to fall disproportionately before or after realignments. We do this by testing the hypothesis that a given political variable has no effect.

By and large, political phenomena are rarely linked to exchange rate episodes. The second row of the table shows that the political orientation of the government seems to be independent of exchange rate episodes.[37] The same is true of both elections and changes in government (which do not require elections in many systems), so that political uncertainty per se does not seem to provoke attacks.

Government victories (e.g., winning an election) are not strongly associated with speculative attacks (though one might have expected disproportionate numbers of tranquil periods). This is true not only of contemporaneous government victories, but also of those that

occurred during the past or next year. But a *defeat* of the government in the past year is associated with a disproportionately larger number of realignments; a new finance minister in the past year has the same effect. On the other hand, there is little evidence that exchange rate episodes are associated with future government defeats; the finance minister is used as a sacrificial lamb (consistent with Cooper's celebrated result).

Table 5.1 also confirms the importance of capital controls (as measured by the *EAER* dummy variable). Periods of tranquility and capital mobility outnumber periods of tranquility with controls by two to one. But important events such as devaluations and flotations are more likely to occur without controls, and failed attacks are more likely when controls are present. It seems that controls allow governments to avoid not only realignments (which are frequently warranted by economic circumstances), but also regime transitions. In other words, capital controls may be a potent weapon for governments wishing to avoid (frequently unjustified) regime switches.

**The Joint Effects of Economic and Political Variables**

Most of the preceding analysis can be criticized on two grounds. First, it is *univariate*. We compare the behavior of our variables one by one, during, for example, devaluations and periods of tranquility. We do not consider groups of variables and ask whether their *joint* behavior differs between crises or events and tranquility. Second, it is *uninomial*. We compare each exchange rate state (crisis, devaluation, revaluation, flotation, etc.) to periods of tranquility in isolation from one another. We do not analyze the causes and consequences of crises and various events *simultaneously*. It is well known, however, that such a piecemeal approach may lead to unwarranted conclusions. We now attempt to rectify these deficiencies. Our econometric strategy has four features. The model we develop is *multivariate*, in that it considers a number of economic and political variables simultaneously. It is *multinomial*, in that it simultaneously compares periods of tranquility to crises and a variety of different events. It is *dynamic*, in that it examines periods of time both before and after crises and events. We look backward to study the *antecedents* of various exchange rate episodes, and forward to examine their *consequences*. Finally, it is *non-structural*, in that it does not attempt to

**Table 5.2**
Variables Correlated with Exchange Rate Episodes (Effect on Probability of Each Episode, and [in brackets] Probability that Each Variable Does Not Affect the Distribution of Events)
Coefficient estimates (P-value of null hypothesis)

| | Failed attack | Devaluation | Revaluation |
|---|---|---|---|
| Past crisis | −3.50 (0.00) | 0.27 (0.34) | 0.03 (0.97) |
| Past event | 0.77 (0.51) | 0.14 (0.77) | −1.4 (0.11) |
| Past controls | 3.90 (0.00) | −2.2 (0.02) | 3.2 (0.05) |
| Past govt. win | −0.44 (0.59) | −0.10 (0.82) | −0.12 (0.88) |
| Past govt. loss | 1.10 (0.11) | 0.88 (0.01) | 1.9 (0.01) |
| Credit lag | 0.02 (0.63) | 0.01 (0.74) | −0.11 (0.15) |
| Inflation lag | −0.21 (0.03) | −0.09 (0.07) | −0.16 (0.23) |
| Growth lag | 0.12 (0.30) | −0.08 (0.30) | 0.01 (0.96) |
| Employment lag | 0.53 (0.00) | 0.02 (0.87) | −0.34 (0.30) |
| Unemployment lag | 0.17 (0.65) | 0.22 (0.27) | 0.53 (0.34) |
| Budget lag | −0.05 (0.77) | 0.09 (0.22) | 0.03 (0.88) |
| Current account lag | −0.05 (0.68) | −0.22 (0.00) | 0.12 (0.43) |
| Future controls | −3.30 (0.01) | 2.90 (0.00) | −0.88 (0.49) |
| Future govt. win | 0.43 (0.63) | 0.53 (0.13) | 0.03 (0.97) |
| Future govt. loss | 1.80 (0.01) | 0.30 (0.41) | −33.00 (1.0) |
| Credit lead | −0.01 (0.78) | −0.03 (0.16) | 0.06 (0.13) |
| Inflation lead | 0.38 (0.00) | 0.05 (0.34) | 0.03 (0.82) |
| Growth lead | 0.27 (0.03) | 0.04 (0.54) | 0.09 (0.63) |
| Employment lead | 0.31 (0.08) | −0.13 (0.39) | −0.08 (0.81) |
| Unemployment lead | −0.02 (0.97) | −0.17 (0.37) | −0.46 (0.40) |
| Budget lead | 0.14 (0.35) | −0.17 (0.02) | −0.00 (1.0) |
| Current account lead | 0.12 (0.32) | 0.14 (0.04) | 0.09 (0.55) |

*Notes:* 1300 total observations. Coefficients estimated by maximum likelihood. McFadden's $R^2 = 0.18$. Implied chi-squared statistics used to construct inferences below.

estimate or test any particular speculative attack theory. Rather than confirming or rejecting a narrowly defined structural model, our statistical approach amounts to systematic data exploration.

We proceed as follows. We ask whether the economic and political variables under consideration can help predict the likelihood of each of the events listed in the column heading of table 5.1: a crisis that is not an event (a failed attack or successful defense), devaluation, revaluation, flotation of the exchange rate, fixing the rate, other events in foreign exchange markets, and tranquility (the omitted alternative). We use a one-quarter exclusion window, so that each country

| | Flotation | Fixing | Other event |
|---|---|---|---|
| Past crisis | −0.61 (0.33) | −1.40 (0.09) | 0.33 (0.44) |
| Past event | 0.55 (0.61) | 20.00 (0.00) | −1.10 (0.03) |
| Past controls | −0.62 (0.80) | 0.89 (0.79) | −0.58 (0.74) |
| Past govt. win | 0.12 (0.85) | −0.69 (0.55) | 0.51 (0.38) |
| Past govt. loss | 0.44 (0.55) | 1.20 (0.09) | 0.64 (0.21) |
| Credit lag | −0.03 (0.51) | −0.18 (0.00) | 0.01 (0.94) |
| Inflation lag | −0.13 (0.16) | −0.16 (0.13) | 0.03 (0.68) |
| Growth lag | −0.12 (0.43) | 0.14 (0.39) | −0.15 (0.03) |
| Employment lag | −0.10 (0.68) | 0.62 (0.02) | −0.02 (0.33) |
| Unemployment lag | 0.07 (0.85) | 0.06 (0.90) | 0.13 (0.34) |
| Budget lag | −0.01 (0.94) | −0.19 (0.29) | −0.24 (0.03) |
| Current account lag | 0.15 (0.14) | −0.05 (0.69) | 0.12 (0.33) |
| Future controls | 1.30 (0.61) | 2.20 (0.51) | 1.70 (0.34) |
| Future govt. win | −1.10 (0.33) | 1.30 (0.07) | 0.70 (0.16) |
| Future govt. loss | −0.08 (0.92) | −0.89 (0.43) | 0.70 (0.18) |
| Credit lead | 0.05 (0.14) | −0.04 (0.49) | 0.01 (0.75) |
| Inflation lead | 0.16 (0.05) | 0.23 (0.02) | −0.05 (0.52) |
| Growth lead | 0.14 (0.29) | 0.39 (0.01) | −0.14 (0.27) |
| Employment lead | −0.25 (0.29) | −0.39 (0.24) | 0.20 (0.33) |
| Unemployment lead | −0.12 (0.74) | 0.09 (0.85) | −0.18 (0.56) |
| Budget lead | 0.08 (0.57) | 0.15 (0.40) | 0.14 (0.20) |
| Current account lead | −0.24 (0.06) | 0.02 (0.91) | 0.04 (0.68) |

contributes no more than two observations annually, in order to avoid counting the same episode twice. In assessing the role of each variable, we consider both its past and future linkages to the exchange rate episode (we estimate a multinomial logit model).[38]

We began by using (the lead and lags of) nearly all of the variables discussed above, but found that (fourth-order moving) averages are appropriate for analyzing the causes of crises and events. We found very similar results when we utilized second- or eighth-order lags. This is unsurprising given the smooth behavior of the variables manifest in the figures.

Table 5.2 collects the results. We show how much each economic or political variable listed in the first column affects the probability

that the event listed in the top row will occur. A positive number indicates that the relevant variable raises the probability of the event, and the converse for a negative sign. The numbers in parentheses show the probability that the effect is nil; a low value indicates that the measured effect is not a statistical fluke, so that the variable does affect the event under consideration.[39]

In table 5.3 we report a number of summary tests. The first series asks whether events listed in the column headings differ (in the sense that the behavior of the economic and political variables listed down the left-hand side of the table is not the same) from the benchmark case of tranquility. For example, there is zero probability that failed attacks are identical to tranquility. The results broadly confirm the discussion above, which is based upon graphics.

Failed attacks (a subset of the crises portrayed in figure 5.6) and devaluations are significantly different from periods of tranquility. More importantly, neither exchange rate flotations nor other changes in regime can be distinguished from periods of tranquility, a reflection of the fact that regime transitions seem idiosyncratic. Exchange rate fixings *can* be distinguished from periods of tranquility, but this is mostly the result of the fact that collective systems of managed rates like the EMS begin at the same time.

The second series of tests asks the opposite question: do the economic and political variables behave differently across the different episodes under consideration? We look separately at lagged and leading effects. These statistics can be interpreted like the first set. Thus the hypothesis that lagged government victories are irrelevant for all cells cannot be rejected, unlike the hypothesis that lagged government defeats are irrelevant. The variables that matter are capital controls (both lags and leads), past government defeats, past and future inflation, future GDP and employment growth, and past current account balances.

Overall, what do we find in the details of the table? In a word, confirmation of the portrait painted by our informal analysis of the data. Past crises and events matter for current ones: this is an indication that credibility is an important factor. Past crises make failed attacks more likely, whereas recent events make exchange rate fixings much more likely. Capital controls are also highly significant, as expected. Their presence makes future devaluations less likely and future unsuccessful attacks more likely. Capital controls are also

more likely to appear after devaluations and to disappear after failed attacks.

Although recent government defeats seem to provoke realignments, there is remarkably little evidence of feedback between the government's popularity and the exchange rate regime. The role of monetary factors and inflation in triggering attacks is confirmed. In contrast, fiscal laxity does not play an important role. Put differently, bond-financed budget deficits typically do not pose an exchange rate problem, unless they have an inflationary impact. The role of labor market conditions is generally not confirmed, however, although favorable employment growth increases the probability of a successful attack. A deteriorating current account balance makes devaluation more likely.

The interpretations of leads of variables can be tricky. One possible reading of the table, for example, is that a successful defense is followed by faster output growth. But the results of table 5.2 are also compatible with the view that success in repelling an attack is enhanced by the expectation that the economy is turning around and about to grow faster.

A devaluation is followed by budgetary relaxation and an improvement in the current account, which suggests that spending declines. Fixing the exchange rate is rewarded with a significantly higher growth rate. Similarly, a successful defense is conducive to growth, and is also followed by inflation; the same applies to fixings.

There is also much to learn from the insignificant entries in table 5.2. Unemployment rates, government budgets, and the growth of domestic credit are essentially unrelated to exchange rate episodes. The latter two are especially important because they represent the tools of monetary and fiscal policy, whose laxity is said to both provoke and be provoked by devaluations, exchange rate flotations, and the like.[40]

## 5.6 Policy Implications

The simplest interpretation of our results is that governments bring currency crises on themselves through the reckless pursuit of excessively expansionary policies. In particular, they pursue accommodating monetary policies that lead to high inflation and reserve losses, generally in response to disturbing developments on the un-

employment front. Those that take significant last-minute steps to defend the currency by significantly reducing the growth rate of the money supply (undertaking unsterilized foreign exchange market intervention) may succeed in defending the rate. Those that retrench less dramatically on the monetary front may still have to devalue, but may succeed in doing so without creating an atmosphere of crisis. Those that rely for defense of the exchange rate purely on sterilized intervention may find themselves unable to avoid a full-blown currency crisis.

Thus a clear implication of our results is that governments that are serious about defending their exchange rates cannot expect to rely on sterilized intervention. They need also to take serious, and often seriously painful, policy steps with uncomfortable domestic macroeconomic implications.

But many other governments whose currencies are attacked do not clearly bring their exchange market difficulties on themselves through the reckless pursuit of expansionary policies. Virtuous behavior, in other words, is no guarantee of immunity from exchange market pressures; many flotations are not preceded by lax monetary or fiscal policy. Speculative attacks can occur because markets are uncertain about a government's intentions and test its resolve. Alternatively, speculative attacks can be a symptom of self-fulfilling attacks, in the sense that markets believe that the government will not resist pressure and will shift to more expansionary policies as it abandons its exchange rate commitment in response to the attack itself.

Self-fulfilling attacks rest on a bet by markets that governments will not take tough policy action. The conditions under which governments hesitate to take such steps turn out to be obvious: they include recession, high unemployment, past or impending elections, and finance ministers on thin ice. This is why markets are more likely to trigger attacks when a country is in a delicate economic or political state.

What this means is that a system of fixed exchange rates requires some form of insurance to support countries that cannot simply help themselves. When facing self-fulfilling attacks, they must be able to draw automatic and commensurate support from their strong currency counterparts. Every modern system of pegged exchange rates (Bretton Woods, the EMS) has sought to provide some such insur-

**Table 5.3**
Hypothesis Tests

| Hypothesis | Probability true | Reject hypothesis? |
|---|---|---|
| *Coefficients same for tranquility and* | | |
| failed attacks | 0.00 | yes |
| devaluations | 0.00 | yes |
| fixings | 0.00 | yes |
| flotations | 0.17 | no |
| revaluations | 0.31 | no |
| other events | 0.51 | no |
| *Events uncorrelated with* | | |
| past crises | 0.02 | yes |
| past events | 0.00 | yes |
| *Events uncorrelated with past (future)* | | |
| government victory | 0.95 (0.22) | no (no) |
| government defeat | 0.00 (0.15) | yes (no) |
| credit growth differential | 0.07 (0.30) | no (no) |
| inflation differential | 0.04 (0.00) | yes (yes) |
| real GDP growth differential | 0.53 (0.02) | no (yes) |
| employment growth differential | 0.02 (0.27) | yes (no) |
| unemployment differential | 0.87 (0.93) | no (no) |
| budget/GDP differential | 0.25 (0.16) | no (no) |
| current account/GDP differential | 0.03 (0.15) | yes (no) |

ance. However, as with any insurance system, this raises issues of moral hazard. Experience shows that such problems deter countries that are formally obliged to extend unlimited support to weak currencies from doing so. This same factor limits the ability of multilateral organizations such as the IMF to provide fast and adequate assistance.

These findings reinforce skepticism about the viability of several otherwise attractive proposals for international monetary reform. Advocates of exchange rate target zones (Williamson and Henning 1994; Bergsten 1994) argue that if governments only commit to the pursuit of the "right" policies, exchange rates between the currencies of the leading industrial countries can be held within bilateral fluctuation bands of, say, plus or minus 10 percent, which would represent a considerable improvement on the historical volatility of the dollar/yen and dollar/Deutschmark rates. Our results suggest

that pursuit of any particular set of policies is no guarantee of insulation from speculative pressure, and indeed no guarantee that an attack, once launched, will not succeed. The implication is that recommendations of a return to even narrower bands, whether globally (Bretton Woods Commission 1994) or in Europe, where EMS bands were widened from $2\frac{1}{4}$ to 15 percent in 1993, are more problematic still. The realignment mechanism seems to work well, in that devaluations are both warranted and effective, while not tempting the authorities toward lax policies. However, systems of pegged but adjustable rates (or bands) are inherently fragile in that they disintegrate quickly under stress, even when the speculative pressures giving rise to the crisis are not obviously grounded in fundamentals.

This conclusion leaves only a limited menu of options for improving the operation of the exchange rate system: (1) monetary union in the style of Maastricht, which promises to abolish exchange rate instability by abolishing the exchange rate; (2) a transactions tax on foreign currency dealing to provide policymakers with insulation from market pressures; and (3) learning to live with the dirty float. All of these options have drawbacks.

A single world currency, or a single currency for the OECD countries, hardly seems feasible in our lifetimes. Our analysis shows that the exchange rate can be a useful instrument of adjustment. The greater the asymmetry in the disturbances affecting the different OECD countries, the stronger the argument for retaining the exchange rate escape clause. In any case, monetary unification raises fundamental political questions about the limits of nation sovereignty. Europe, with 50 years of experience in pursuing monetary integration, is sui generis. It is hard to imagine a monetary union between, say, the EU and the United States over a horizon relevant for practical policy discussion.

The second option is a Tobin tax on foreign exchange transactions.[41] If effective, this would enhance policymakers' ability to contain market pressures, and allow them to repel self-fulfilling attacks. But economists, including the authors of this chapter, resist the idea of interfering in the operation of markets.

In addition, to be effective, a foreign exchange transactions tax would have to be implemented globally. An initiative along these lines would presumably have to take the form of an amendment to

the IMF Articles of Agreement. This is not something that will occur overnight.

For those who oppose both monetary unification and the Tobin tax, there remains only one alternative: living with floating—misalignments, volatility, and all. This means more systematically adapting domestic policies in a manner consistent with exchange rate stability, coordinating policies internationally, and hoping for the best. There are no facile alternatives free of costs.

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# 6 Contagious Currency Crises

with Andrew K. Rose and Charles Wyplosz

## 6.1 Introduction

The scope for currency crises to spill contagiously across countries has been hotly debated in the wake of the Mexican meltdown. A frequently cited justification for the $50 billion of assistance provided by the IMF, the United States, and the other G-7 governments in early 1995 was that the effects of the Mexican crisis, if allowed to play themselves out, would not be limited to that country; rather, other emerging markets would have experienced serious repercussions. Because the Mexican authorities had little incentive to internalize these externalities, multilateral intervention was justified. In support of this view, observers cite the reserve losses, interest rate increases, and weakening exchange rates suffered by countries including Argentina and Thailand in the early weeks of 1995. The contrary view is that investors were discriminating in the countries they attacked. Currencies other than the Mexican peso were subjected to relatively little pressure, and only countries with large current account deficits, overvalued real rates, and other weak fundamentals felt much of an effect. The implication is that the Mexican bailout, to the extent that it was justified by fears of contagion, was uncalled for.

A similar controversy arose during the 1992–1993 crises in the European Monetary System. In 1992, it was argued that the French franc and the Irish punt came under attack as a result of the earlier crises experienced by the British pound and the Italian lira. In 1993, it was argued that the attack on the French franc threatened to spill over to other European currencies. The implication drawn was that foreign support of the franc was essential to prevent chaos from spreading throughout the EMS. The rebuttal was that only European

countries whose fundamentals were weak were subjected to speculative attacks; others such as The Netherlands remained immune because they appropriately aligned their economic policies to the maintenance of their currency pegs. Thus, the argument went, only countries in certain economic and political circumstances were susceptible.

Clearly, the stakes for policy are immense. Ascertaining whether there exists contagion in the foreign exchange market—by which we mean a systematic effect on the probability of a speculative attack that stems from attacks on *other* currencies, and is therefore an additional effect above and beyond those of domestic "fundamentals"—and under what conditions contagious currency crises arise should be a high priority for empirical research in open-economy macroeconomics. It is remarkable, therefore, that there exists little systematic analysis of the question. Our goal in this paper is to take a first step toward filling this gap.

We use a panel of quarterly data for 20 industrial countries for the period 1959–1993 to test for contagious currency crises. We ask whether the probability of a crisis in a country at a point in time is correlated with the incidence of crises in other countries at the same time, after controlling for the effects of political and economic fundamentals. The evidence is striking: a variety of tests and sensitivity analyses uniformly suggest that a crisis elsewhere in the world increases the probability of a speculative attack by an economically and statistically significant amount (our best estimate is eight percentage points), even after controlling for economic and political fundamentals in the country concerned. This would appear to be the first systematic evidence consistent with the existence of contagious currency crises. However, the evidence is suggestive rather than definitive, because it could also result from shocks to an unmeasurable common shock (e.g., a shock to our center country that is not picked up by our control variables.)

One can think of a number of channels through which instability in foreign exchange markets might be transmitted across countries. One is the impact of a speculative attack on the current and prospective international competitiveness of the countries concerned and hence on their current accounts. Thus, the attack on the United Kingdom in September 1992 and sterling's subsequent depreciation are said to have damaged the international competitiveness of the Republic of Ireland, for which the United Kingdom is the single most

important export market, and to have provoked the attack on the punt at the beginning of 1993. Finland's devaluation in August 1992 was widely regarded as having had negative repercussions for Sweden, not so much because of direct trade between the two countries but because their exporters competed in the same third markets. Attacks on Spain in 1992–1993 and the depreciation of the peseta are said to have damaged the international competitiveness of Portugal, which relies heavily on the Spanish export market, and to have provoked an attack on the escudo despite the virtual absence of imbalances in domestic fundamentals.

Trade links may not be the only channel of transmission, of course. It is difficult to argue, for example, that the Tequila Effect—the pressure applied to currencies in Latin America and East Asia following the crash of the Mexican peso in 1994—stemmed from strong trade links between Mexico and the other countries concerned. Argentina and Brazil may have traded extensively with Mexico, but the same was not true of Hong Kong, Malaysia, and Thailand. Rather than focusing on trade links, commentators pointed to similarities across countries in macroeconomic policies and conditions.

Thus, one can imagine a second model focusing on co-movements in macroeconomic policies and conditions in the countries subject to attack. Evidence that certain market participants are skeptical about the stability of a currency may lead their colleagues to suspect that they are also skeptical about the prospects for the currencies of other countries in a similar macroeconomic position. Difficulties in one country pursuing a program of exchange rate–based stabilization, for example, might lead currency traders to revise their assessment of the likelihood that other countries pursuing this macroeconomic strategy will carry it off. An attack on one currency and the issuing government's response to the pressure may thus provide new information relevant for expectations of how other governments will respond if placed in a similar position. For example, evidence that a country with an unusually high unemployment rate succumbed to a speculative attack and abandoned its currency peg out of reluctance to raise interest rates if that meant further aggravating unemployment might lead investors to revise their expectations of the likelihood that other countries in similar positions would be prepared to do the same.

These two interpretations emphasizing different channels of international transmission of currency crises have different empirical im-

plications. The interpretation emphasizing trade links suggests that currency crises will spread contagiously among countries that trade disproportionately with one another. The one emphasizing economic and political commonalities suggests that instability will instead infect countries in broadly similar economic and political positions.

To compare these different channels of contagion transmission, we weight crises elsewhere in the world by country characteristics intended to capture the extent to which contagion is transmitted through specific channels. We compare two different weighting schemes. First, on the assumption that countries that trade disproportionately with one another are prone to contagion operating through the competitiveness effects of crisis-induced exchange rate changes, we weight crises in neighboring countries by the importance of trade with those countries. Second, on the assumption that crises and governments' reactions to them lead investors to revise their expectations of officials' resolve in similar ways with respect to countries in broadly similar macroeconomic positions, we weight crises by the similarity of macroeconomic policies and outcomes.

The results provide further support for the hypothesis that speculative attacks in foreign exchange markets spread contagiously across countries. Our trade-weighted measure of crises elsewhere in the world is important economically as well as being significant statistically at high levels of confidence; it is robust to a variety of sensitivity tests. Our macro-weighted measure of crises does not display the same level of significance. Although there is always the possibility that our empirical measures of macroeconomic contagion are not capturing these phenomena adequately, we are inclined to interpret these results as suggesting that trade, rather than revisions of expectations based on macroeconomic factors, has been the dominant channel of transmission for contagious currency crises for the bulk of the sample period.

Importantly, the trade- and macro-weighted specifications both outperform the naive model of contagion when they are included one at a time in alternative specifications. This supports the interpretation of our results in terms of contagion rather than omitted environmental variables. It is nevertheless appropriate to err on the side of caution, especially because our unweighted measure remains significant in the presence of the weighted variables.

The remainder of this chapter is organized as follows. Section 6.2 provides an overview of the theoretical literature on speculative

attacks in foreign exchange markets, with special reference to contagion. Section 6.3 reviews related empirical studies. In Section 6.4, we present new evidence on contagion, and Section 6.5 we analyze various channels of transmission for the contagion effect. Section 6.6 concludes.

## 6.2 Contagion

Relatively little theoretical work has analyzed the conditions under which currency crises can spread contagiously across countries.

Perhaps the first systematic theoretical treatment of this question was by Gerlach and Smets (1995). Inspired by the links between the fall of the Finnish markka in 1992 and the subsequent attack on the Swedish krona, they consider two countries linked together by trade in merchandise and financial assets. In their model, a successful attack on one exchange rate leads to its real depreciation, which enhances the competitiveness of the country's merchandise exports. This produces a trade deficit in the second country, a gradual decline in the international reserves of its central bank, and ultimately an attack on its currency. A second channel for contagious transmission is the impact of crisis and depreciation in the first country on the import prices and the overall price level in the second. Post-crisis real depreciation in the first country reduces import prices in the second. In turn, this reduces its consumer price index and the demand for money by its residents. Their efforts to swap domestic currency for foreign exchange then depletes the central bank's foreign reserves. This may shift the second economy from a no-attack equilibrium, in which reserves more than suffice to absorb the volume of prospective speculative sales and in which there consequently exist no grounds for a speculative attack, to an equilibrium in which an attack can succeed and in which speculators thus have an incentive to launch it.[1]

Buiter et al. (1998) use an escape-clause model of exchange rate policy to analyze the spread of currency crises in a system of $N + 1$ countries, N of which (denoted the "periphery") peg to the remaining country (the "center"). The center is more risk averse than the others and is hence unwilling to pursue a cooperative monetary policy designed to stabilize exchange rates. A negative shock to the center that leads it to raise interest rates then induces the members of the periphery to reconsider their currency-pegging policy. If the

members of the periphery cooperate, they may find it collectively optimal to leave the system—an extreme case of contagion. More generally, some subset of peripheral countries—those with the least tolerance for high interest rates—will find it optimal to leave the system under these circumstances, and contagion will be limited to this subset. Importantly, however, their decision to leave stabilizes the currency pegs of the remaining members of the system, because monetary expansion and currency depreciation by some members of the periphery provide an incentive for the center country, which now finds itself with an increasingly overvalued exchange rate, to relax its monetary stance, relieving the pressure on the rest of the periphery. In this model, contagion is selective: the shock to the center spills over negatively to some members of the periphery but positively to others.

Goldfajn and Valdés (1995) provide another analysis of contagious currency crises. They focus on the role of illiquidity in financial markets. A key feature of their model is the introduction of financial intermediaries. These authors show how, in the presence of such intermediaries, small disturbances can provoke large-scale runs on a currency. Intermediaries supply liquid assets to foreigners unwilling to commit to long-term investments; that is, they provide maturity-transformation services. By offering attractive terms on liquid deposits, their presence augments the volume of capital inflows. But when, for exogenous reasons, foreign investors withdraw their deposits, intermediaries unable to costlessly liquidate their assets face the risk of failure. Hence, a bank run can produce a self-fulfilling banking crisis (Diamond and Dibvig 1983), in the same way that a run on the currency can provoke a self-fulfilling exchange rate crisis. Moreover, the run on intermediaries can spill over into a run on the currency as foreign investors withdraw their deposits and convert them into foreign exchange. These crises can spread contagiously to other countries when international investors encountering liquidity difficulties as a result of the banking crisis in one country respond by liquidating their positions in other national markets.

A related literature concerned with information, although not directly concerned with contagion in foreign exchange markets, provides a complementary approach to the issue. Shiller (1995) provides a model in which financial market participants share access to much of the same information (e.g., what appears on Reuters screens) but interpret and process it in different ways. What they make of

their shared information depends on their own experience, which in turn is shaped by local conditions that only they experience. Consequently, one market's reaction to a piece of new information can provide a signal about its global implications, and it may suggest to traders in other markets how they too should react. The fact that one market draws dramatic conclusions from some information may overcome local culture in other markets and lead to a revision of expectations (an "information cascade"). In the present context, one can see how this effect could lead to an attack on one exchange rate and prompt traders in other currency markets to attack those exchange rates as well.

A similar analysis, also based on informational issues, is that of Caplin and Leahy (1995). In their model, financial market participants expect a crisis but have diffuse priors over its timing. It is costly for traders to take a position in advance of a crisis, moving too early. Each trader is unsure whether others share his or her belief that a crisis will eventually occur. They exchange "cheap talk" amongst themselves but draw inferences only from positions taken in the market. The result is normal market conditions ("business as usual") with no hint of crisis until it suddenly erupts. Once it occurs, however, market participants all claim that they knew the crisis was about to happen and that they were readying themselves for it (they display "wisdom after the fact"). This model can give rise to contagion insofar as a crisis somewhere in the world confirms individually held suspicions in other markets.[2]

## 6.3 Empirical Studies of Speculative Attacks, Contagious and Otherwise

Although the literature on crises in foreign exchange markets is replete with models that highlight the motives for and dynamics of speculative attacks, the process of systematically testing the predictions of those theories has barely begun. We put the emphasis in this last sentence on the word, "systematically." Otherwise convincing studies of currency crises frequently assemble evidence from biased samples of episodes. It is not just that they consider a selective sample of episodes in which currency pegs collapsed without confirming that the collapses they analyze are representative of the underlying population. It is that episodes in which pegs were abandoned are themselves unrepresentative of the population of

speculative attacks. Some pegs are abandoned without a speculative attack. Others are repelled. Thus, studies such as Dornbusch, Goldfajn, and Valdés 1995 and Krugman 1996, although informative about the characteristics of the episodes they consider, do not provide a representative characterization of speculative attacks.

We (Eichengreen, Rose, and Wyplosz 1996; see chapter 5) attempt to analyze currency crises systematically by constructing a measure of speculative attacks that excludes devaluations and flotations not taken in a climate of crisis and includes unsuccessful attacks. We compare these with actual devaluations and other changes in exchange rate arrangements. Our measure of crises is a weighted average of changes in the exchange rate, changes in international reserves that can be paid out in response to speculative pressure, and changes in the interest differential because interest rates can be raised to fend off an attack. We analyze the experience of some two dozen OECD economies since 1959.

Our findings on the causes and consequences of devaluations and revaluations are consistent with the predictions of mainstream models. Countries that devalue experience problems of external balance in the period leading up to the event. Their trade deficits and reserve losses are associated with relatively expansionary monetary policies. In addition, the period leading up to devaluations is characterized by problems of internal balance as reflected in relatively high levels of unemployment; the expansionary monetary stance in these countires may be adopted partly in response to these domestic concerns. Broadly speaking, revaluations are mirror images of devaluations.[3] Other events in foreign exchange markets, in contrast, resist generalization. For example, transitions between exchange rate regimes (such as movements from fixed to floating rates) are largely unpredictable.

We find that countries susceptible to crises are those whose governments have pursued accommodating monetary policies leading to high inflation and reserve losses, generally in response to deteriorating conditions on the unemployment front. Initially, the current account moves into deficit and the capital account worsens as the crises nears. Countries that take last-minute steps to defend the currency by significantly reducing the rate of money growth sometimes succeed in defending the rate. Those that retrench less dramatically may still be forced to capitulate but often do so without provoking a major crisis. In contrast, governments that rely on sterilized inter-

vention to the exclusion of more fundamental policy adjustments are generally unable to avoid full-blown currency crises.

A few other studies have adopted this approach. For example, Moreno (1995) analyzes crises in the Pacific Basin economies from 1980 to 1994. He finds that periods of speculative pressure tend to be associated with large budget deficits and rapid rates of domestic credit growth. There is some evidence that episodes of pressure arise when slow growth and relatively high inflation make it difficult for the government to maintain a stable exchange rate. In contrast, there is no evidence that indicators of external balance differ between crises and tranquil periods.

Kaminsky and Reinhart (1996) consider speculative attacks on currencies and banking crises, analyzing the connections between the two. They focus on 20 countries in Asia, Europe, Latin America, and the Middle East that experienced banking difficulties in the period 1970–1995. Their index of currency crises is constructed as a weighted average of exchange rate changes and reserve changes (because the relevant interest rate data are lacking for some countries). In their sample, crises tend to be preceded by declining economic activity, weakening export sectors, falling stock markets, and high real interest rates. In addition, crises are preceded by accelerating money growth and rapid rates of growth of the liabilities of the banking system. Banking crises are leading indicators of currency crises, but there are few instances where currency crises predict banking crises.

By comparison, empirical analyses of contagion are few. Typical of the literature are studies that provide informal comparisons of small groups of countries. Burki and Edwards (1996) contrast the experiences of Argentina, Brazil, and Venezuela in the wake of the Mexican crisis with those of Chile and Colombia, suggesting that contagion, although present, was selective. Calvo (1996) provides a series of comparisons between Mexico and other countries in an effort to understand why some countries were more susceptible than others to the Tequila Effect.

We are aware of three statistical studies of contagion. Calvo and Reinhard (1995) report evidence of contagion in an econometric model in which capital flows to four small Latin American countries depend on their standard determinants but also on a contagion proxy, namely, capital flows to four large Latin American countries. Their results can be questioned, however, on the grounds that the

flow of capital to neighboring countries is a less than ideal proxy for contagion and that the sample of countries is not random.

Schmukler and Frankel (1996) model contagion using data on closed-end country funds. Although their dependent variable, the level of stock prices, is different from the one with which we are concerned, the two are linked insofar as the rise in domestic interest rates needed to fend off an attack on the currency will tend to depress equity prices. Their evidence suggests that investors differentiated among countries to a greater extent after the 1994 Mexican crisis than after its 1982 predecessor. In the short run, a drop in Mexican prices tends to induce sell-offs in other markets motivated by the desire to raise cash; although there is evidence of contagion in Latin America in the long run as well, the long-run effect of a Mexican sell-off on Asian markets is positive.[4]

Sachs, Tornell, and Velasco (1996) analyzed the period immediately after the crash of the Mexican peso in December 1994, and found that the countries hit by the Tequila Effect had experienced lending booms, overvalued real exchange rates, and low reserves. Their sample is far from random (both in terms of time and country choice); in addition, they do not distinguish between attacks that are unwarranted by fundamentals but are triggered by macroeconomic similarity, and attacks warranted by macroeconomic factors.

## 6.4 Analyzing Contagion

In this section, we test for the existence of contagious currency crises. The contagion effect with which we are concerned can be thought of as an increase in the probability of a speculative attack on the domestic currency that stems not from domestic fundamentals such as money and output but from the existence of a (not necessarily successful) speculative attack elsewhere in the world.

We analyze a panel of quarterly macroeconomic and political data covering 20 industrial countries from 1959 through 1993 (a total of 2,800 observations). We pose the following question: Is the incidence of a currency crisis in a particular country at a given point in time (e.g., France in the third quarter of 1992) correlated with the incidence of a currency crisis in a different country (e.g., the United Kingdom) at the same point in time, even after taking into account the effects of current and lagged domestic macroeconomic and political influences? The finding of a strong positive partial correlation

is consistent with the existence of contagion, because it implies that speculative attacks are temporally correlated even after conditioning on domestic factors. Still, it is difficult to interpret this as definitive proof of contagion, because it may in fact reflect not contagion but an unmeasured common shock to economic fundamentals striking a number of countries simultaneously, rather than actual spillovers from one country to another. For this reason, we continue, in the next section, to consider alternative channels of transmitting this contagion effect.

**Measuring Currency Crises**

The first issue that must be confronted is how to determine when a speculative attack has occurred. Having addressed this issue in chapter 5, we provide only a summary of our thinking here.

Currency crises cannot be identified with actual devaluations, revaluations, and instances in which the currency is floated, for two reasons.[5] First, not all speculative attacks are successful. The currency may be supported through the expenditure of reserves by the central bank or by foreign central banks and governments.[6] Alternatively, the authorities may repel attacks by raising interest rates and adopting other austerity policies. Further, many realignments are taken deliberately in tranquil periods, possibly to preclude future attacks.

Ideally, an index of speculative pressure would be obtained by employing a structural model of exchange rate determination, from which one would derive the excess demand for foreign exchange. In practice, however, empirical models linking macroeconomic variables to the exchange rate have little explanatory power at short and intermediate horizons.[7] In the absence of an empirically valid macro-model, we resort to an ad hoc approach, the intuition for which is derived from the well-known model of exchange market pressure due to Girton and Roper (1977). The idea is that an excess demand for foreign exchange can be met through several (not mutually exclusive) channels. If the attack is successful, depreciation or devaluation occurs. But the monetary authorities may instead accommodate the pressure by running down their international reserves or deter the attack by raising interest rates. As a measure of speculative pressure, we therefore construct a weighted average of exchange rate changes, reserve changes, and interest rate changes. All of these variables are measured relative to those prevailing in

Germany, the reference country. Germany is a logical choice for a center country, because it has had a strong currency throughout the post-war era, and has been a critical member of all important OECD fixed exchange rate systems (including the Bretton Woods System, the EMS, and the "Snake" preceding the EMS).[8] Our index of exchange market pressure is:

$$\mathrm{EMP}_{i,t} \equiv [(\alpha \%\Delta \mathrm{e}_{i,t}) + (\beta \Delta(i_{i,t} - i_{G,t})) - (\gamma(\%\Delta r_{i,t} - \%\Delta r_{G,t}))]$$

where: $e_{i,t}$ denotes the price of a DM in $i$'s currency at time $t$; $i$ denotes the short-term interest rate; $i_G$ denotes the short-term German interest rate; $r$ denotes the ratio of international reserves;[9] and $\alpha$, $\beta$, and $\gamma$ are weights.

We define crises as extreme values of this index:

$$\begin{aligned} \mathrm{Crisis}_{i,t} &= 1 \quad \text{if } \mathrm{EMP}_{i,t} > 1.5\sigma_{\mathrm{EMP}} + \mu_{\mathrm{EMP}} \\ &= 0 \quad \text{otherwise} \end{aligned}$$

where: $\mu_{\mathrm{EMP}}$ and $\sigma_{\mathrm{EMP}}$ are the sample mean and standard deviation of EMP, respectively.

A critical step is weighting the three components of the index. An obvious option is an unweighted average, which has the advantage of simplicity. But because the volatility of reserves, exchange rates, and interest differentials is very different, we instead weight the components so as to equalize the volatilities of the three components, thereby preventing any one of them from dominating the index. Below, we then check the sensitivity of our results to this scheme.

We identify quarters in which our index of speculative pressure is at least 1.5 standard deviations above the sample mean as instances of speculative attacks (although we again test for sensitivity with respect to this arbitrarily chosen threshold). To avoid counting the same crisis more than once, we exclude the later observation(s) when two (or more) crises occur in successive quarters. Thus, our "exclusion window" is one quarter (though again we vary this parameter). We refer to our non-crisis observations as "tranquil" periods and use these as the control group.[10]

Our choice of a one quarter exclusion window (so that each country contributes no more than two observations annually) and a 1.5 standard deviation outlier threshold produce a sample of 77 crises and 1,179 periods of tranquility.[11]

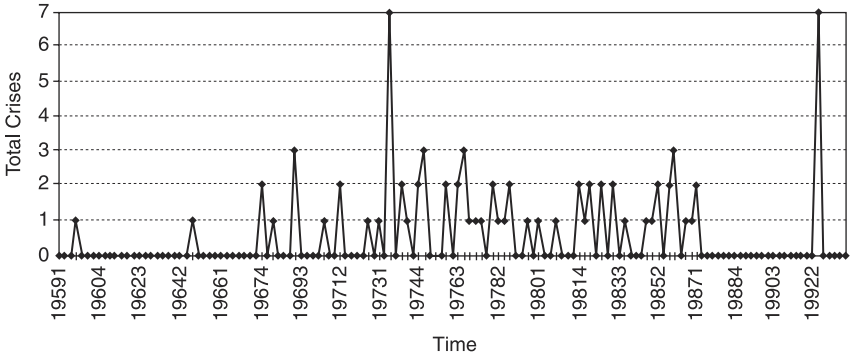


**Figure 6.1**
Crises per Quarter

The crisis observations are not randomly distributed. There are clusters of speculative attacks in 1973 (at the time of the breakup of the Bretton Woods System) and in 1992 (at the time of the European currency crisis), separated by long periods of tranquility. Figure 6.1 provides a time-series plot of the number of crises in each quarter.

## The Data

Most of the financial and macroeconomic variables are taken from the CD-ROM version of the International Monetary Fund's *International Financial Statistics* (IFS). The data set is quarterly, spanning 1959 through 1993 for 20 industrial countries.[12] It has been checked for transcription and other errors and corrected. Most of the variables are transformed into differential percentage changes by taking differences between domestic and German annualized fourth-differences of natural logarithms and multiplying by a hundred.

We employ the following variables: total non-gold international reserves (IFS line 11d); period-average exchange rates (line rf); short-term interest rates (money market rates [line 60b] where possible, discount rates otherwise [line 60]); exports and imports (both measured in dollars, lines 70d and 71d respectively); the current account (line 77a.d, converted to domestic currency) and the central government budget position (line 80), both measured as percentages of nominal GDP (frequently line 99a); long-term government bond yields (line 61); a nominal stock market index (line 62, which sets 1990 = 100); domestic credit (line 32); M1 (line 34); M2 (line 35+ M1);

the CPI (line 64); and real GDP (usually line 99a.r). We also use the real effective exchange rate as a measure of competitiveness (line reu, which uses normalized relative unit labor costs), through this variable is only available from 1975.

We also utilize a number of labor market indicators not included in IFS. Data on total employment, the unemployment rate, and the business sector wage rate were drawn from OECD's *Main Economic Indicators*. To capture political conditions, we construct indicators of governmental electoral victories and defeats, using Keesing's *Record of World Events* and Banks's *Political Handbook of the World*.

Finally, we use a list of exchange market events (devaluations, flotations, changes in exchange rate band width, and so forth). These are gleaned from the IMF's annual report on *Exchange Arrangements and Exchange Restrictions*. These volumes also provide us the basis for constructing dummy variables indicating the presence of capital controls.

The available data on international reserves are less than ideal for a number of well-known reasons. Off-balance sheet transactions, third-party intervention, stand-by credits, and foreign liabilities, all of which are relevant for foreign exchange intervention, tend to be omitted or incompletely reported. In addition, short-duration attacks (especially unsuccessful ones) may not be evident in quarterly data. Finally, subtle changes in actual or anticipated capital controls, although difficult to measure, may in fact be quite important, especially when countries are mounting defenses against speculative attacks.

**Statistical Analysis**

We can now test for the existence of contagion. We test the null hypothesis that the incidence of currency crises elsewhere in the world at the same point in time does not affect the probability of a speculative attack on the domestic currency. Although our model attempts to control for the influence of a wide range of current and lagged macroeconomic variables, it is non-structural. This is one reason for viewing our evidence (which turns out to be inconsistent with the null at standard confidence levels) as consistent with, but not definitive proof of, contagion.

We estimate a binary probit model, linking our dependent variable (an indicator variable that takes on a value of unity for a speculative attack and zero otherwise) to our controls with maximum likelihood, including additional regressors to capture the effects of

macroeconomic and political influences that affect crisis incidence. We cast our net as widely as possible, including: (1) the presence of capital controls; (2) electoral victory or defeat of the government; (3) the growth of domestic credit; (4) inflation; (5) output growth; (6) employment growth; (7) the unemployment rate; (8) the central government budget surplus (+) or deficit (−), expressed as a percentage of GDP; and (9) the current account surplus/deficit (again, a percentage of GDP). All these variables are included as deviations from German values.

Because the literature on currency crises does not provide much guidance about the time horizon for these influences, we consider a range of plausible alternatives. At the short end of the spectrum, we allow only contemporary influences to affect the probability of a crisis. We then allow for explanatory variables lagged up to two quarters, one year, and two years. We allow these lagged influences to operate jointly with the contemporaneous variables or by themselves (as would be appropriate if lags in data collection or processing preclude the consideration of contemporaneous developments). To conserve degrees of freedom, we model the lags using moving averages. Rather than including the first and second lags of inflation separately, for example, we include only a single term that is the average inflation differential in the two preceding quarters.

This leads us to estimate the following model:

$$\text{Crisis}_{i,t} = \omega \text{D}(\text{Crisis}_{j,t}) + \lambda \text{I}(\text{L})_{i,t} + \varepsilon_{i,t} \quad \text{where}$$

$$\text{D}(\text{Crisis}_{j,t}) = 1 \quad \text{if Crisis}_{j,t} = 1, \text{ for any } j \neq i$$

$$= 0 \quad \text{otherwise}$$

where: $\text{I}(\text{L})_{i,t}$ is an information set of ten contemporaneous and/or lagged control regressors; $\lambda$ is the corresponding vector of nuisance coefficients; and $\varepsilon$ is a normally distributed disturbance representing omitted influences that affect the probability of a currency crisis.

The null of interest is Ho: $\omega = 0$. We interpret evidence of the null as being inconsistent with a contagion effect.

**Results**

Table 6.1 presents benchmark results. Its five columns correspond to five assumptions about the appropriate time horizon for the regressors. Because probit coefficients are not easily interpretable, we report the effects of one-unit (percentage point) changes in the

**Table 6.1**
Probit Results

| | Contemporaneous | MA of contemporaneous + 2 lags | MA of 2 lags | MA of contemporaneous + 4 lags | MA of contemporaneous + 8 lags |
|---|---|---|---|---|---|
| Crisis elsewhere | 7.45 (3.8) | 8.33 (4.0) | 8.14 (4.3) | 8.72 (4.0) | 8.83 (3.8) |
| Capital controls | −1.66 (.7) | .22 (.1) | .66 (.3) | .48 (.2) | 1.24 (.4) |
| Government victory | −4.24 (1.0) | −1.71 (.3) | −.60 (.2) | 5.30 (1.6) | −.45 (.2) |
| Government loss | −3.45 (.9) | −7.44 (1.3) | −3.34 (1.2) | 2.49 (.8) | −.63 (.2) |
| Credit growth | .19 (1.8) | .11 (.8) | .10 (1.2) | −.00 (.0) | −.09 (.4) |
| Inflation rate | .75 (3.5) | .57 (2.4) | .40 (1.9) | .59 (2.1) | .64 (1.8) |
| Output growth | .21 (.6) | −.39 (.9) | −.50 (1.4) | −.74 (1.3) | −.36 (.4) |
| Employment growth | .37 (.7) | .86 (1.5) | .78 (1.5) | 1.08 (1.6) | 1.30 (1.6) |
| Unemployment rate | .86 (3.0) | .96 (3.2) | .92 (3.5) | 1.04 (3.3) | 1.19 (3.4) |
| Budget position/GDP | .47 (1.9) | .41 (1.6) | .35 (1.5) | .46 (1.6) | .57 (1.8) |
| Current account/GDP | −.23 (.8) | −.36 (1.1) | −.51 (1.9) | −.42 (1.2) | −.34 (.8) |
| Number of observations | 645 | 626 | 703 | 608 | 572 |
| McFadden's $R^2$ | .15 | .12 | .13 | .12 | .10 |
| Joint test for slopes $\chi^2(11)$ | 55 | 46 | 53 | 43 | 36 |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated z-statistics (for hypothesis of no effect). Model estimated with a constant, by maximum likelihood.

regressors on the probability of a crisis (also expressed in percentage points), evaluated at the mean of the data. We tabulate the associated z-statistics, which test the null of no effect. Statistics that are inconsistent with the null at the 5 percent level are printed in bold. Diagnostics are reported at the foot of the table, including a test for the joint significance of all the coefficients.

The results are consistent with the existence of a contagion effect that is economically important and statistically significant. A speculative attack elsewhere in the world is associated with an increased probability of a domestic currency crisis of around eight percentage points.

The impact of the other regressors is not dramatic, though a few effects are worth noting. For example, higher inflation and unemployment are associated with increases in the odds of an attack. Generally speaking, however, the absence of robust partial correlations provides grounds for caution against over-interpreting the results.

Table 6.2 reports sensitivity analysis. We consider six perturbations of our basic model. First, we change the definition of a speculative attack by raising the outlier threshold on our exchange market pressure index to two standard deviations (from one and a half) and by widening the exclusion band width to two quarters (from one). This marginally increases the magnitude of the contagion variable, although the change is not statistically significant. Second, we change the definition of a speculative attack by doubling the weight on actual exchange rate changes in our tripartite index. This has no discernible impact on the coefficient on the contagion variable. Third, we drop post-1978 data so as to focus on the pre-EMS period. This increases the magnitude of the contagion coefficient further. Fourth, we limit the sample to EMS observations; here we get strikingly large contagion effects, with slope derivatives almost three times the size of the benchmark result in the first column of table 6.1. Fifth, we employ only observations where capital controls are present. Here, the coefficient on the contagion variable is indistinguishable from the benchmark result. Finally, we substitute for crises elsewhere in the world, actual events elsewhere in the world (e.g., actual devaluations or transitions to floating rates), a perturbation that leaves the baseline results relatively unaffected.

Our sensitivity tests confirm a key finding of this chapter, namely, that a speculative attack elsewhere in the world seems to significantly

**Table 6.2**
Sensitivity Analysis

| | 2 quarter window, 2 threshold | Increased weight on exchange rates | Pre 1979 | EMS | Only immobile capital | With contemporaneous events |
|---|---|---|---|---|---|---|
| Crisis elsewhere | 9.38 (3.5) | 7.42 (3.3) | 12.31 (2.8) | 19.90 (3.4) | 7.88 (2.9) | 6.99 (3.4) |
| Capital controls | 2.43 (1.1) | −.50 (.2) | 5.41 (.8) | 10.05 (2.0) | N/A | .18 (.1) |
| Government victory | 5.67 (2.0) | 4.48 (.9) | −9.52 (.8) | 2.22 (.3) | −1.64 (.2) | −1.13 (.2) |
| Government loss | −1.74 (.4) | −1.90 (.3) | −14.57 (1.2) | −1.57 (.3) | −4.71 (.7) | −6.60 (1.2) |
| Credit growth | .09 (.8) | .09 (.6) | .34 (1.3) | .13 (.7) | .22 (1.2) | .14 (1.0) |
| Inflation rate | .26 (1.4) | .47 (1.7) | .17 (.4) | .01 (.0) | .59 (2.0) | .58 (2.4) |
| Output growth | .19 (.8) | −.07 (.1) | −.97 (1.1) | −.70 (.9) | −.68 (1.2) | −.40 (.9) |
| Employment growth | 1.27 (2.6) | .52 (.8) | −.12 (.1) | 1.51 (1.1) | .37 (.5) | .87 (1.5) |
| Unemployment rate | .19 (.8) | .45 (1.4) | 4.06 (3.0) | 1.44 (1.7) | .91 (2.4) | .99 (3.2) |
| Budget position/GDP | .05 (.3) | .47 (1.7) | 1.16 (1.6) | −.10 (.3) | .38 (1.1) | .40 (1.5) |
| Current account/GDP | −.47 (1.9) | −.89 (2.6) | −1.48 (1.7) | .08 (.2) | −.23 (.5) | −.36 (1.1) |
| Number of observations | 326 | 623 | 233 | 224 | 425 | 626 |
| McFadden's $R^2$ | .32 | .09 | .17 | .21 | .11 | .12 |
| Joint test for slopes $\chi^2(11)$ | 55 | 36 | 31 | 28 | 28 | 45 |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated *z*-statistics (for hypothesis of no effect).
Model estimated with a constant, by maximum likelihood.
All regressors are expressed as equally weighted moving averages of contemporaneous and two quarterly lags.

increase the odds of an attack on the domestic currency. But they do not allow us to distinguish among various theories of contagion. For example, the relatively large contagion coefficient for the EMS subsample and the fact that events matter as much as crises point to the operation of the competitiveness channel modeled by Gerlach and Smets (1995) and Andersen (1994). But these results are also compatible with theories that emphasize the information-coordination effect of exchange market events.

We have also performed a number of further robustness checks that are not reported here. These include adding a lagged contagion term, which represents the incidence of a currency crisis (in a different country) in the preceding quarter (as opposed to contemporaneously); adding cross products of the contagion term and the remaining regressors; adding money growth, long-term interest rates, wages, exports, and imports to the standard set of explanatory variables; using Huber-White covariance estimators instead of standard ones; and separating out the effects of contemporaneous and lagged regressors. Again, none of these tests disturbs our central finding that speculative attacks in other countries significantly increase the odds of a currency crisis.[13]

A limitation of this approach is that it does not allow us to distinguish the effects of crises in neighboring countries (contagion per se) from the effects of global shocks (unobserved environmental factors). This situation is familiar to epidemologists, for whom the problem is one of determining whether the spread of a virus reflects the contagious nature of the germ or the disease-conducive nature of the environment. Thus, our results could be the result of shocks to an unmeasured common fundamental. We need therefore to place additional structure on the problem.

## 6.5 Channels for Contagion

Having established evidence of contagion, we now explore two alternative channels of transmission for this effect.

### Methodology

We begin by extending our estimation model slightly to:

$$\text{Crisis}_{i,t} = \omega \text{W}_{ij,t}(\text{Crisis}_{j,t}) + \lambda \text{I(L)}_{i,t} + \varepsilon_{i,t}$$

$$W_{ij,t}(\text{Crisis}_{j,t}) = w_{ij,t} \quad \text{if Crisis}_{j,t} = 1, \text{ for any } j \neq i$$
$$= 0 \quad \text{otherwise}$$

where: $w_{ij,t}$ is a weight that corresponds to the "relevance" at time $t$ of country $j$ for country $i$. The null hypothesis of interest to us is Ho: $\omega = 0$. We interpret this evidence against the null as being consistent with the existence of a contagion effect.[14]

Our first weighting scheme quantifies the ties between countries $i$ and $j$ using trade data. We use the Multilateral Exchange Rate Model (MERM) weights that the International Monetary Fund computed in the course of constructing its real multilateral effective exchange rates.[15] The IMF's methodology derives the weight for $j$ in country $i$'s effective exchange rate as a convex combination of bilateral import weights and export weights, using trade in manufacturing. The weights use unit labor costs, widely considered to be reliable indicators of international competitiveness. The weights are time-invariant. They have been computed for our industrial countries by the IMF, and were created in October 1994.

Thus, our trade-weighting scheme is:

$$w_{ij,t} = \text{EER}_{ij} \quad \text{for any } j \neq i$$

where $\text{EER}_{ij}$ is the weight for country $j$ in country $i$'s IMF effective exchange rate index.

Our second weighting scheme is intended to capture macroeconomic similarities whose existence is a potential channel for contagion. We think of two countries as being "similar" if they display similar macroeconomic conditions—for example, if they have similar rates of domestic credit growth. We then test the hypothesis that an attack on the currency of country $j$ affects the probability of an attack on the currency of country $i$.

In practice, implementing this notion depends on being able to measure "similarity." We concentrate on seven focus variables that appear to be the subject of considerable attention among participants in foreign exchange markets: (1) domestic credit growth (as always, relative to Germany); (2) money growth; (3) CPI inflation; (4) output growth; (5) the unemployment rate; (6) the current account (as always, in nominal GDP percentage points); and (7) the government budget deficit.[16] We multiply the rate of GDP growth, the current account, and the government budget by minus one in order to allow

for easier comparison with the other four variables; this means that higher values are associated with greater risk. We standardize the variables by subtracting sample means and dividing the result by the sample standard deviation. In practice, we standardize in two ways: we take a country-specific approach which compares a country only with itself, so that, e.g., the average rate of growth of French domestic credit is subtracted from the raw series and then divided by the sample French credit growth standard deviation; alternatively, we take a time-specific approach in which the observations at one point in time are compared with observations for all 20 countries at that same point in time. The first approach is appropriate if currency speculators compare credit growth in a country in a quarter to that country's own past credit growth; the second is relevant if speculators compare the country's credit growth to that typical of other countries in the same quarter.

Having standardized the variables, we compute the macro weights as follows for the "country specific" and "time-specific" standardizations, respectively:

$$w_{ij,t} = \Sigma_j(1 - \{\Phi[(x_{jt} - \mu_i)/\sigma_i] - \Phi[(x_{it} - \mu_i)/\sigma_i]\}) \quad \text{for any } j \neq i, \text{ and}$$

$$w_{ij,t} = \Sigma_j(1 - \{\Phi[(x_{jt} - \mu_t)/\sigma_t] - \Phi[(x_{it} - \mu_t)/\sigma_t]\}) \quad \text{for any } j \neq i$$

where $\Phi(.)$ is the cumulative distribution function of the standardized normal functions, $\mu_i(\mu_t)$ is the country-specific (time-specific) sample average of variable $x$, $\sigma_i(\sigma_t)$ is the country-specific (time-specific) standard deviation of variable $x$, and the $x$'s are the seven macroeconomic focus variables.

This specification implies that if country $j$ is attacked at time $t$ and it is similar to country $i$, in the sense of having similar standardized growth rates of the relevant macroeconomic variables, then it receives a high weight in the contagion variable. If $j$ and $i$ have identical (standardized) domestic credit growth rates, the weight is unity; the more dissimilar are the growth rates (being distant in terms of the cumulative distribution), the lower is the weight. If $i$'s credit growth is at the extreme lower end of $i$'s cumulative distribution and $j$'s is at its upper end, then the weight is zero.

Because we have two standardizing techniques (country- and time-specific) and seven focus variables, we obtain 14 sets of macroeconomic contagion weights.

**Trade Weights**

Table 6.3 substitutes our first set of weights—those based on the IMF's MERM weights and intended to capture bilateral trade linkages—for the unweighted contagion variable.

Trade weighting the contagion variable improves the fit of the equation. In contrast to the unweighted results in table 6.1, however, it is not easy to interpret the size of the contagion variable, because this is no longer an indicator variable but is instead the product of a dummy and a trade weight. Nevertheless, the positive sign of the coefficient on the contagion variable indicates that an attack elsewhere in the world still increases the probability of an attack by a statistically significant amount. The level of statistical significance for the contagion effect is higher than in table 6.1.

We interpret this evidence as supporting the hypothesis that currency crises are transmitted, at least in part, via bilateral trade ties. It leads us to the belief that there is contagion, rather than simply a shock to an unmeasured fundamental common to a number of countries.

**Macro Weights**

In table 6.4, we present results using macro weights. We substitute all seven macro-weighted contagion variables for the trade-weighted measure.

The macro-weighted contagion proxies are generally insignificant at conventional statistical levels when considered individually.[17] However, the seven variables are jointly significant at high confidence levels (the relevant chi-square test statistic, labeled "Contagion Test," is at the foot of the table). This suggests collinearity among the seven contagion variables, as one would expect.

Table 6.5 provides direct evidence on the extent of this collinearity. It reports coefficients on the macro-contagion variables when the latter are included in the equation one by one. (The coefficient estimates for the political and macroeconomic fundamentals are not reported for ease of presentation.) As expected, the estimated coefficients are positive, indicating that a currency crisis in a country that is similar, in the relevant macroeconomic sense, raises the probability of an attack on the domestic currency. The coefficients are statistically significant at standard confidence levels and do not vary much across macroeconomic focus variables, conditioning sets, or standardization techniques.

**Table 6.3**
Probit Results with Contagion Variable Weighted by International Trade

| | Contem-poraneous | MA of contem + 2 lags | MA of 2 lags | MA of contem + 4 lags | MA of contem + 8 lags |
|---|---|---|---|---|---|
| Crisis elsewhere | .44 (5.0) | .66 (5.1) | .61 (5.3) | .72 (5.2) | .74 (5.2) |
| Capital controls | −1.8 (.8) | −.77 (.3) | −.06 (.0) | −.76 (.3) | .16 (.1) |
| Government victory | −3.9 (.9) | .59 (.1) | .39 (.1) | 3.7 (1.1) | −2.0 (.7) |
| Government loss | −2.0 (.5) | −6.9 (1.1) | −3.5 (1.2) | 3.0 (.9) | .43 (.2) |
| Credit growth | .17 (1.6) | .05 (.3) | .09 (1.1) | −.09 (.5) | −.10 (.5) |
| Inflation rate | .82 (3.8) | .73 (3.0) | .53 (2.6) | .81 (2.8) | .79 (2.3) |
| Output growth | .10 (.3) | −.39 (.8) | −.48 (1.3) | −.49 (.8) | −.21 (.3) |
| Employment growth | .44 (.8) | .99 (1.6) | .95 (1.8) | 1.12 (1.7) | 1.4 (1.6) |
| Unemploy rate | .71 (2.3) | .78 (2.5) | .76 (2.8) | .85 (2.5) | .97 (2.7) |
| Budget position/GDP | .52 (2.1) | .49 (1.8) | .40 (1.6) | .58 (2.0) | .71 (2.2) |
| Current account/GDP | −.28 (1.0) | −.24 (.8) | −.31 (1.1) | −.33 (.9) | −.21 (.5) |
| Number of observations | 645 | 626 | 703 | 608 | 572 |
| McFadden's $R^2$ | .18 | .19 | .19 | .19 | .18 |
| Joint test for slopes $\chi^2(11)$ | 70 | 70 | 76 | 67 | 63 |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated z-statistics (for hypothesis of no effect). Model estimated with a constant, by maximum likelihood.

**Table 6.4**
Probit Results with Contagion Variable Weighted by Macro-Similarity (All Seven Contagion Variables Included Simultaneously)

| | Country-specific averages | | |
|---|---|---|---|
| | Contem-poraneous | MA of 2 lags | MA of contem + 8 lags |
| Crisis*credit similarity | −.10 (.0) | 1.68 (.7) | 2.72 (.9) |
| Crisis*money similarity | −.32 (.1) | 1.06 (.4) | −.38 (.1) |
| Crisis*inflat similarity | 2.54 (.8) | 4.12 (1.4) | 5.24 (1.5) |
| Crisis*GDP similarity | −1.97 (.8) | −3.48 (1.5) | −3.42 (1.3) |
| Crisis*unemp similarity | −.60 (.3) | −.93 (.6) | −1.08 (.5) |
| Crisis*C/Acc similarity | 2.10 (.7) | 1.19 (.4) | 1.72 (.5) |
| Crisis*budget similarity | 1.80 (.8) | .16 (.1) | −.39 (.2) |
| Cap controls | −2.56 (1.1) | −.43 (.2) | −.49 (.2) |
| Govt. victory | −3.81 (.9) | −.05 (.0) | −1.87 (.7) |
| Govt. loss | −2.62 (.6) | −3.74 (1.4) | −1.03 (.4) |
| Credit | .20 (1.7) | .09 (1.1) | −.16 (.7) |
| Inflation | .80 (3.6) | .48 (2.3) | .81 (2.3) |
| Growth | .10 (.3) | −.58 (1.6) | −.46 (.6) |
| Employment | .24 (.5) | .57 (1.1) | 1.08 (1.3) |
| Unemploy't | .86 (2.9) | .92 (2.4) | 1.16 (3.2) |
| Budget/GDP | .57 (2.2) | .37 (1.5) | .62 (1.9) |
| C/Acc/GDP | −.23 (.8) | −.46 (1.7) | −.37 (.9) |
| NOBS | 645 | 703 | 572 |
| McFadden's $R^2$ | .16 | .16 | .14 |
| Slope $\chi^2(17)$ | 63 | 64 | 49 |
| Contagion test $\chi^2(7)$ | 20 | 27 | 25 |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated z-statistics (for hypothesis of no effect).
Model estimated with a constant, by maximum likelihood.

| | Time-specific averages | | |
|---|---|---|---|
| | Contem-poraneous | MA of 2 lags | MA of contem + 8 lags |
| Crisis*credit similarity | −2.44 (.9) | −.10 (.0) | .01 (.0) |
| Crisis*money similarity | .41 (.2) | .61 (.3) | .12 (.0) |
| Crisis*inflat similarity | 3.06 (1.1) | 4.02 (1.5) | 5.93 (1.9) |
| Crisis*GDP similarity | −1.06 (.6) | −2.57 (1.6) | −2.77 (1.4) |
| Crisis*unemp similarity | 3.35 (1.5) | 3.66 (1.8) | 3.55 (1.4) |
| Crisis*C/Acc similarity | 4.25 (1.7) | 3.07 (1.4) | 3.59 (1.3) |
| Crisis*budget similarity | −4.19 (1.5) | −4.86 (1.9) | −5.99 (2.0) |
| Cap controls | −2.68 (1.1) | −.64 (.3) | −.84 (.3) |
| Govt. victory | −3.52 (.8) | −.36 (.1) | −2.02 (.7) |
| Govt. loss | −2.88 (.7) | −3.99 (1.4) | −.99 (.4) |
| Credit | .22 (1.9) | .10 (1.2) | −.18 (.7) |
| Inflation | .71 (3.1) | .42 (2.0) | .75 (2.1) |
| Growth | .15 (.4) | −.58 (1.6) | −.38 (.5) |
| Employment | .20 (.4) | .67 (1.3) | 1.24 (1.5) |
| Unemploy't | .65 (2.0) | .69 (2.4) | .91 (2.4) |
| Budget/GDP | .33 (1.1) | .20 (.8) | .40 (1.1) |
| C/Acc/GDP | −.08 (.3) | −.29 (1.1) | −.13 (.3) |
| NOBS | 645 | 703 | 572 |
| McFadden's $R^2$ | .17 | .17 | .15 |
| Slope $\chi^2(17)$ | 65 | 67 | 53 |
| Contagion test $\chi^2(7)$ | 21 | 28 | 27 |

We interpret this evidence as consistent with the existence of macroeconomic contagion. But it answers only a subset of the relevant economic questions. For example, is contagion spread through both trade and macroeconomic links? Or does one channel dominate the other?

### Comparing the Trade and Macro Channels

We are interested in testing the explanatory power of the different measures of contagion against each other. This requires dealing with the collinearity among our seven macro-contagion variables, for which purpose we employ factor analysis.

**Table 6.5**
Probit Results with Contagion Variable Weighted by Macro-Similarity (Contagion Variables Included One by One)

| | Country-specific averages | | | Time-specific averages | | |
|---|---|---|---|---|---|---|
| | Contem-poraneous | MA of 2 lags | MA of contem +8 lags | Contem-poraneous | MA of 2 lags | MA of contem +8 lags |
| Crisis*credit similarity | 6.67 (3.7) | 7.46 (4.4) | 8.82 (4.1) | 4.73 (2.7) | 5.68 (3.4) | 6.60 (3.2) |
| Crisis*money similarity | 6.23 (3.8) | 7.05 (4.4) | 7.81 (3.8) | 5.41 (3.3) | 6.44 (4.0) | 7.33 (3.7) |
| Crisis*inflat similarity | 7.17 (4.1) | 7.79 (4.7) | 9.21 (4.4) | 7.23 (4.2) | 8.12 (4.9) | 9.81 (4.8) |
| Crisis*GDP similarity | 6.03 (3.7) | 5.74 (3.8) | 6.84 (3.6) | 5.41 (3.5) | 4.81 (3.4) | 5.90 (3.3) |
| Crisis*unemp similarity | 5.10 (3.4) | 5.25 (3.6) | 5.82 (3.2) | 6.66 (4.3) | 7.00 (4.8) | 8.02 (4.5) |
| Crisis*C/Acc similarity | 7.35 (4.3) | 7.53 (4.7) | 8.91 (4.4) | 7.40 (4.1) | 7.26 (4.5) | 9.05 (4.3) |
| Crisis*budget similarity | 6.15 (3.7) | 5.78 (3.8) | 6.13 (3.1) | 5.13 (3.2) | 5.40 (3.6) | 5.87 (3.1) |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated z-statistics (for hypothesis of no effect).
Each model is estimated by maximum likelihood with a constant and seven political and macroeconomic controls.
All reported slopes differ significantly from zero at the .01 value.

Factor analysis both verifies the existence of multicollinearity and provides a convenient method of rank reduction. We estimated a single-factor model for the seven macro contagion variables using the method of principal factors. The single-factor model works well for both the country-specific and time-specific standardizations.[18] We use the resulting factor—a linear combination of the seven macroeconomic variables—in place of the vector of standardized variables.[19]

Table 6.6 reports estimates of the probit model when the effects of the different classes of contagion variables are estimated simultaneously. The three variables correspond to those used in tables 6.1, 6.3, and 6.4; they are unweighted, trade-weighted, and weighted by the macro factor, respectively. As always, the full set of political and macroeconomic controls is included.

Again, there is overwhelming evidence consistent with contagion; a joint test of the hypothesis that all three contagion variables are significant, which appears at the foot of the table, is wildly inconsistent with the null of no contagion. The weighted measure designed to capture trade linkages remains positive and moderately significant at standard confidence levels. But now the macro factor is negative and insignificant for all three conditioning sets and both standardization techniques.

Thus, our results suggest that contagious currency crises tend to spread across countries mainly as a function of international trade links. In contrast, the influence of macroeconomic similarities disappears when the various classes of contagion measures are included simultaneously. The continuing significance of the unweighted measure of contagion, even when the trade- and macro-weighted measures are included simultaneously, suggests that contagion may also spread through other channels than those that we have emphasized.

**Sensitivity Analysis**

We performed a number of robustness checks to investigate the sensitivity of our finding that trade linkages are more important than macroeconomic similarities. For instance, we split our sample into two parts (at, e.g., 1974 and 1979) to check whether different models of contagion dominated different parts of the sample. We split our sample into observations in which capital controls are present and absent. We added additional macroeconomic fundamentals, and compared the macroeconomic and trade contagion channels without

**Table 6.6**
Probit Results with Three Different Measures of Contagion

| | Country-specific averages | | |
|---|---|---|---|
| | Contem-poraneous | MA of 2 lags | MA of contem + 8 lags |
| Crises elsewhere: Unweighted | 4.66 (2.0) | 5.18 (2.3) | 4.80 (1.7) |
| Crises elsewhere: Int'l trade weights | .39 (3.6) | .58 (4.3) | .75 (4.3) |
| Crises elsewhere: Macro factor weights | −.85 (.6) | −1.87 (1.3) | −2.18 (1.2) |
| Capital controls | −1.62 (.7) | .25 (.1) | .32 (.1) |
| Government victory | −3.70 (.9) | .29 (.1) | −1.60 (.6) |
| Government loss | −2.24 (.6) | −3.32 (1.1) | .44 (.2) |
| Credit | .17 (1.6) | .08 (1.0) | −.09 (.4) |
| Inflation | .77 (3.7) | .47 (2.3) | .72 (2.1) |
| Growth | .09 (.3) | −.53 (1.5) | −.35 (.4) |
| Employment | .39 (.8) | .93 (1.8) | 1.29 (1.6) |
| Unemployment | .69 (2.4) | .76 (2.9) | .96 (2.7) |
| Budget/GDP | .48 (2.0) | .37 (1.6) | .68 (2.1) |
| Current account/GDP | −.23 (.9) | −.33 (1.3) | −.26 (.6) |
| NOBS | 645 | 703 | 572 |
| McFadden's $R^2$ | .20 | .20 | .19 |
| Slopes $\chi^2(13)$ | 75 | 81 | 66 |
| Contagion test $\chi^2(3)$ | 31 | 38 | 34 |

*Notes:* Probit slope derivatives (×100, to convert into percentages) and associated z-statistics (for hypothesis of no effect).
Model estimated with a constant, by maximum likelihood.

our unweighted variable. None of these checks disturbs our basic finding that trade links are the more important conduit for the infectious spread of currency crises.

## 6.6 Conclusion

We have reviewed the theoretical and empirical literatures on crises in foreign exchange markets with an eye toward the prevalence of contagion. Although the possibility of contagious currency crises is a pressing policy issue, the debate surrounding it points up the limitations of existing research. The literature is replete with theoretical

| | Time-specific averages | | |
|---|---|---|---|
| | Contem-poraneous | MA of 2 lags | MA of contem + 8 lags |
| Crises elsewhere: Unweighted | 4.74 (2.0) | 4.97 (2.2) | 4.44 (1.6) |
| Crises elsewhere: Int'l trade weights | .40 (3.7) | .58 (4.2) | .73 (4.1) |
| Crises elsewhere: Macro factor weights | −.94 (.7) | −1.64 (1.2) | −1.68 (1.0) |
| Capital controls | −1.55 (.7) | .27 (.1) | .29 (.1) |
| Government victory | −3.70 (.9) | .32 (.1) | −1.57 (.6) |
| Government loss | −2.23 (.5) | −3.31 (1.2) | .43 (.2) |
| Credit | .17 (1.7) | .09 (1.0) | −.09 (.4) |
| Inflation | .77 (3.7) | .48 (2.4) | .74 (2.1) |
| Growth | .09 (.3) | −.52 (1.5) | −.34 (.4) |
| Employment | .40 (.8) | .89 (1.8) | 1.25 (1.5) |
| Unemployment | .70 (2.4) | .78 (2.9) | .98 (2.7) |
| Budget/GDP | .47 (2.0) | .37 (1.6) | .67 (2.1) |
| Current account/GDP | −.24 (.9) | −.36 (1.4) | −.29 (.7) |
| NOBS | 645 | 703 | 572 |
| McFadden's $R^2$ | .20 | .20 | .19 |
| Slopes $\chi^2(13)$ | 74 | 81 | 66 |
| Contagion test $\chi^2(3)$ | 31 | 37 | 33 |

models highlighting the motives for and dynamics of speculative attacks on pegged currencies and potential channels of contagion, but empirical work has lagged behind. Stories of contagion abound, but systematic analysis is lacking.

Here we have taken a first step toward such an analysis. Using data for 20 industrial countries spanning more than three decades, a battery of empirical specifications fails to reject, at high levels of significance, the hypothesis of contagion. We find that a speculative attack elsewhere in the world increases the odds of an attack on the domestic currency. Without conditioning on the size or relevance of these other attacks, our best estimate is that attacks on foreign currencies raise the probability of a domestic attack by 8 percent. But this does not disprove the hypothesis of common unobservable

shocks, nor does it narrow down the channels by which contagion is transmitted. Accordingly, we have also sought to test for contagion in foreign exchange markets using a framework that distinguishes two channels of international transmission of speculative attacks.

The first channel is trade links, and the hypothesis is that attacks spill over contagiously to other countries with which the subject country trades. The second channel is macroeconomic similarities, where the hypothesis is that attacks spread to other countries where economic policies and conditions are broadly similar. The first approach emphasizes the implications for competitiveness of an attack elsewhere in the world. The second focuses on the information content of an attack (where the assumption is that an attack on one country reveals information about market sentiment regarding the viability of a particular economic strategy).

We have compared these alternatives. Both the trade-weighted contagion proxy and the macro-weighted proxy outperform the naive unweighted contagion measure when they are included one at a time. We take this as confirmation that what our tests are picking up is contagion per se, and not only the effects of omitted environmental factors common to the countries in question (although the latter are still present).

The effect of contagion operating through trade is stronger than that of contagion spreading as a result of macroeconomic similarities. When the specification includes measures of both mechanisms, trade-related contagion dominates the macro effect. Admittedly, similarities in macroeconomic policies and performance across countries are more difficult to capture in a weighting scheme than is the intensity of bilateral trade; the stronger showing of trade-related contagion may simply reflect our greater success in proxying this effect. At the same time, considerable experimentation with alternative measures of macro-related contagion, all of which points to the same conclusion, lends some support to our favored interpretation that it is trade links rather than macroeconomic similarities that have been the dominant channel for the contagious transmission in the sample period.

In the 1960s, toward the beginning of our sample, the debate over contagion centered on the industrial countries. The fear was that a currency crisis in one industrial country might destabilize the exchange rate pegs of the other advanced industrial nations. The

fallout from the 1967 devaluation of sterling provides some retrospective justification for these fears (see chapter 8 below). Today the debate over contagion increasingly focuses on emerging markets, in Latin America, Asia, and elsewhere (e.g., Sachs, Tornell, and Velasco 1996). The nature of the data makes systematic cross-country analyses of the sort we undertake here more difficult for emerging markets. But it is clear that this should be a high priority for future research.

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# 7 The Baring Crisis in a Mexican Mirror

## 7.1 Introduction

It was Michael Camdessus who dubbed the Mexican crisis of 1994–1995 "the first financial crisis of the 21st century."[1] In this chapter I argue that it may be better understood as the last financial crisis of the nineteenth. The crisis in Mexico exhibits striking similarities to the 1890 Baring crisis, an event that did much to shape modern opinion about the causes and consequences of financial crises and the role for official management.

Parallels between the two episodes are extensive. Just as Mexico was the benchmark for investors in emerging markets in the 1990s (it was the single largest borrower, and the spreads it commanded set the floor for other borrowers), Argentina, the country whose financial difficulties ignited the Baring crisis, was commended to investors as "The United States of South America." It was the single most important destination for British capital outside the United States and the British Empire. Lending in both periods was encouraged by policy reform and economic development in recipient countries, and the wheels of international finance were greased by declining interest rates worldwide, associated with Goschen's debt conversion in the 1880s and recession-induced cuts in interest rates by the Federal Reserve in the 1990s. In both cases, investors who had been slow to join the bandwagon climbed on board in the final stages of the boom.

Although foreign borrowing was portrayed as financing investment in productive capacity, in both cases capital inflows fueled rising levels of consumption. Foreign capital flowed through the banking system, and bank lending financed purchases of luxury imports as well as capital goods. Governments failed to boost their savings to offset dissaving by the private sector. In both cases,

powerful opposition existed to the government in power, leaving officials reluctant to tighten monetary and fiscal policy for fear of alienating their core constituencies. Hence, they did little to damp down the impact on the economy of international capital flows.

But increased demand did not automatically elicit increased supply. Investment in capacity took time to translate into improved export performance. In both cases, questions arose about the capacity of the economy to sustain mounting debt levels. Political shocks (strikes and an incipient coup in Buenos Aires in 1889–1890, the Chiapas revolt and Colosio assassination in 1994) then raised doubts about the ability of the government to carry out adjustment. Better-informed investors grew wary significantly in advance of the crisis.

The crisis itself drove the Argentine government, like the Mexican government after it, to the brink of default. The fallout destabilized the banking system. It provoked a major recession, and it spilled over to other countries. In 1995, the Tequila Effect was felt in Argentina, Brazil, Thailand, and Hong Kong. In the wake of the 1890 Baring crisis, interest rates rose in Brazil, Uruguay, Venezuela, and Turkey. Countries as far afield as Australia and New Zealand found it difficult to access external finance. Thus, the Baring crisis provides an even more extreme example of the destabilizing dynamics that infected emerging markets a little more than a century later.

At the same time, there are important differences between the two episodes. Monetary and fiscal excesses were more clearly evident in Argentina in the 1880s than in Mexico in the 1990s. In Argentina in the 1880s, monetary and fiscal excesses were a principal element in the crisis; the Mexican government may not be free of blame, but it in contrast took significant steps in the direction of monetary and fiscal reform. In 1995, the Clinton administration and the IMF saw the need to help Mexico avert a suspension of debt-service payments. Default on government bonds, they feared, would prompt equity investors to flee, force Mexico to impose comprehensive exchange and capital controls, spread contagiously to other emerging markets, and set back economic reform and liberalization worldwide. But in 1994, there was no single financial institution as exposed as Baring Brothers. In 1890, the fear was for the stability of financial markets in the First World, not the Third. Where the U.S. government's first reaction in 1994 was to assemble financial aid for Mexico, in 1890 the Bank of England and the British Government

arranged a rescue fund for Baring Brothers, not for Argentina. The assistance offered Argentina was hardly generous, and it was provided by markets, not governments.

Where the Bank of England could make arrangements with other financial institutions before news of Baring's difficulties became public, the 1995 crisis was a very public affair. Unable to induce commercial banks to contribute to the Mexican rescue, the Clinton administration relied on a larger ratio of public to private funds than had the Bank of England a century before. The capital market being less cohesive and concentrated than in 1890, it found it more difficult to reach an agreement with other governments than had the Bank of England and the British government.

In a sense, then, the Mexican crisis is both the last financial crisis of the nineteenth century and the first financial crisis of the twenty-first. Its implications resemble those of the Baring crisis insofar as it marks a return to an international market increasingly dominated by bonded debt. But today's international financial scene being even more decentralized than that of the 1880s, it anticipates the kind of crises that will become increasingly prevalent in the twenty-first century.

In elaborating these points, I focus on the period leading up to the 1890 crisis. Information on the recent Mexican episode is abundant, and interpretations abound. Hence, I assume that the reader is familiar with the outlines of the Mexican crisis. I concentrate mainly on Argentina in the 1880s, providing just as much information on the Mexican crisis as is needed to place the comparison in relief.

## 7.2 The Context

Structural changes significantly improving the prospects for economic growth and development served as the backdrop for the surge in foreign investment in both periods. An important precondition for Mexico's return to the international capital market was put in place by its negotiation of a Brady deal, which reduced its debt and exchanged its floating-rate bank debt for bonds. Economic reform then provided the impetus for lending. Policy initiatives included liberalizing international trade, privatizing public enterprises, reducing the size of the government, reforming the tax system, and deregulating and liberalizing domestic markets. The country's application to the GATT and its negotiation of the North

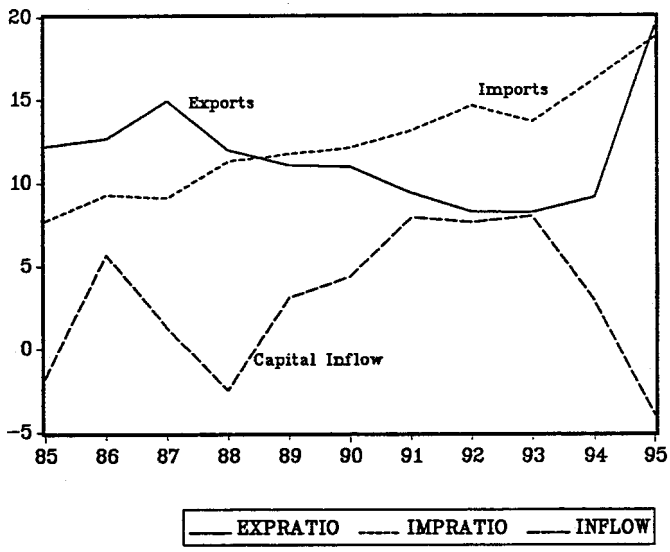


**Figure 7.1**
Mexican Exports, Imports and Foreign Borrowing, 1985–1995 (as Shares of GDP)
*Source:* International Monetary Fund, *International Financial Statistics*.

American Free Trade Agreement effectively locked in the new regime. Figure 7.1 shows the time-profile of the capital inflow that ensued.

Late-nineteenth-century Argentina returned to the international market more gradually. None other than Baring Brothers had floated Buenos Aires' first public loans in 1824–1825, but these soon lapsed into default and remained there until a settlement was reached 1857. Although Barings offered another Argentine loan in 1866, the country's commercial prospects were hardly glowing. Until the 1880s, it remained a minor player in the European capital market.

At that point, the Argentine government "laid the foundations of the [country's foreign-financed] investment boom."[2] It secured the Pampas for settlement by waging military campaigns against the Indian population and driving the survivors across the Rio Negro. This opened the way for wheat cultivation, allowing Argentina to become a net exporter of grain. An insurrection in the Province of Buenos Aires was put down in 1879, solidifying the rule of the national authorities. The government reformed the monetary system, replacing the diverse currencies of the provinces with a uniform national money. It put the country on a bimetallic standard in 1881.

In the 1990s, trade liberalization in general and NAFTA in particular made it attractive for foreigners to invest in Mexico as a platform for exporting to the United States. Argentina felt analogous effects in the 1880s as a result of sharp falls in ocean freight rates. These increased the attractions of building railroads to link the pampas to the ports and integrate the country's productive capacity into the world market. The voyage of the *Frigorifique* in 1876 had just demonstrated the feasibility of carrying chilled meat across the tropics. As late as 1880, Argentina may have still been regarded as a backward, frontier community, dependent upon the herds of wild and unimproved cattle of the pampas and flocks of sheep, "but the decline in ocean freight rates and development of refrigeration did much to transform this perception."[3]

Foreign investment was as integral to the development strategy of the government of General Julio A. Roca as to that of President Carlos Salinas de Gortari a century later. Roca's government first solicited loans for two state railways, the Central Norte and Andino, in 1881. The provinces competed with one another to establish links to the coast. Buenos Aires borrowed to expand and modernize its port facilities. It invested in urban infrastructure in an effort to transform itself into the "Paris of South America."

Soon Argentina was a major destination for European funds. It attracted as much foreign capital in the course of the 1880s as Brazil, Mexico, and Uruguay combined. Half or more of these funds were raised on the London market, although French and German investors also contributed significantly. In 1889, Argentina absorbed 40 to 50 percent of all British funds invested outside the United Kingdom. Figure 7.2 shows the pattern of foreign lending that resulted. The comparison with figure 7.1 suggests that the surge of capital inflows was larger in relation to trade—and hence in relation to debt servicing capacity—in Argentina in the 1880s than Mexico in the 1990s.

## 7.3 The Role of Global Financial Conditions

However far-reaching these structural changes in Mexico and Argentina, neither surge of foreign lending can be understood without reference to developments elsewhere in the world. In the early 1990s, interest rates were allowed to decline by the Federal Reserve Board in response to recession in the United States. Lower rates encouraged investors who had previously placed their funds in American

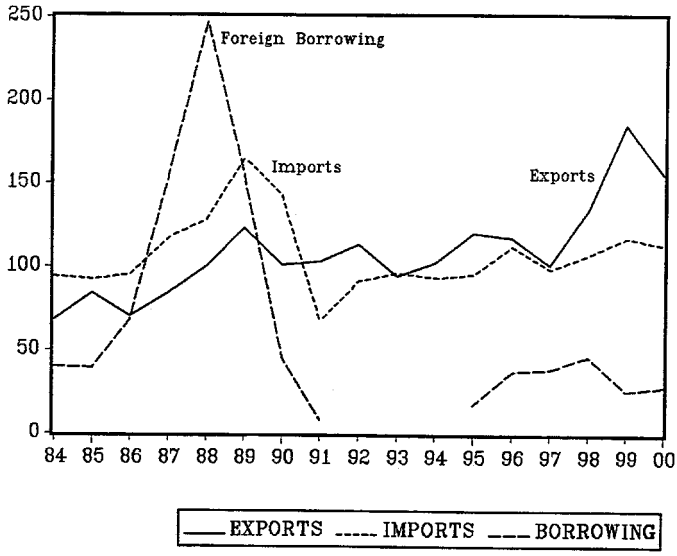


**Figure 7.2**
Argentine Exports, Imports and Foreign Borrowing, 1884–1900 (Millions of Gold Pesos)
*Source:* Ford 1962.

markets to seek higher yields abroad and enhanced the credit worthiness of borrowers still servicing significant amounts of floating-rate debt (Eichengreen and Fishlow 1995). This last effect encouraged borrowers previously unable to access foreign capital to return to international markets. The influence of global monetary conditions is evident in the fact that countries such as Peru and Brazil received substantial inflows before stabilizing their inflations or completing Brady Plan operations.

The 1880s was also a decade of low interest rates, in this case initiated by weak demand (attributed by historians to rising tariffs and falling gold production) and sustained by the slow reaction of central banks. Low interest rates encouraged investors to look abroad for higher yielding investments.[4] London and Edinburgh were soon "honeycombed with agencies" for collecting money for banks in South America and elsewhere.[5] Just as Calvo, Leiderman, and Reinhart (1993) noted that the flow of funds to emerging markets around the world in the early 1990s is only explicable in terms of push factors, John H. Williams (1920) argued that the flow of funds

to Australia, South Africa, and South America in the 1880s had to be understood in terms of the low interest rates prevailing in London.[6]

The decline in interest rates was not limited to the British market, conditions in the principal financial centers being yoked together by the operation of the international gold standard. The conversion of the British debt in 1888 by George Joachim Goschen, who sought to reap for the British government the benefits of lower money-market rates, ignited a rise in the prices of French 3 percent Rentes. This allowed the Prussian government to emit 3 percent Consols. It also encouraged French and German investors to redouble their search for yield abroad. As a disillusioned Max Wirth put it in 1893, "German investors, at this time, preferred to purchase foreign securities with high rates of interest; and were so imprudent as to be caught by the radiant descriptions of rising wealth in Argentina, and to buy stocks and bonds from this ill-governed republic."[7]

In this way, the low interest rates and accommodating monetary policies of the 1880s set in motion a global boom. Low central bank discount rates encouraged joint-stock banks to lend. Bank reserves declined to 10 percent of liabilities, and commercial banks replenished their reserves by borrowing from the Bank of England and its continental counterparts.

By 1889, central banks had had enough. The Bank of England ratcheted up its discount rate from $2\frac{1}{2}$ to 6 percent over the second half of the year. As was the case when the Federal Reserve Board tightened in 1994, higher interest rates in the financial centers diminished the attractions of foreign securities. Ferns (1960) points to the rise in the bank rate as one factor that made it difficult for Barings to place the Buenos Aires Water Supply and Drainage Loan of 1888, the failed issue that precipitated its downfall.

New issues in London on behalf of Argentina fell from £23 million in 1888 to £12 in 1889 and £5 million in 1890.[8] Where new foreign borrowing had exceeded debt service for several years running, the balance was now reversed. For the nation as a whole, service changes exceeded foreign borrowing for the first time in 1890. The national government felt the effects even more quickly; its foreign borrowing fell short of its service payments in 1889.[9]

External borrowing by Mexico also fell off in advance of the country's 1994–95 crisis, although the time profile was different. Net external borrowing by the private sector fell off in 1993, net external

borrowing by the public sector only in 1994.[10] Overall, the combined capital account of the public and private sectors fell from $30.5 billion to $11.6 billion between 1993 and 1994.

This difference in timing suggests that problems of external credit worthiness were more heavily concentrated in the public sector in 1889–1890. There is evidence to this effect, as we will see below. But at the same time, there existed doubts about the ability of private-sector borrowers to service their external debts. Before considering problems with the public finances, it is worth pausing over the problem of private investments.

## 7.4 Private Investment and Public Guarantees

Historians have noted the long gestation of the Argentine investments. "[W]hereas interest payments had to be met at once, it took time to build railways—and exports grew only after the railways were built."[11] Some two-thirds of all British capital invested in Argentina in 1886–89 was devoted to railway construction. In itself, this was not unusual; British investors regularly favored railway securities. The economic prospects of a railway line were more easily assessed than the reputational and organizational assets of a commercial or manufacturing enterprise; hence, railway bonds were particularly attractive to risk-averse investors in an environment of asymmetric information.[12]

Nor was there anything unusual about a concentrated burst in railway construction like that in Argentina in the second half of the 1880s. The United States had experienced similar booms in the mid 1850s, the early 1870s, and the early 1880s, each of which was associated with the constellation of factors Simon Kuznets identifies in his studies of long swings.[13] Periods of liberal lending to regions of recent European settlement, Kuznets notes, were also periods of high emigration from the Old World. Immigration created a demand for population-sensitive capital (transportation capital in particular). The 1880s being a decade of high immigration into Argentina, all the preconditions for a Kuznets Cycle upswing and a railway building boom were in place.[14]

Foreigners were encouraged to invest in Argentine railways by the government's interest guarantee. If the revenues generated by the railway were insufficient to service its debts, the government made up the difference. Such guarantees were viewed as essential

for attracting foreign capital in an environment of asymmetric information.[15] They were common in the United States (where railway securities were guaranteed by the states and municipalities), in Canada, and throughout the British Empire. Indian railway bonds received a 5 percent interest guarantee from the Indian government and hence "were regarded as perfectly safe; investors included widows, barristers, clergymen, bankers and retired army officers."[16] Accepting the guarantee placed the railway under an obligation to the government; typically, it ceded the right to set freight rates. Hence, Argentine railways that achieved profitability sought to regain rate-setting freedom by buying out their guarantees. But some three-quarters of all British investments in Argentine railways circa 1890 were nonetheless in companies covered by the guarantee system.[17]

One can readily see how such a system could give rise to moral hazard. Investors in bonds guaranteed by the government had no need to concern themselves with the profitability of the enterprise; their only worry was the credit worthiness of the government. This freed companies of monitoring by investors; the only agent with an incentive to oversee the railroad's activities was the government itself. To prevent contractors from inflating construction costs, the government specified that the cost per kilometer of constructing the line could not exceed a prescribed amount. But railway companies still had the incentive to raise capital for lines of questionable economic viability so long as they could obtain a guarantee.

Ultimately, then, access to external capital rested on the credit worthiness of the government, to which we now turn.

## 7.5 The Public Finances

The state of the Mexican public finances in 1994 is a matter of some dispute. Between the fourth quarter of 1989 and the third quarter of 1993, surpluses ran around 5 percent of GDP. Although the surplus declined to some 3 percent of GDP by late 1993 (and 2 percent by late 1994), the published budget was still reassuring. But there existed hidden deficits in the accounts of the development banks, which borrowed on the open market, often abroad, and lent to domestic commercial banks for activities that would have otherwise been undertaken by the government. Leiderman and Thorne (1995) show that the Mexican budget moved into substantial deficit after

the fourth quarter of 1993 when the net lending of the development banks is included. Sachs, Tornell, and Velasco (1995) object that only the contingent liabilities to the government in the event of losses by the state banks should be included in the fiscal balance, because the development banks borrowed and repaid on commercial terms.

Whatever one's view, there is no question that Mexico's fiscal difficulties in 1993–1994 pale in comparison with Argentina's in 1890–1891. The Argentine national government's deficit was more than 68 percent of its expenditure.[18] The provincial governments were in deficit; the deficit of the Province of Buenos Aires was more than two-thirds provincial spending.[19] Municipal governments also financed deficits by borrowing abroad.[20]

When the sorry state of the Argentine public finances became apparent in 1889 and lending to the government fell off, Roca's successor, his brother-in-law Miguel Juárez Celman, sought to boost revenues and cut spending. In October, the Congress agreed to expenditure cuts and began discussing increased taxes on luxury products, but there was powerful opposition to such measures. Support for the government of Juárez Celman derived from wealthy interests who would have suffered from its tax increases. When a new finance minister, José Uriburu, proposed raising customs duties by 15 percent in April 1890, he met a barrage of criticism. Forced to choose between Uriburu and his own supporters—between "deflation with increased taxes [and] the status quo"—Juárez Celman opted for inflation, forcing Uriburu to resign.[21]

Austerity threatened to provoke unrest among workers as well. Inflation and currency depreciation (discussed in section 7.7, below) had already eroded the real incomes of wage earners, leading to strikes among port workers in Buenos Aires in August 1889. In September, the employees of the railway companies struck, and in October, thousands of construction workers in Buenos Aires walked out. Opponents of the government organized a series of protest meetings. A coup attempt led by prominent army officers was defeated only after heavy fighting. The National Congress then forced Juárez Celman to resign, replacing him with his vice president, Carlos Pellegrini, who formed an emergency cabinet.

The parallels with Mexico are obvious. With an election approaching in 1994, the Salinas government was reluctant to tighten policy for fear of eroding political support and damaging its successor's electoral prospects. The Colosio assassination and the Chiapas

revolt raised questions about the government's stability, leading investors to wonder whether it had the capacity to cut spending and raise interest rates. These political shocks made it increasingly difficult for Mexico to borrow on international markets. The same was true of Argentina following the strikes of August 1889 and the abortive coup of April 1890.

### 7.6 State Banks

In Argentina as in Mexico, much of the action in the budget was hidden in the accounts of the state banks. During Roca's presidency, the government's development strategy had centered on the railways, but it shifted the state banks under Juárez Celman after 1886. Provincial banks contracted foreign loans to extend credit to the provincial government and back the emission of notes. According to Williams (1920, 58), some of these provincial banks were "banks only in name"; their actual function was to secure the foreign finance needed to underwrite the operations of provincial governments. Some made advances directly to politicians. Williams notes reports that these banks issued false balance sheets and reported nonexistent dividends.

Then there were the national and provincial mortgage banks, which extended loans to large landowners on security of their real estate.[22] The vehicles for these loans were peso-denominated bonds, or *cedulas*.[23] These banks made loans on the security of land in the form not of cash but *cedulas*. The landowner then typically turned around and sold these negotiable bearer bonds to investors for cash.[24] Following the creation of the National Mortgage Bank in 1886, foreign investors in Britain and on the continent were "seized with a mania for [*cedulas*]. Series after series, from A to P, were issued by the banks and quickly absorbed by credulous Europeans, who were ignorant of the true state of affairs and who argued that the cedulas were a better investment than Government bonds for the reason that ... they were backed by real estate."[25] Thus, just as institutional investors drew back from Argentina, small investors climbed onto the bandwagon.

Such investors unfortunately knew little about the backing for their securities. For this they relied on the mortgage banks,[26] which were riddled with "encroaching nepotism.... Loans were allowed less by reason of gold security than as a matter of personal favor.[27]

Although the law prohibited loans exceeding 50 percent of the assessed value of the land offered in mortgage, the face value of a bank's *cedulas* regularly exceeded the market value of the real estate with which they were backed.

*Cedulas* therefore posed a problem for the national government. There was no foreign financial institution with an interest in supporting the market or the institutions of which they were an obligation. The only entity with any such interest was the government itself, but a collapse in the market for *cedulas* might so aggravate the weakness of the Argentine banking system and increase the contingent liabilities of the government as to threaten the latter's own solvency.

Hence, the Argentine government sought to prop up the market for *cedulas* by freeing them of exchange risk. In May 1889, it laid before Congress a plan to purchase paper *cedulas* and issue gold *cedulas*. But with mortgage bonds now effectively denominated in foreign currency, anything that interrupted the flow of foreign exchange receipts, such as a decline in capital inflows, could precipitate a crisis. The government tied itself to the mast, attempting to reassure investors and sustaining the inflow of foreign funds. But as with any strategy of tying oneself to the mast, when the wind blows up, there is a danger of getting wet. A disturbance to the flow of foreign exchange could now lead not just to devaluation but to default.

This strategy of issuing foreign-currency-linked debt will be familiar to observers of the recent Mexican crisis. Following the Colosio assassination, the Mexican government began converting its short-term peso-denominated liabilities into dollar-indexed debt. It issued dollar-linked securities, the now-notorious *tesobonos*, in an attempt to reassure foreign investors wary of devaluation risk. From $1 billion at the beginning of 1994, the outstanding stock of *tesobonos* reached $18 billion by December. Thus, the Mexican authorities similarly tied themselves to the mast, issuing foreign-currency-indexed debt as a way of making devaluation unattractive and reassuring investors. When the storm blew up, they too were soaked.

## 7.7 Consumption and Investment

In both Argentina and Mexico, slow growth created worries about the sustainability of the external position. It led investors to question

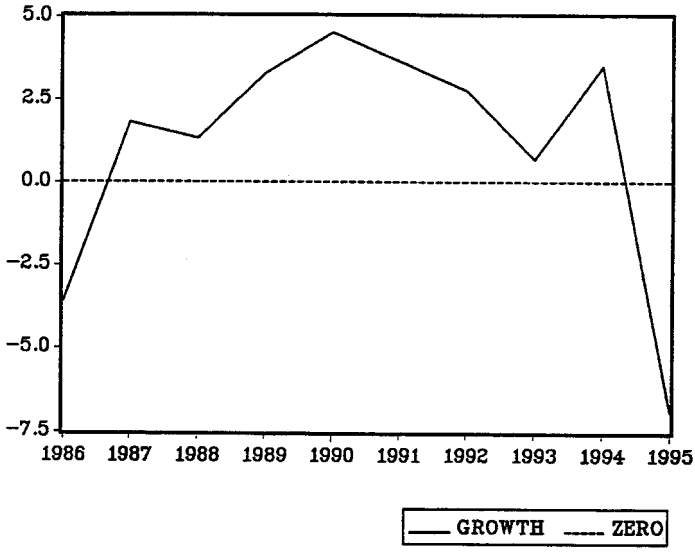


**Figure 7.3**
Mexico: GDP Growth Rate (GDP at 1990 Prices, 1986–1995)
*Source:* International Monetary Fund, *International Financial Statistics*.

whether the country could generate the exports and foreign exchange receipts needed to service its debt and whether the government could stomach painful adjustment policies. Mexican economic growth stagnated after 1992 (fig. 7.3). Argentine railway receipts per kilometer of track declined from 1884 through 1890 (fig. 7.4).

The villain in most explanations for the slow growth of these economies is inadequate savings, which constrained the level of investment. The Mexican savings rate fell from 19 percent in 1988 to 17 percent in 1989–94 and 15 percent in the second half of the period (fig. 7.5). Most of the decline was by the private sector; to put the point another way, the capital inflows of the 1990s financed a significant increase in private consumption. Lower interest rates and improved access to foreign capital encouraged the Mexican banks to lend, and they responded by increasing real estate and consumption loans.[28] Consumers may have welcomed these loans because they had been liquidity-constrained previously, the surge of foreign capital into the Mexican financial system in conjunction with deregulation allowing them to satisfy pent-up demands. Doubts about the permanence of the country's newly liberal tax and import regime

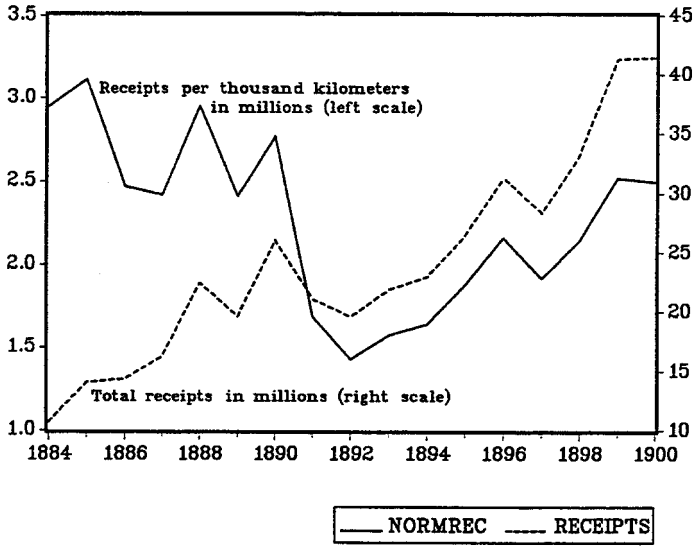


**Figure 7.4**
Argentine Railway Receipts in Gold Pesos, 1884–1900
*Source:* Ford 1962.

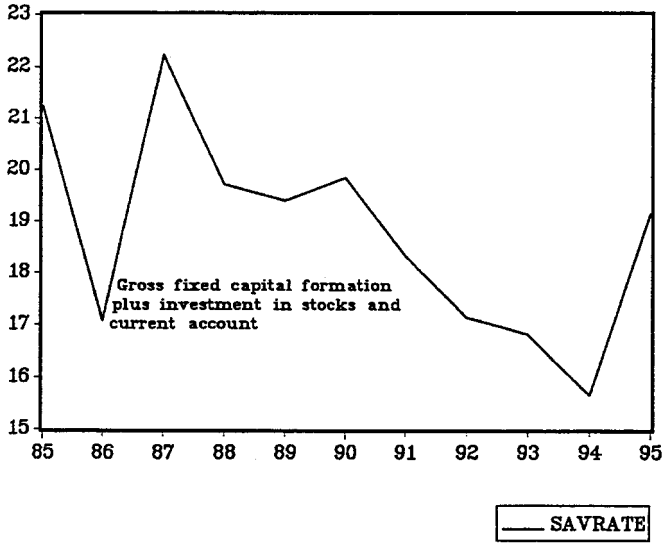


**Figure 7.5**
Imputed Rate of Mexican Saving, 1985–1995
*Source:* International Monetary Fund, *International Financial Statistics*.

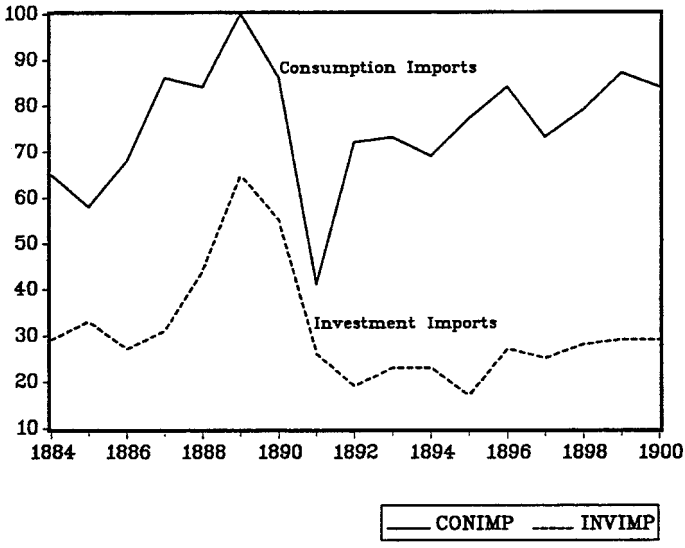


**Figure 7.6**
Argentine Consumption and Investment Imports, 1884–1900 (Millions of Gold Pesos)
*Source:* Ford 1962.

may have further encouraged spending on consumer durables to beat expected future tax increases.

Mexico's investment rate rose modestly over the period, from 20.4 percent in 1988 to 21.9 percent in 1989–1994. The problem was that it did not rise further. Capital imports mainly financed consumption, not investment. There was no way that this allocation of resources could easily generate the foreign exchange needed to service the country's dollar-denominated and dollar-indexed debt.

The rapid increase in kilometers of railway track in service in Argentina in the 1880s points to significant investment. The doubling (in gold pesos) of investment-good imports between 1886 and 1890 is consistent with this conclusion. But there is also reason to think that a substantial portion of the country's externally accessed resources were actually devoted to consumption. Sixty percent of the increase in imports between 1886 and 1890 took the form of consumption goods (fig. 7.6). The prices of pastoral goods (the only domestic price index available for the entire period) rose substantially in 1886–1889, as if domestic consumption demand was overstimulated (fig. 7.7). Property sales in 1889 were 10 times those of 1886.

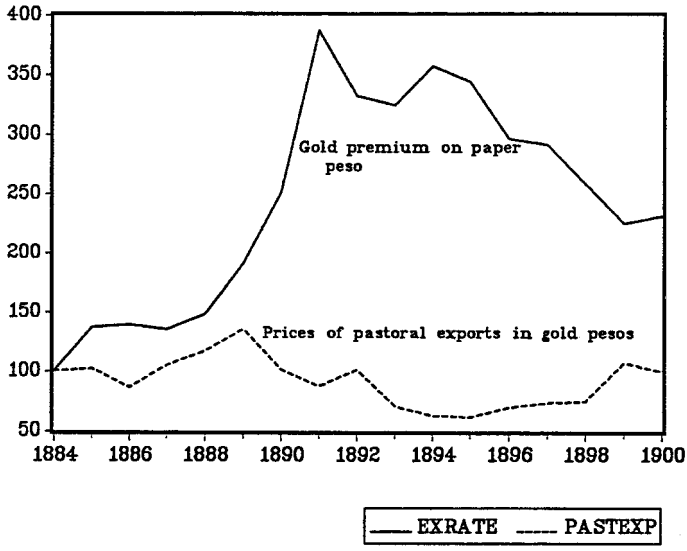


**Figure 7.7**
Argentina: Gold Premium and Pastoral Export Prices, 1884–1900
*Source:* Ford 1962.

We can impute the level of national saving—investment plus the current account—by approximating investment with investment-goods imports and measuring the current account as the trade balance minus debt service. This measure of saving (fig. 7.8) declines after 1885. In Argentina as in Mexico, it appears that the failure of savings rates to rise in the period of capital inflows set the stage for subsequent difficulties.

## 7.8 The Exchange Rate and Monetary Policy

The most dramatic contrast between Mexico and Argentina was exchange rate policy. Mexico's problem was partly caused by a policy of pegging the peso, which resulted in a growing overvaluation. Argentina's crisis, in contrast, was aggravated by the continuous depreciation of the paper currency, which undermined confidence and, ultimately, capital flows.

Mexico in the 1990s was committed to holding its peso in a band against the dollar. Under the system it had operated since November 1991, the ceiling of the band was adjusted by 0.0004 new pesos a

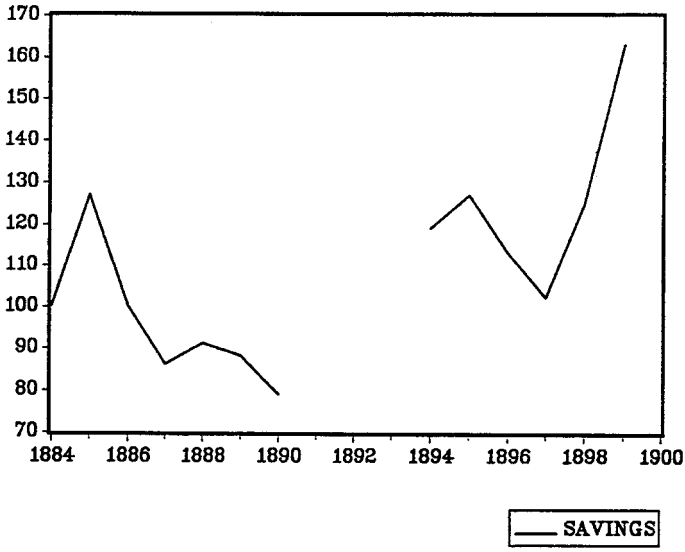


**Figure 7.8**
Imputed Level of Argentine Saving, 1884–1900 (1884 = 100)
*Note:* Constructed using investment good imports to approximate investment and the trade balance plus debt service to approximate the current account.

day, with the floor remaining constant at 3.0512 new pesos per dollar. In 1994, this produced in a band of approximately plus or minus 6 percent. Many observers regarded the government's maintenance of this band as the keystone of its policy. Indeed, it was the decision to devalue in December 1994 that sparked the crisis.

How to characterize the stance of monetary policy in the quarters preceding the Mexican crisis is another disputed issue. Rapid growth of monetary aggregates is to be expected in a country that recently brought down a high inflation and liberalized its financial markets. If the increase reflected a change in money demand, not money supply, it should not have been a source of instability. What now seems clear, however, is that the combined monetary, fiscal, and wage policies under which the economy was operating were too accommodating to remain consistent with the exchange rate commitment for long. This became obvious when inflows slowed in the wake of the Colosio assassination. Hiking interest rates was the obvious way of squaring the circle; it would have damped down the demand for imports and attracted footloose finance. But the Bank of Mexico

hesitated to raise rates on the eve of a presidential election, opting instead to finance the current account with reserves. This policy of financing the deficit rather than adjusting only put off the day of reckoning.[29] Thus, even if monetary policy did not initiate the problem, the country's difficulties were compounded by the central bank's failure to produce a solution.

Monetary policy was more obviously at the root of the Argentine crisis. Bimetallic convertibility had been established during the first period of large-scale capital inflows, and when these fell off in 1884 (due to financial difficulties in London), the gold and silver parities turned out to be too high to be easily sustained.[30] The coinage of silver ceased almost immediately, and the convertibility of paper into gold at par was suspended in 1885.[31] An inspection board appointed by the executive was created to verify that the banks of issue were not emitting notes excessively, but that board had to contend with pressure for the banks to subsidize a financially strapped government. An October 1885 decree allowed the Banco Nacional to double its emission of notes. The Bank of the Province of Buenos Aires was permitted to increase its note issue in December 1886. In all, note circulation rose from 62 million paper pesos in 1884 to 75 million in 1885 and 89 million in 1886. As in Mexico in the 1990s, the demand for money rose strongly with the economy growing at a rapid rate.[32] Even so, demand failed to keep pace with supply, and the price of gold in terms of pesos rose from par in 1884 to a premium of 37 percent in 1885 and 39 percent in 1886 (see fig. 7.7).

The real break with stability came in 1887, however, when the Free Banking Law was passed. This law was an effort to free other provinces from their dependence on the banks of the Province of Buenos Aires. Free banks were allowed to emit notes backed by government bonds, which they purchased using funds borrowed abroad. The fact that foreign capital flowed through the banking system magnified its impact on aggregate demand: it encouraged public spending (because it allowed the government to sell bonds and replenish its reserves); it also financed spending by the recipients of the banks' note emissions.

The aggregate-demand effects were even greater to the extent that the Free Banking Law was inadequately enforced. Sometimes payment for guarantee bonds was deferred. Many banks made no payment at all. In all, the banks paid only 80 million pesos in gold to secure 200 million gold pesos of government bonds and issue 200

million gold pesos' worth of paper currency.[33] As foreign capital flowed into the Argentine banking system and the authorities looked the other way, note issue rose by 38 percent in 1888, 26 percent in 1889, and 49 percent in 1890. This policy had a predictable effect on the exchange rate, which rose by 10 percent in 1888, 29 percent in 1889, and 31 percent in 1890.[34]

Inflation benefitted powerful interests. Large landowners had borrowed in *cedulas*, which were repayable in paper. The banks benefitted from a regulatory regime that allowed them to emit additional notes. The provincial and national governments benefited from the activities of their captive banks. The only significant objections came from workers whose wages did not keep up with inflation, but most workers lacked the market power of the dockers who brought the port of Buenos Aires to a halt in the summer of 1889.

## 7.9 The Outbreak of Crisis

In neither 1890 nor 1994 was a crisis totally unanticipated. More than a year before December 1994, Calvo, Leiderman, and Reinhart (1993) had warned that financial transfers to Latin America depended on the level of global interest rates and that a rise in U.S. rates could create serious adjustment problems. Dornbusch and Werner (1994) argued that inflation and slow growth since 1991 had rendered the peso overvalued, implying the need for devaluation if a crisis was to be averted (see fig. 7.9). Still, there existed no consensus on the extent of the problem or the policies required to address it.

As early as 1886, there were fears for the stability of the Argentine finances. Already that year it was suggested that Barings was lending to the government mainly to support the value of Argentine securities.[35] H. G. Anderson of the London and River Plate Bank warned of a crisis as early as November 1887.

The onset of serious difficulties was marked by the failure of the Buenos Aires Water Supply and Drainage Company Loan, first floated in November 1888. The bulk of this issue was left with the syndicators, notably Baring Brothers. The head office of the London and River Plate Bank, another member of the syndicate, was led to conclude that "[t]he market has had enough of Argentine issues."[36]

Just as the Mexican government expended reserves to defer adjustment in 1994, the Argentine government did so in 1889–1890. In the spring of 1889, it became apparent that the wheat crop and the

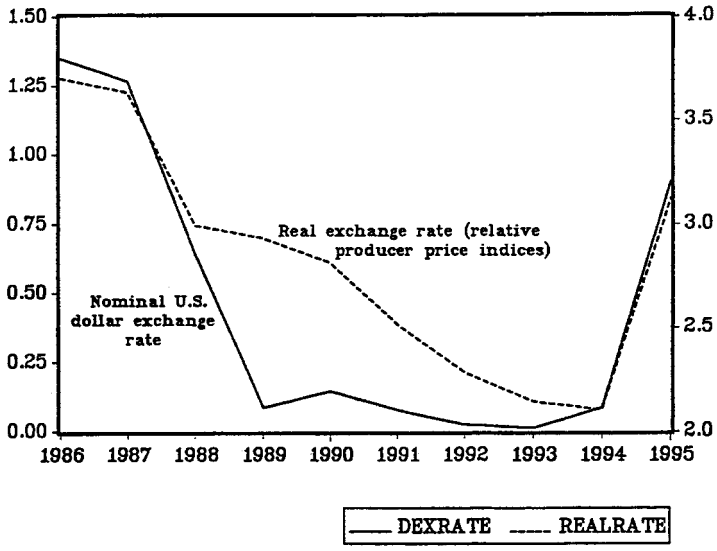


**Figure 7.9**
Mexico: Change in Dollar Exchange Rate and Level of Real Rate
*Source:* International Monetary Fund, *International Financial Statistics*.

attempt to float a conversion loan had failed. The government employed bullion sales and fresh borrowing in Europe to limit the currency's depreciation and maintain the liquidity of financial markets in the face of a weakening banking system. In May, it released 5 million pesos of gold, using bullion it had acquired in payment for bonds guaranteeing note emissions. The Free Banking Law having required the Banco Nacional to retain these funds until January 1890, this posed a clear threat to Argentina's international credit standing.

By March 1890, the Banco Nacional, its reserves exhausted, was rapidly approaching bankruptcy. In June, it warned Barings that it would be unable to meet the coming installment on the Argentine loans. The government sought to raise funds by selling the state railways, including the remaining publicly owned branches of the Andino and Central Norte lines. To recapitalize his bankrupt provincial bank, the governor of the Province of Buenos Aires ordered the sale of the Ferrocarril Oeste. This led to protest meetings in the capital, the failed coup of July, and Juárez Celman's resignation.[37] The new Pellegrini government announced a plan to restrain borrowing by the provinces and municipalities and to assume responsi-

bility for municipal and provincial debts. It attempted to restore investor confidence by raising duties on imported consumption goods (while cutting those on machinery and equipment), and it imposed a 5 percent tax on beef, hides, wool, and tallow. A 7 percent tax was levied on all premiums collected by foreign insurance companies.[38] Dr. Vittorino de La Plaza, the noted financial expert, was dispatched to London to negotiate a one-year moratorium on the foreign debt in the form of a new $20 million 5 percent loan.

De La Plaza had only began his talks when the Baring crisis broke. Barings was still saddled with the ill-fated Buenos Aires Water Supply and Drainage Loan. The market for its securities was depressed and illiquid. Barings had already been forced to borrow substantial sums to meet its obligations. Its credit lines exhausted, management made the extent of its difficulties known to the Bank of England on the weekend of November 8–9. The bank estimated that Barings needed £4 million to meet its immediate obligations and offered to contribute £1 million if the government did the same. The chancellor, Goschen, preferred a plan that did not involve the government directly. The bank reluctantly consented to start the rescue fund without a matching contribution by the government once the latter agreed to share any losses the bank incurred in its first 24 hours of operation. To ensure that the gold reserve ratio would not be violated by any injection of credit, Rothschilds negotiated a £3 million gold loan from the Bank of France against Treasury bills and William Lidderdale of the Bank of England obtained half that sum from Russia (Pressnell 1968). The bank's £1 million was quickly matched by £3 million from the major financial houses. In little more than a week, the contributions of the joint-stock banks had topped up the fund to £18 million.

What is remarkable in comparison with Mexico is that this rescue was negotiated in secret. Although rumors circulated in the City that a leading financial house was in trouble, Barings was not the only name cited, and traders remained ignorant of the extent of its difficulties. The news received by Goschen on Sunday, November 8, became public only the following Friday, by which time the £4 million fund had been assembled.[39] Given the speed with which markets respond and information circulates today, it is inconceivable that a comparable rescue could be arranged in secret.

Barings' negotiations with de la Plaza having collapsed, the financial houses formed the Rothschild Committee (headed by Nathan

Rothschild of the financial house of the same name, one of the few in London not to be engaged in business with Argentina) to restructure the country's debts. As a precondition, the committee demanded that the Banco Nacional transfer funds to meet the country's short-term debts (many of which were acceptances due Barings) and canceled Barings' obligation to pay out the final tranche of the Water Supply and Drainage Company Loan. In return, the houses represented on the committee agreed to underwrite a bond issue, the receipts from which would suffice to meet Argentina's remaining debt service for a period of three years. In effect, they agreed to defer the receipt of payment on the country's remaining obligations while protecting themselves from default on securities of which they still held considerable quantities.

The London financiers' German and French colleagues criticized this settlement as excessively generous. The committee, they objected, should have imposed harsher terms on Argentina. They complained that they had not received the same treatment as the British institutions whose acceptances Argentina had liquidated in return for receiving its loan. One is reminded of disagreements between the United States and European governments over the terms of financial assistance for Mexico in 1994–1995. Then too, the Europeans complained that the Americans proposed an excessively generous financial package. But in 1890, the British financial houses still dominated financial markets sufficiently that they could ignore these objections and proceed. In 1995, the United States needed the support of the IMF and its G-7 partners and had to reach an accommodation with them (although it retained sufficient financial and political leverage to ultimately carry the day.)

## 7.10 The Aftermath of Crisis

From the perspective of the London financial community, the crisis was as short as it was sharp. Barings was restored to health and survived another century. The implications for Argentina were not so happy. It endured a banking crisis in January, starting with a run on the Bank of the Province of Buenos Aires. Pellegrini instructed the Banco Nacional to transfer a portion of its reserve to that institution. The Banco Nacional's position having been weakened by the transfer of assets to meet the demands of the Rothschild Committee, the cri-

sis predictably spread there. Both banks were placed in liquidation, and by late spring the entire banking system had been infected. Just one bank in Argentina kept its doors open continuously: the Bank of London and the River Plate. Although Mexico also experienced serious banking problems, it avoided a banking crisis through financial assistance underwritten by U.S. and IMF loans.

In both Mexico and Argentina, the crisis caused a major shift in the current account. Mexico, its reserves depleted and capital inflows tailing off, had to boost exports and cut imports sufficiently to eliminate a current account deficit of 8 percent of GDP. Argentina had to eliminate a trade deficit of 50 million gold pesos. In Mexico, this was done mainly by increasingly the value of exports (although imports declined as well). In Argentina, in contrast, exports (in gold pesos) remained flat through 1895 (see fig. 7.2, above). The entire adjustment had to be accomplished by compressing imports, which depressed the economy for a considerable period. Railway receipts continued to decline through 1892, suggesting that recovery only set in two and more years after the crisis. Investment imports rose only marginally through the end of the 1890s, suggesting that the recovery was feeble.

Given this evidence of distress, the Argentine government was able to modify the terms of the moratorium loan in 1893. Sinking fund payments on most of the country's external obligations were deferred for a decade. Given this radical restructuring of debt contracts, foreigners remained understandably reluctant to lend. Argentina remained a net capital exporter through the end of the century.

In comparison, Mexico recovered more quickly from its crisis. Exports boomed, especially those of sectors engaged in assembly operations for the U.S. market, although the home-goods sector remained depressed. Although GDP remains below pre-crisis levels at the time of writing, the economy is expanding at respectable rates. In part, the greater severity of the Argentine crisis reflected the greater imbalance in the stance of monetary and fiscal policies and the more difficult subsequent adjustment; in part, it reflected the more extensive support Mexico received from foreign governments, which helped to stabilize the domestic financial system and restore the confidence of foreign investors. More work (and accumulation of evidence on Mexico's recovery) will be needed to assign weights to the relative importance of these factors.

## 7.11 Conclusion

In discussing another earlier crisis, Mexico in 1982, Fishlow (1986) comments that observers were "too much struck by the novelty of the event." Although the Mexican crisis of 1994–95 differs from its predecessor in important respects, Fishlow's insight remains valid. The recent crisis bears a striking resemblance to earlier lending booms and busts in bond-based capital markets. There are striking parallels with lending to Argentina in the 1880s and the Baring crisis of 1890. These include the enthusiastic reaction of investors to the combination of low interest rates in the financial centers and economic reform in the developing world; they extend to the role of state banks in accentuating the impact of foreign capital on the domestic economy and of political weakness in hamstringing the government's management efforts.

The obvious difference between the two episodes is the response of the official community. The Bank of England–led rescue of Baring Brothers in 1890 was designed to secure the stability of the London market; only secondarily was there any concern with the plight of Argentina. The U.S.- and IMF-led rescue in 1995 was concerned first and foremost with the stability of the Mexican economy and its financial system; congressional insinuations notwithstanding, it was prompted only secondarily by concern for Wall Street institutions with positions in Mexico (DeLong, DeLong, and Robinson, 1996). In part, the difference reflects the even more decentralized and diversified nature of lending to emerging markets today, when few financial institutions in the advanced industrial countries are as exposed to individual emerging markets as was Baring Brothers in 1890. In part, it reflects the proximity of Mexico to its leading creditor, the United States, and the political capital that Washington, D.C. has invested in reform south of the border.

The comparison between 1890 and 1994–1995 underscores just how difficult it has become to arrange financial rescues. It is hard to imagine that a fund like that amassed by the Bank of England in 1890 could again be assembled before panic sales of securities had compounded the problem. It is hard to imagine that the governments of leading industrial countries could reach agreement as quickly as the leading financial houses of London did. Capital markets have grown even more decentralized and multinational

than they were in 1890. United States dominance no longer matches that enjoyed by Britain a century ago. Managing future Mexicos will require cooperation among G-10 governments and multilateral institutions. Although the accelerated response procedures recently adopted by the IMF and the decision to double the General Arrangements to Borrow are steps in the right direction, there remain real questions of whether they go far enough.[40]

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# 8 The EMS Crisis in Retrospect

## 8.1 Introduction

The Mexican crisis was not the first currency and financial crisis of the 1990s. Two years earlier, Europe had endured an equally dramatic crisis of its own. In September 1992, the lira and pound sterling were driven from the Exchange Rate Mechanism of the European Monetary System. The peseta, the escudo, and krona (not officially a member of the EMS but pegged to the ECU) suffered the same fate two months later. Early in 1993, Spain and Portugal, together with Ireland, were forced to devalue again due to another surge of speculative pressure. By the summer, when market participants turned their attention to France, the fate of the EMS and of Europe's monetary unification project hung in the balance.

Europe is different from Latin America, a point so obvious that it hardly bears stating. Europe's developed, diversified economies are less volatile. Its financial markets are deeper. Its governments and firms have the reputation and capacity to borrow at long term in their own currencies. Above all, there is a commitment to political integration and monetary cooperation unlike any that exists in other parts of the world. The credibility of this commitment—which could be and was doubted in 1992—is of an entirely different sort than any that has so far developed in Latin America or, for that matter, Asia.

Despite these differences, many of the debates provoked by the EMS crisis will resonate with those acquainted with its emerging-market successors. There is the debate over fundamentals (real overvaluation, excessive deficits, excessive rates of money and credit growth) versus destabilizing shifts in investor sentiment in the outbreak of the crisis. There is the debate over the importance of

imbalances in the crisis countries themselves versus shocks from outside (in the European case, the German unification shock; in the Mexican case, the U.S. interest rate shock). There is the debate over the role of capital account liberalization in heightening financial risks (most of Europe's capital controls having been removed in the years leading up to the crisis). There is the role of highly leveraged institutions. There is the importance of banking-sector problems in limiting resort to interest rate increases to defend the currency. Replace "Europe" with "Latin America" (or, for that matter, "Asia"), and the same debates apply.

Above all, there are the lessons of the EMS crisis for monetary and exchange-rate policies. My reading is that Europe's experience underscores the difficulty of pegging exchange rates in a world of high capital mobility and establishes the existence of but two viable options for countries seeking to reconcile financial stability with financial openness: monetary unification, which was achieved in Europe through the creation of a new currency and a transnational central bank but will more likely be achieved in Latin America through dollarization; and a more freely floating exchange rate anchored by a clear and credible monetary policy strategy, namely, inflation targeting. Although the 11 founding members of what is now the euro area gradually hardened their exchange rate pegs before taking the leap to monetary unification, other European countries, notably the United Kingdom and Sweden, continue to float and to target inflation. Europe's experience thus suggests that both floating and dollarization may have a future in Latin America as well.

## 8.2 The Context

Every crisis has its context. What was distinctive about Europe's was the depth of the commitment to stabilizing exchange rates. The "quest" for exchange rate stability (as Giavazzi and Giovannini 1989 put it) was rooted in a desire for monetary and financial stability, which is hardly unique to Europe, but also in a commitment to economic and political integration. Since the 1950s, integration has been the organizing principle for Europe's international relations. The integrationist agenda has always had an economic component, starting with the creation of a European customs union in the 1960s and culminating with the agreement to forge a single market in 1986. It has always had a political component, as reflected in the creation of the

European Parliament, the European Court of Justice, and the European Commission.

Monetary integration was tied to both of these elements. It was integral to economic integration, for exchange rate volatility threatened to wreak havoc with competitive advantage and to erode political support for the customs union.[1] Exchange rate changes disrupted the operation of the Common Agricultural Policy, the European Community's first concrete achievement.[2] With the move from customs union to single market, arbitrary and capricious exchange rate changes threatened to produce even larger shifts in the direction of trade and to provoke an even larger backlash. More even than in NAFTA, where integration largely stops at the border, European initiatives extending well beyond the removal of border controls to the creation of a single labor market and a single financial market caused exchange rate fluctuations and economic integration to be seen as incompatible.[3]

Monetary integration was also the vehicle for pushing forward political integration. The formulation and implementation of a single monetary policy required new institutions and deliberative bodies, facilitating the institutionalization of cooperation. Starting with the Werner Report in 1970, monetary policy was the lever used to pry open the door to political integration, and, predictably, the strongest opposition to the monetary project (as in the United Kingdom) came from committed anti-federalists. To say that monetary integration was a concomitant of political integration may be too simple, but it is impossible to imagine a European monetary project that took the form it did in the absence of the political motor.

The collapse of the Bretton Woods System in 1971–1973 and the resulting volatility in financial markets heightened the urgency of efforts to create a zone of monetary stability. Europe's first attempt, the Snake, was less than successful. The success of the next initiative, the EMS, a multilateral parity grid established in 1979, surprised even the optimists. In retrospect, the ingredients of this success are clear. Compared to the Snake, the EMS provided for more liberal credit lines.[4] It was supported by a firmer political commitment.[5] The global environment was more favorable; none of the shocks of the 1980s were as severe as the first oil shock and the productivity slowdown of the 1970s.[6] France's commitment to price stability having come under a cloud as a result of President Mitterrand's abortive Keynesian experiment in 1981–1983, Germany emerged as the an-

chor for exchange rate and inflation expectations. Moreover, there was a greater willingness to harmonize policies once governments absorbed the lessons of Mitterrand's failed effort to go it alone.[7] Because there was provision for realigning ERM currencies, policy harmonization did not consign governments to a macroeconomic straitjacket. There was a readiness to coordinate those realignments, which could be negotiated in advance, courtesy of the breathing space provided by capital controls. These were the elements that sustained the EMS through its first seven years of operation.

Then came the single market agreement in 1986. An essential step toward creating a single capital market was removing controls on cross-border capital flows. The implications of doing so for the narrow-band EMS were not fully appreciated. With the removal of capital controls over the subsequent five years, realigning became problematic. The merest hint that the authorities were contemplating a change in parity could prompt the markets to launch a preemptive strike; hence, the option could no longer be discussed in polite company. Where there had been 11 realignments between the birth of the EMS and January 1987, there were none from that point to the crisis in 1992.[8] Commentators (e.g., Giavazzi and Spaventa 1990) began to distinguish between the Old (flexible) and New (rigid) EMS.

The EMS was then buffeted by far-reaching changes to the global economy. There was the growth of international financial transactions, most notably after the Brady Plan allowed banks to write down and sell off their nonperforming loans to developing countries. There was the deregulation of financial markets, the surge in bank lending, and the growth of financial institutions that fed on this credit, notably macro hedge funds that lacked long-term relationships with the governments of the countries whose currencies they traded. There was the Soviet collapse and German unification. The impact of German unification on the European economy was not hard to anticipate. Early analysts such as Begg et al. (1990) hit the nail on the head, forecasting strong domestic demand fueled by deficit spending and high interest rates as the Bundesbank sought to limit the inflationary consequences.[9] But if the macroeconomic effects were foreseen, the consequences for the EMS were not.

## 8.3 The Crisis

Those consequences showed up first in Finland, not a member of the EMS (because Finland was not yet a member of the EU) but an ECU

pegger. Finland's exports were hit by the disintegration of the Soviet economy. Its banks and firms were heavily exposed as a result of the credit boom that had followed financial liberalization in the mid 1980s, and rising German and European interest rates then made it more difficult for them to fund their operations. The magnitude of the problem became apparent in late 1991, when the Bank of Finland devalued the markka by 12 percent. But this adjustment turned out to be woefully inadequate to restore the health and vigor of the Finnish economy.

Similar problems afflicted other European countries. There were questions about the competitive position of Italy and the United Kingdom. Italy, as a number of other EU member states with recent histories of inflation, had used the EMS as a way of importing the Bundesbank's anti-inflationary credibility. As in any exchange rate based stabilization, not just current inflation but also the cumulative effects of past inflation were built into the price level, creating overvaluation problems. Because inflation stabilized less rapidly than the exchange rate, interest rates were also slow to come down. Investors borrowed in low-interest-rate markets (Japan and the United States) and invested where interest rates were high on the assumption that ERM pegs were firm.[10] These inflows fueled bank lending and domestic credit expansion; they papered over problems. The label attached to this process may have been "the convergence play" rather than "the carry trade" (the 1990s variant to gain infamy as a result of the Mexican and Asian crises), but the mechanism was fundamentally the same.[11] And if doubts arose about the stability of exchange rate pegs, these convergence plays could be quickly unwound.

In Britain, the problem was having entered the EMS at an unsustainably high exchange rate. The pound had appreciated, despite inflation, with the country's macroeconomic boom, and recession and unemployment loomed just as sterling went into the EMS.[12] Indeed, concern over unemployment was continentwide: together with the weakness of banking systems, it raised the question of whether central banks and governments had the will to defend their exchange rates if they came under attack.

If governments chose to stay the course, it would be for political reasons and the belief that defending the EMS was essential to the survival of the monetary union project. The Delors Report, accepted by the council at the Madrid Summit in June 1989, and the Maastricht Treaty, negotiated in 1991 but not yet ratified, raised the stakes. The Maastricht Treaty made participation in the EMS, with no

involuntary devaluations, a precondition for qualifying for EMU.[13] Countries displaying an inadequate commitment to defending their currencies might be barred from joining the monetary union, thereby jeopardizing their standing as good Europeans.

When Danish voters narrowly rejected the treaty in their June 2 referendum, this presumption was shattered. If there might be no monetary union to aspire to, there was less incentive to pursue painful policies of austerity. Financial markets quickly recognized the implications. Italy, where competitiveness problems had built up as a result of chronic inflation, became an obvious target. Despite not straying from its EMS band since it had been narrowed from 6 to $2\frac{1}{4}$ percent in January 1990, the lira now fell to its lower limit.[14] The Bank of Italy hiked interest rates, but to no avail; the markets were more alarmed by the implied increase in debt service than they were reassured by the signal of commitment.[15] The three currencies still operating the wide band (sterling, the peseta, and the escudo), whose credibility was least, weakened in response.[16]

The pressure mounted with the approach of the French referendum scheduled for September 20, because another rejection of the treaty would leave monetary unification dead in the water. On August 26, the pound fell to its ERM floor despite Bank of England intervention. Within 48 hours, it was joined there by the lira. The effort to negotiate a coordinated response (a devaluation of the weak ERM currencies—essentially all of them except the DM and the Dutch guilder—The Netherlands being regarded by the markets as just another German *länder*—together with a reduction in German interest rates) at a meeting of economy and finance ministers in Bath in early September went badly wrong. Germany, preoccupied by inflation, refused to reduce interest rates, while France, Britain, and Spain, fearing the consequences of association with Italy, avoided all discussion of a general realignment of ERM currencies as a precondition for looser German monetary policy. The prospects for cooperation dimmed.

The consequences became apparent on September 8, when Finland abandoned its peg and the markka depreciated by 15 percent. The size of the drop implied large potential profits if other weak European currencies responded similarly, prompting traders to turn to Sweden, which superficially resembled its Nordic neighbor. Over the next week, the Riksbank, to defend the ECU peg, raised its marginal lending rate to triple digits. The Bank of Norway supported the

krone with very extensive intervention. Despite raising short-term interest rates to more than 30 percent, the Bank of Italy found its reserves on the verge of exhaustion. The formula presented at Bath —a general realignment coupled with a German interest rate cut— was run up the flagpole again, but once more, ERM members failed to salute. Following bilateral negotiations with Germany, Italy devalued the lira by 7 percent on September 13, and the Bundesbank lowered its Lombard rate by 25 basis points.[17]

This tale of mounting tensions, culminating in the inevitable tragedy, is told with benefit of hindsight. Europe's exchange rate pegs were fragile, reflecting a combination of macroeconomic imbalances and structural weaknesses. Governments and central banks had a limited political capacity to defend their currencies, and the monetary union project had uncertain prospects. It is no surprise, in retrospect, that currency speculators trained their attention on the EMS or that their campaign ultimately succeeded.

The aura of inevitability surrounding this account makes it important to recall that this outcome seemed far from assured at the time. Many years had passed since ERM parities had been changed. The commitment to monetary union continued to shape official decisions, Danish referendum or not. Measures of market expectations, whether the forward exchange rate (as in Eichengreen and Wyplosz 1993), trend-adjusted measures of realignment expectations (as in Rose and Svensson 1994), or realignment probabilities derived from options prices (as in Campa and Chang 1996) suggest that no significant likelihood was attached to realignment until the weeks immediately preceding the crisis.

September changed this. The first realignment in five years reminded observers that the devaluation of European currencies was still possible. The refusal of other countries to agree on a simultaneous realignment against the DM and the Bundesbank's reluctance to cut interest rates by more than a small margin intensified the pressure on Europe's weak currencies. This was the point at which George Soros's positions against sterling became known (Muehring 1992). The news on Tuesday, September 15, that the German newspaper *Handelsblatt* would the next day publish an interview with Bundesbank president Schlesinger saying that "further devaluations could not be excluded," and the absence of a firm rebuttal by the German central bank, ratcheted up the pressure. The British government and the Bank of England hesitated to raise interest rates,

apparently fearing that further hikes would aggravate unemployment and incite a rebellion in the Conservative bank benches.[18] At the height of the speculative attack, on Wednesday, September 16, the bank raised its base lending rate from 10 to 12 percent and announced the intention of raising it by a further 300 basis points the following day. But the first increase was delayed by more than an hour following the opening of the markets and was in any case a feeble response by the standards of, say, the Riksbank. It had no discernible impact on the currency.[19] Doubts took hold even before the second increase was implemented; it was quickly rescinded. That evening, the EC Monetary Committee accepted Britain's request to take the pound out of the ERM (and did the same for Italy and the lira) but rejected London's request to suspend the ERM entirely.[20] In addition, the Monetary Committee then authorized a 5 percent devaluation of the peseta.

From this point on, no ERM currency (other than the Deutschmark and the Dutch guilder) was immune. The Bank of France was forced to raise interest rates, despite French voters' ratification of the Maastricht Treaty. The French central bank spent $32 billion on the franc's defense in the week ending September 23. Sweden abandoned its ECU peg on November 19, following reserve losses of $26 billion (more than 10 percent of Swedish GNP) in the preceding six days.[21] Denmark was forced to raise interest rates, followed by Spain and Portugal, and after three days, the peseta and escudo were devalued by (in the Spanish case, a further) 3 percent. Norway abandoned its ECU peg on December 10, and Ireland devalued by 10 percent within the ERM on January 30.

Although the Danish krone and Belgian franc also came under attack in early 1993, the center of attention was now Iberia. Spanish unemployment had risen to 20 percent. The release in mid-February of disappointing unemployment figures for the final quarter of 1992 ignited selling pressure, and the calling of elections for April 12 created uncertainty about the intentions of the government. Reserve losses forced another 8 percent devaluation on May 13, and the spillover to neighboring Portugal forced that country to devalue by another $6\frac{1}{2}$ percent.

Investors now had France in their sights. French unemployment had been a concern throughout the period. It placed the French government under pressure not to raise interest rates to defend the

franc and the German government under pressure to lower them to support its Gallic neighbor. On June 24, the French economy minister, Edmond Alphandery, demanded a meeting with his German counterpart, Theo Waigel, for the purpose of coordinating reductions in German and French interest rates; Waigel, citing pressing business, declined. When the Institut National de la Statistique et des Etudes (INSEE) released a gloomy report on the French economy, the franc crumbled. On July 14, it approached its maximum permissible divergence against the DM, forcing the Bundesbank to intervene. But on the last Thursday of the month, at its final regular meeting of the summer, the Bundesbank Council declined to lower the discount rate (citing recent German money supply figures that showed that money supply targets had again been overshot).[22] Massive market sales of francs prompted equally massive purchases by the Bank of France (which expended more than $32 billion of reserves in the last week of July—80 percent of this on July 29, the last trading day of the month). The Bundesbank's reserves, meanwhile, rose by DM 40 billion (some 33 percent), again foreshadowing a sharp increase in the money supply.

By now the writing was on the wall. The Bank of France lacked the reserves to continue intervening, and for the Bundesbank to do so threatened its anti-inflationary objectives. For the same reasons, neither central bank was prepared to alter interest rates. In a crisis meeting over the last weekend of July, Europe's central bank governors and finance ministers widened the ERM's bands to 15 percent. Only time would tell whether this decision was compatible with the Maastricht blueprint, but the impending opening of the Tokyo market (in just minutes when the decision was taken) left them no choice.

Turmoil in foreign exchange markets then subsided. Eliminating the one-way bet reduced speculative activity: because other currencies could now rise as well as fall against the DM within the wide band, the costs of losing a speculative bet were greatly increased. Eventually, reductions in German interest rates helped reduce the pressure. And, perhaps most importantly, EU members reiterated their commitment to move ahead with monetary unification, Danish referendum or not; this meant that the disciplining effects on fiscal policy of the Maastricht convergence criteria would increasingly bite. So reassured, the markets settled down, and the crisis receded.

## 8.4 Two Interpretations

The debate over the causes of the crisis is typically framed in terms of first- versus second-generation models.[23] In first-generation models (e.g., Krugman 1979), excessively expansionary macroeconomic policies pointing to the eventual exhaustion of reserves precipitate the speculative attack. In second-generation models (e.g., Flood and Garber 1984b; Obstfeld 1986), the reverse is true: the attack precipitates the change in policies that validates the expectations of the exhaustion of reserves. The first generation can be thought of as modeling a current account crisis. Excessively expansionary policies generate current account deficits that cannot be financed indefinitely; when financing becomes a constraint, the crisis erupts. In contrast, the second generation can be seen as modeling a capital account crisis in which swings in the capital account first allow current account deficits to be financed and then require them to be eliminated all at once through an uncomfortably large shift in relative prices.

The first interpretation points to the reluctance of the authorities to pursue policies consistent with the maintenance of their currency pegs. Budget deficits were large, and governments and central banks were reluctant to match the level of interest rates prevailing in Germany, against whose currency they were de facto pegging. The role of hedge funds and other currency speculators was to identify this problem, to foresee the eventual exhaustion of reserves, and to anticipate the inevitable exchange rate adjustments.

The second interpretation, by comparison, attributes a more active role to the markets. Currency traders, in this view, "ganged up" on Europe's central banks and governments. They forced the authorities to raise interest rates in order to defend their ERM parities. Although maintaining those parities might have been tolerable under normal market conditions, this was no longer true once confidence was lost and interest rates had to be jacked up regardless of existing economic difficulties. After enduring this battering for a few days, the Italian and British governments threw in the towel, allowing their currencies to depreciate.

The first round of post-crisis studies did not succeed in deciding between these two interpretations owing to the difficulty of giving empirical content to these theoretical constructs. A decade later, we are unable to do much better. The gap between theory and empirics remains large. Any model will be over-determined in the sense that

we have only one observation (the 1992 crisis) and any number of coefficients to estimate (each representing a different set of factors).[24] Nonetheless, I will suggest that a decade of discussion and rumination has led to the emergence of a synthesis combining elements of the current and capital account based interpretations in something that approaches a consensus view.

## 8.5 A Current Account Crisis

The competitiveness interpretation should enjoy the benefit of the doubt if only because a number of countries (Italy and Spain prominent among them) had been following policies of exchange rate based disinflation.[25] Exchange rate based stabilization tends to aggravate problems of competitiveness. Even if pegging the currency accelerates the transition to price stability, inflation is still likely to take time to decline to the levels prevailing in the anchor country. One or two points of extra inflation will cumulate to 5–12 points of overvaluation over a five-year period such as that from 1987 to 1992.

In Europe's case, there were, in addition to the problems created by exchange rate based stabilization, the effects of fiscal stimulus, as governments sought to avoid importing recession from the United States and United Kingdom. Deficits as a percentage of GDP rose between 1991 and 1992 in six of 10 European countries. The exceptions were Germany, Italy, Spain, and Portugal, where deficits were already large[26] (see table 8.1).

In addition, there was the shock to competitiveness from a declining U.S. dollar. The dollar fell by nearly 20 percent against the DM between April and August, reflecting interest rate cuts by the Federal Reserve intended to jump-start recovery from the 1991–1992 U.S. recession (fig. 8.1). The lower dollar aggravated problems of competitiveness in Europe that were felt disproportionately by the continent's weak-currency countries.[27]

It is worth emphasizing the contrast between this story and that told of the role of interest rates in the Mexican crisis. Whereas it was falling U.S. interest rates that aggravated Europe's crisis, it was rising U.S. interest rates that compounded Mexico's difficulties. Both stories can be correct, of course, if one believes that Europe's was predominately a current account crisis (lower U.S. interest rates, leading to a lower dollar, undermined Europe's competitiveness on current account), whereas Mexico's was predominately a capital

**Table 8.1**
Performance of ERM Members Relative to the Deficit and Debt Criteria

| | Deficit/GDP (%) | | | | | Debt/GDP (%) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 1992 | 1993 | 1994 | 1995 | 1991 | 1992 | 1993 | 1994 | 1995 |
| Austria | 2.4 | 2 | 4.1 | 4.4 | 5.5 | 56.6 | 56.1 | 63 | 65.2 | 68 |
| Belgium | 6.5 | 6.6 | 6.6 | 5.3 | 4.3 | 132.6 | 134.4 | 141.3 | 140.1 | 138.3 |
| Denmark | 2.1 | 2.9 | 4.5 | 3.9 | 2.1 | 60.9 | 63.1 | 66.8 | 68.7 | 68.8 |
| Germany | 3.3 | 2.9 | 3.3 | 2.5 | 2.3 | 42.7 | 47.3 | 51.8 | 54.6 | 62.5 |
| Finland | 1.5 | 5.8 | 7.9 | 5.5 | 5 | 23.2 | 42.7 | 56.2 | 62.7 | 69.1 |
| France | 2.2 | 4 | 6.1 | 6 | 5 | 41.1 | 45.6 | 52.9 | 56.8 | 59.5 |
| Greece | 11.5 | 12.3 | 13.2 | 12.5 | 11.4 | 81.7 | 88.6 | 117.1 | 119.8 | 120.2 |
| Ireland | 2.1 | 2.2 | 2.3 | 2.2 | 2.5 | 95.3 | 90.7 | 92.7 | 87.9 | 83.3 |
| Italy | 10.2 | 9.5 | 9.6 | 9 | 7.8 | 103.9 | 111.4 | 120.2 | 122.6 | 122.1 |
| Luxembourg | 1 | 2.5 | 2.1 | 2.3 | 1.4 | 6 | 7 | 7 | 7 | 8 |
| Netherlands | 2.8 | 3.8 | 3.2 | 3 | 3.3 | 76.4 | 77.1 | 78.5 | 79 | 79.4 |
| Portugal | 6.5 | 3.3 | 7.1 | 5.7 | 5.4 | 62.2 | 63.2 | 67.8 | 70.4 | 70.8 |
| Spain | 4.9 | 4.2 | 7.5 | 6.6 | 6.2 | 49.9 | 53 | 59.4 | 63.5 | 66.5 |
| Sweden | 1.1 | 7.5 | 13.4 | 10.4 | 9.2 | 53.7 | 69.8 | 74.6 | 79.4 | 84.5 |
| United Kingdom | 2.6 | 6.1 | 7.9 | 6.5 | 4.2 | 35.5 | 41.4 | 47.4 | 51.6 | 53.4 |

*Source:* Buiter, Corsetti, and Pesenti 1998.

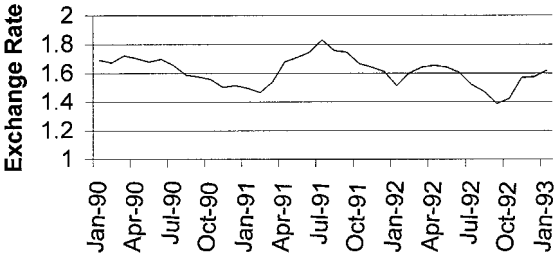



**Figure 8.1**
Deutschmark-Dollar Exchange Rate
*Source:* Datastream.

account crisis (higher U.S. interest rates curtailed capital flows to Mexico, compressing the capital account).[28]

Uncomfortably for the exponents of this view, widespread overvaluation was not evident to the naked eye. In part, this reflects the limitations of the data. The wholesale and retail price indices (even the GDP deflators) on which estimates of competitiveness are based show little movement insofar as they are dominated by the prices of traded goods whose divergence is minimized by commodity-price arbitrage. Relative unit labor costs are more informative insofar as labor services are nontraded (table 8.2). For Italy, unit labor costs relative to the country's ERM partners rose by 7 percent between the advent of the New EMS and the onset of the crisis.[29] For Spain, the movement of relative unit labor costs was roughly the same, although the economy's shift in this period into the production of higher value added goods creates index-number problems and doubts about the figures. In the United Kingdom, there was also a significant increase in relative unit labor costs from their end-1986 trough, though this predated sterling's 1990 entry into the EMS.[30] For Sweden, there is similar evidence for the second half of the 1980s.

But for no other European country do these indices provide evidence of real overvaluation. That Italy, Spain, the United Kingdom, and Sweden were four of the first countries to feel speculative pressure tells us that the competitiveness story is important. But the absence of comparable evidence elsewhere is troubling for the first-generation story given the indiscriminate nature of the subsequent attacks.[31]

These data may be less than informative, however, due to the German unification shock. Kohl's pledge not to raise taxes to finance the costs of unification, and the explosion of spending on unemployment benefits and pensions for residents of the Eastern *länder* (with the goal of limiting politically sensitive migration to the western states), together with increased spending on infrastructure repair and environmental clean-up, stimulated demand in Germany. Given the disproportionate propensity of residents to consume domestically produced goods, this fiscal-driven surge in demand required a rise in the relative price of German goods. This change in relative prices could come about in three ways. First, German prices could rise. But here the Bundesbank's aversion to inflation froze the mechanism. Second, altering exchange rates against the Deutschmark

**Table 8.2**
Indicators of Cumulative Competitiveness Changes[a] (in percent)

| Country | Relative to other EC countries[b] | | Relative to industrial countries | | Relative to other EC countries[b] | | Relative to industrial countries | |
|---|---|---|---|---|---|---|---|---|
| | Producer prices | Unit labor costs[c] | Producer prices | Unit labor costs[c] | Producer prices | Unit labor costs[c] | Producer prices | Unit labor costs[c] |
| | 1987–August 1992 | | | | 1987–December 1992[e] | | | |
| Belgium | 4 | 5.6 | 1.3 | 2.7 | 0.9 | 1.9 | −0.3 | 0.3 |
| Denmark | 3.6 | 6.4 | −0.5 | 3.8 | −1.9 | 4.1 | −4.9 | 1.9 |
| Germany (Western) | 1.7 | 0.5 | −3.8 | −5.5 | −4.3 | −6.6 | −5.5 | −8.6 |
| Greece | n.a. | n.a. | −10.2 | −15.6 | n.a. | n.a. | −10.8 | −13.4 |
| France | 7.9 | 13.3 | 3.3 | 7.2 | 3.1 | 8.1 | 1.7 | 5.1 |
| Ireland | 6.4 | 35.7 | 1.3 | 27.9 | −0.6 | 26.6 | −1.9 | 23.6 |
| Italy | −3 | −7 | −6.4 | −9.8 | 11.1 | 5.7 | 8.2 | 4.6 |
| Netherlands | 1.5 | 5.2 | −1.4 | 1.9 | −2.6 | 2.1 | −3.9 | 0.1 |
| | From ERM entry[d]–August 1992 | | | | From ERM entry[d]–December 1992[e] | | | |
| Spain | −2.1 | −7.5 | −8.1 | −13.8 | 4.2 | −2.2 | 0.5 | −6.2 |
| Portugal | n.a. | −4.6 | n.a. | −6.9 | n.a. | −9.5 | n.a. | −9.5 |
| United Kingdom | −1.7 | −0.4 | −4 | −1.7 | 8.3 | 13.2 | 8.7 | 13.2 |

*Source:* Bank for International Settlements (BIS) (1993), except for the Spanish and Italian data, which were provided by the respective central banks.

*Notes:* (a) Negative numbers indicate losses. (b) Excluding Greece. (c) Manufacturing sector. (d) Spain: June 1989; Portugal: April 1992; United Kingdom: October 1999. (e) Estimates.

could accomplish the task. But other countries were reluctant to change their parities, given the exchange rate based disinflation strategies they had been following and the Maastricht requirement to keep their currencies stable within the ERM. This left only a fall in price levels relative to the Germany's (equivalently, an inflation rate lower than Germany's) to bring about the requisite adjustment.

This interpretation has been advanced by authors such as Branson (1994) as a way of reconciling the competitive-imbalance story with the absence of a strong trend in relative inflation rates. Although their logic is impeccable, it is hard to know how much importance to attach to the argument. In the absence of a fully specified model, in other words, it is hard to know whether the observed movement in relative prices was inadequate. Eichengreen and Wyplosz (1993) consider the quantities affected by these relative prices—the current account deficit and manufacturing-sector profitability—and find that only in Italy did both variables deteriorate during the run-up to the crisis, unambiguously suggesting deteriorating competitiveness.[32]

A second attempt to rescue the interpretation emphasizes the implications of the Danish referendum. Satisfying the convergence criteria of the Maastricht Treaty required eliminating excessive budget deficits and matching the inflation and interest rates of Europe's low-inflation countries.[33] If the Maastricht Treaty was not going to be ratified, then the pressure was off, allowing governments and central banks to revert to their inflationary ways. Even if competitiveness problems were not yet evident, they would surface soon enough. In particular, countries where unemployment was high would not want to match the high level of German interest rates (and, by implication, the low level of German inflation). The normal behavior of their central banks would have been to reduce rates in the face of this unemployment (Clarida, Galí, and Gertler 1997), and it was only the Maastricht promise of a reward that prevented them from doing so. As unemployment rose still further, the pressure for interest rate reductions intensified (table 8.3). As German interest rates ratcheted up, this tension ratcheted up with them. When "plucky little Denmark" (as Norman Lamont referred to the country) rejected the treaty, it cast doubt over the premise that countries that resisted the temptation to relax would reap a reward down the road. Traders, anticipating that governments were about to throw in the towel, sold off the currencies of Europe's high-unemployment countries.

**Table 8.3**
Unemployment Rates[a]

| Country | Percentage of civilian labor force | | | |
|---|---|---|---|---|
| | 1987–89 average | 1990 | 1991 | 1992[b] |
| Belgium | 10 | 7.6 | 7.5 | 8.2 |
| Denmark | 6.6 | 8.1 | 8.9 | 9.5 |
| Germany (Western)[c] | 6.1 | 4.8 | 4.2 | 4.5 |
| Greece | 7.5 | 7 | 7.7 | 7.7 |
| Spain | 19.1 | 16.3 | 16.3 | 18.4 |
| France | 9.9 | 9 | 9.5 | 10 |
| Ireland | 17 | 14.5 | 16.2 | 17.8 |
| Italy | 10.9 | 10 | 10 | 10.1 |
| Luxembourg | 2.1 | 1.7 | 1.6 | 1.9 |
| Netherlands | 9.2 | 7.5 | 7 | 6.7 |
| Portugal | 5.9 | 4.6 | 4.1 | 4.8 |
| United Kingdom | 8.7 | 7 | 9.1 | 10.8 |
| *EEC* | | | | |
| Average | 9.7 | 8.3 | 8.7 | 9.5 |
| Dispersion[d] | 2.7 | 2.6 | 3.3 | 3.7 |
| *ERM Original Narrow Band* | | | | |
| Average | 8.1 | 7.2 | 7.1 | 7.4 |
| Dispersion[d] | 2.2 | 2.2 | 2.8 | 2.9 |
| United States[e] | 5.7 | 5.5 | 6.7 | 7.3 |
| Japan[e] | 2.5 | 2.1 | 2.1 | 2.2 |

*Source:* Eurostat
*Notes:* (a) Standardized definition. (b) Preliminary. (c) For 1992, unemployment rates (national definition) 14.3% for Eastern Germany and 7.7% for the whole of Germany. (d) Weighted standard deviation. (e) Percentage of total labor force.

The problem with this interpretation is that there was no monetary explosion or loss of fiscal discipline following the Danish "*nej*." Deficits may have been excessive, but this had already been true before the Danish referendum, and there was no subsequent change in fiscal stance[34] (see again table 8.1). Although Denmark's participation in the Maastricht process was now in doubt, other member countries remained as committed as ever.

These interpretations are more convincing if they can explain the timing of events. Timing certainly favors the Maastricht-based interpretation, given how volatility spiked with the Danish referendum. Yet European governments repeatedly reaffirmed their commitment to the Maastricht glidepath, and even the most forceful statements

to this effect (and unchanging monetary and fiscal policies) did not make the volatility go away. It can be argued that their statements were not taken at face value, but only for Italy is there evidence of imperfect credibility in the behavior of asset prices.[35]

Can German unification explain the timing? Buiter, Corsetti, and Pesenti (1998, 41) suggest that the Bundesbank held off raising interest rates in the hope that the German government would show fiscal restraint, but by the second half of 1991 it had been overwhelmed by evidence to the contrary. When German inflation accelerated to 4 percent (not an alarming figure for other countries, but truly horrifying by German standards), it raised interest rates "regardless of the consequences for the domestic real economy and with utter disregard for the international implications of its policies."[36] Clarida, Galí, and Gertler (1997) argue on the basis of monetary policy reaction functions that the Bundesbank pushed interest rates above predicted levels immediately before the EMS break-up; if so, this could explain the timing of the crisis. But their reaction functions under-predict interest rates over the entire preceding five years, not just in 1992.[37] This makes it hard to interpret the forecast errors for months immediately preceding the crisis.

Thus, this picture of the ERM break-up as a current account crisis (suitably amended for the German unification and Danish referendum shocks) takes us some way toward understanding the timing and character of events. Of course, this interpretation benefits from 20-20 hindsight. A sense of how things looked at the time can be gleaned from the October 1992 *World Economic Outlook* (IMF 1992), presented to the IMF Board on September 2–4. The WEO did not warn of real overvaluation, unsustainable current account deficits, or an impending crisis. Insofar as the markets and their monitors did not see problems as inevitable, one cannot help but feel that the preceding analysis is incomplete.

## 8.6 A Capital Account Crisis

Completing the picture requires adding a role for the capital account. Although the first half of the 1980s had seen EMS members devalue under pressure, the intensity of that pressure had been limited by controls. The first occasion when the capital account was fully open was 1992, with implications for both the pre-crisis and crisis periods.

Recall that the Maastricht Treaty included a requirement that countries bring their inflation rates down to the levels prevailing in Europe's low-inflation countries in order to quality for monetary union. The desire of Europe's inflation-prone countries not to be left on the platform when the train left the station encouraged the belief that they would take whatever steps were necessary for their inflation rates to converge to those prevailing elsewhere on the continent. As their inflation rates came down, so would their interest rates.[38] This was the logic for the "convergence play."[39]

To be sure, the convergence play was not entirely Maastricht related. Inflows into the higher-yielding ERM currencies had occurred over the 1987–1991 period that preceded the negotiation of the Maastricht Treaty (and the first half of which preceded the Delors Report). The success of countries in bringing down inflation in the context of their ERM-centered exchange rate based stabilization strategies had set these inflows in train. Thus, capital inflows into both Italy and Spain tripled between 1986–1988 and 1989–1991. Interest rate spreads on one-year Eurocurrency deposits fell from 800 to 200 basis points. When the United Kingdom entered the ERM in October 1990, it too found itself on the receiving end of these financial flows. Banks and firms funded themselves abroad, borrowing in deutschmarks and guilders. The IMF reported estimates of convergence plays as high as $300 billion.[40] Many of these were booked by hedge funds and other institutional investors who saw easy money to be made.

So far, our analysis includes no autonomous role for the capital account. The negative outcome of the Danish referendum affected the direction of capital flows only because it gave grounds for anticipating that policy would shift in a more expansionary direction. Capital flows simply responded to the prospective change in policy in this view; they did not precipitate it.

An autonomous role for capital movements enters if we consider the possibility that this policy shift was contingent on the level of interest rates. European governments were trading off the costs of maintaining the exchange rate, in the form of the high interest rates needed to defend it, against the perceived benefits of qualifying for monetary union down the road. The front-loaded costs increased with the slowing of economic growth.

The most obvious cost of high interest rates and a high exchange rate was the squeeze on industrial profitability and high unemploy-

ment. In Sweden and Finland, in addition, the high exchange rate and high interest rates compounded the difficulties of a weak banking system and constrained the government in its pursuit of policies to resolve them. In Italy, a country with a debt/GDP ratio in excess of 100 percent, a large portion of which ran short terms to maturity, a hundred-basis-point increase in the central bank's discount rate added 13 trillion lire to the budget deficit. Hence, high interest rates meant fiscal strains and difficult political choices. And in Britain, where mortgage interest rates were indexed and higher interest rates threatened to depress property values, monetary stringency provoked howls of protest as "[t]he bailiffs began arriving in the leafy avenues of the Home Counties and in the chic new developments of London's Docklands to repossess the homes of Thatcher's children."[41]

Thus, a policy that was optimal in the absence of a loss of investor confidence could become suboptimal if capital flows reversed direction. If it became necessary to ratchet up interest rates to counter that loss of confidence, the terms of trade between unemployment now and EMU membership later would change for the worse. Governments previously prepared to accept the unemployment associated with the prevailing level of interest rates in return for the golden ring of EMU membership might no longer regard the game as worth the candle. They would abandon their ERM parities, reduce interest rates, and allow their currencies to depreciate. This is, as theorists refer to it, a model with multiple equilibria and contingent policy shifts, where the policy that is chosen depends on the direction of capital flows. It is a model with an autonomous role for the capital account.[42]

Clearly, not all countries were exposed equally to these pressures. It was those with high unemployment, weak banking systems, large amounts of short-term debt, and indexed mortgage rates for whom interest rate increases were least tolerable, and that were presumably most inclined to abandon the exchange rate commitment due to a sudden loss of confidence. In this sense, this interpretation is not an alternative to the current-account-centered analysis of the preceding section but a complement to it. The difference is that the fundamentals of interest are not just those related to international competitiveness (which now matters not just because it affects the current account but also because it feeds through into unemployment) but also others that heighten the economy's macroeconomic

and financial fragility and thereby limit the steps that politicians are prepared to take to defend the currency.

The role of the Danish referendum, so interpreted, was to move countries into this zone of vulnerability. The lure of monetary unification was so strong that governments were prepared to endure significant hardships to qualify for participation. But when the Danish referendum created a significant likelihood that monetary union would not happen, this bargain became less attractive. An interest rate increase policymakers might have accepted previously on the grounds that it preserved their Maastricht-compliant status might no longer be tolerable now that the expected value of Maastricht good citizenship had fallen.

This interpretation can explain why countries such as the United Kingdom, Italy, Sweden, and Spain were first to be attacked: they had the highest unemployment rates, the worst recessions, the weakest banking systems, and the highest public debts. But it can also explain why speculators targeted the French franc, because French unemployment was high (and politically sensitive given the country's impending election). It can explain the reluctance of some governments (such as that of the United Kingdom) to raise interest rates and the unwillingness of others (such as that of Sweden) to hold them at high levels to defend their currencies. It provides a role for the Danish referendum in crystalizing skepticism about whether European governments were prepared to stay the course.

This interpretation has been challenged (by, e.g., Buiter, Corsetti, and Pesenti 1998) on the grounds that policy—monetary policy in particular—did not become more expansionary following the crisis. The Obstfeld (1986) model that is the basis for this tale of self-fulfilling attacks runs on the assumption that if (and only if) the currency is attacked, the peg will be abandoned and policy will become more expansionary. The exchange rate will depreciate, providing ex post justification (and profits) for currency speculators. In fact, there is little evidence that policy in countries that abandoned their pegs shifted in more expansionary directions. Additional monetary ease was offset by additional fiscal retrenchment, leaving the thrust of macroeconomic policy unchanged. If speculators expected a significant relaxation of policy, they were disappointed.

It can be argued that this objection rests on too literal an interpretation of the Obstfeld model. An expansionary shift in policy was only one of several contingencies that could have driven the lira and

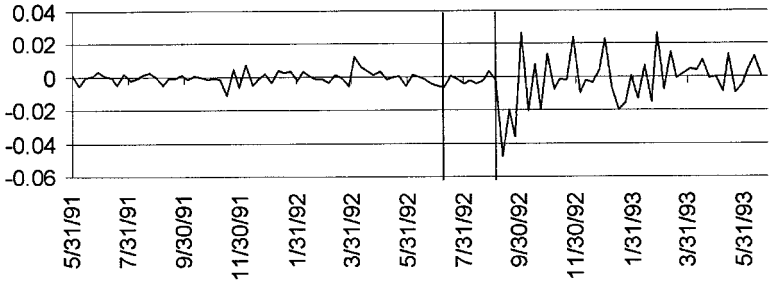



**Figure 8.2a**
Volatility of the Deutschmark-Sterling Exchange Rate

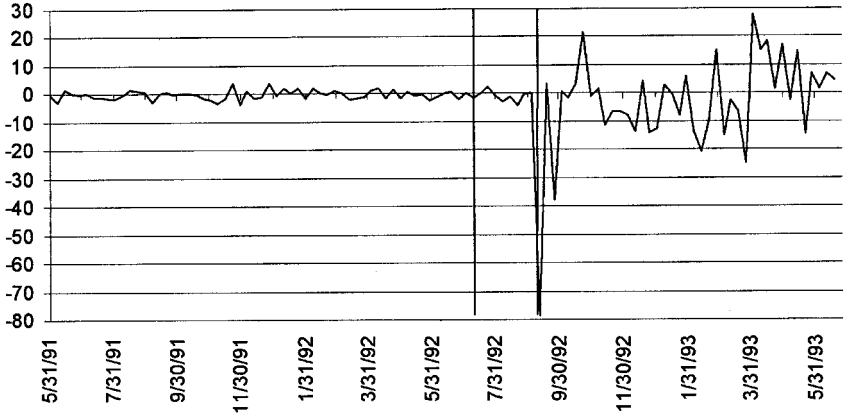



**Figure 8.2b**
Volatility of the Deutschmark-Lira Exchange Rate
*Source:* Datastream.
*Note:* The first vertical line denotes the Danish referendum in June 1992, the second Black Wednesday in September.

sterling to lower levels after September 1992. Another, analyzed by Flood and Marion (1999), is a change in the exchange risk premium. Assume that a larger risk premium requires higher interest rates to maintain the previously prevailing peg. If the authorities refuse to raise interest rates following an increase in the risk premium, then the exchange rate will fall to lower levels. If the risk premium is an increasing function of the volatility of the exchange rate (which rose sharply in September 1992, as figure 8.2 shows), then the fact that the exchange rate has suddenly fallen by a large amount and is now floating validates investors' expectations of a larger premium.

The speculative attack that precipitated these events is rational and self-fulfilling, and no change in monetary and fiscal policies is required.

This, then, is as close as we have come after a decade to a consensus interpretation of the crisis. Countries such as Italy, the United Kingdom, and Spain would not have been so readily attacked had they not allowed their currencies to become overvalued. France would not have found it so difficult to defend the franc had its unemployment rate not risen to high levels, and Sweden and Finland would not have found defending their currencies so difficult had the condition of their banking systems not been so fragile. The Bundesbank's interest rate increases aggravated these strains. Still, there was nothing inevitable about the fact of the attacks, their timing, or their direction. The Maastricht process gave investors reason to believe that governments and central banks would strengthen their anti-inflationary resolve and put their houses in order before conditions became unsustainable. Capital thus flowed into these countries, courtesy of convergence plays. But if confidence was disturbed and flows reversed direction, countries in the zone of vulnerability—whose current account deficits were substantial, whose unemployment rates were high, whose public debts were large, and whose banking systems were weak—would lack the economic and political capacity to undertake the adjustments needed to reconcile the new financial circumstances with their prevailing currency pegs. The shock in question, it turned out, was the Danish referendum. And the rest, as they say, is history.

## 8.7 Did It Matter that the EMS Was a Collective System of Pegs?

Europe was different in that it operated a system of collective currency pegs, in contrast to Mexico's unilateral peg before 1995 or Argentina's unilateral peg today. Buiter, Corsetti, and Pesenti (1998) argue that a system of collective pegs, cooperatively managed, should be more stable than a unilateral peg, and that Europe's tragedy was that it squandered its opportunity to cooperate. This failure to cooperate was what transformed market pressures into a crisis; had cooperative policies been pursued, adjustment would have been smoother and the threat to the EMS would have been less.[43]

The logic of the Buiter et al. analysis is the following. Although the Bundesbank was aware that its high interest rates were increasing

the strain on the ERM's weak sisters—for present purposes, the lira and sterling—the German authorities were unwilling to reduce interest rates unilaterally for fear of aggravating inflation. The resulting tension drove the lira and sterling out of the ERM, resulting in their substantial depreciation. The cooperative counterfactual is one in which a larger number of ERM countries—say, all but The Netherlands—realigned by a small amount against the Deutschmark within the ERM, and Germany reduced interest rates.[44] This would have been incentive compatible for Germany, because the lower prices of goods imported from other European countries would have reduced inflationary pressures.[45] It would have allowed Italy and the United Kingdom to remain in the ERM following their realignment, because lower German interest rates would have strengthened their economies. And it would have been congenial to other European countries, because it would protect the ERM against the destabilizing shock of Britain and Italy's ejection. Thus, this cooperative solution would have averted the crisis that consigned Europe to another year of exchange market turbulence.

This bargain—a German interest rate reduction in return for a general realignment of ERM currencies—had been mooted at the Bath Summit, as noted above. John Major reports that Helmut Schleisinger acknowledged Germany's willingness to cut interest rates in conjunction with a general realignment of ERM currencies but that France refused to go along.[46] The same formula informed the negotiations between Germany and Italy over the weekend of September 11–12, when Italy agreed to realign within the ERM and Germany agreed to a modest reduction in interest rates. But the Bath Summit yielded up no positive result, and the Bundesbank was prepared to reduce interest rates by only the narrowest margin in the wake of the Italian move, given that just one country, not seven, had devalued.[47]

That Europe, where monetary cooperation was more highly developed than anywhere else in the world, was unable to respond to this crisis cooperatively is revealing of the obstacles to the collective management of exchange rates under even the most favorable circumstances. Those countries in the best position to reject the pressure to devalue—France, for instance—had non-economic reasons to resist going along. The French government had been pursuing a "franc fort" policy intended to establish the franc as an equal partner with the Deutschmark; to devalue would have put paid to the notion

that France was the co-leader of the EMS and an equal partner in EMU—and would have done so at the worst possible time, only days prior to the French referendum. And if France refused to devalue, so too would other countries, and the prospects for a coordinated realignment would disintegrate.

In addition, Ireland, Spain, and Portugal (and even the United Kingdom, as late as the Bath Summit) had their own reasons to avoid devaluing. The currency peg was the repository of their anti-inflationary credibility, and to abandon it would be a heavy blow to confidence.[48] The essence of this problem is the now familiar inability of countries to develop an "exit strategy" from a peg adopted as part of an exchange rate based stabilization (Eichengreen and Masson et al. 1998).

Moreover, if countries devalued once, what was to prevent the markets from thinking that they would devalue again? In the new control-free environment, what would prevent currency traders from acting on this expectation? A general realignment, even if formulated cooperatively, threatened to undermine confidence in the ERM. Inevitably, in this environment of high capital mobility, the "adjustable peg" became an oxymoron.

Stephens reports that the government of John Major had already locked itself into a no-devaluation strategy in June in response to a paper warning that devaluation within the ERM would deal a terrible blow to confidence. "The conclusion drawn by the Treasury was that if sterling was devalued—unilaterally or alongside other weak currencies like the lira and the peseta—the government would lose this essential credibility. A depreciation of, say, 5 or even 10 percent within the ERM would lead investors to doubt the government's commitment to a strong pound and, perversely, to anticipate a further depreciation."[49] The implication was that if sterling's level was to be adjusted, it would be better to abandon the Exchange Rate Mechanism altogether and allow the currency to float downward, rather than attempting and possibly failing to hold a new parity within the ERM. This, of course, was the view that ultimately prevailed on "Black Wednesday." Countries with a choice, even as slim a choice as Britain and Spain, thus refused to go along with proposals for a joint devaluation, and their strong-currency counterparts had no way of forcing them.

In addition, even in Europe, where the institutions of monetary cooperation were singularly well developed, there were practical

obstacles to cooperation. It was finance ministers and central bank presidents who assembled at the Bath Summit, but the boards of central banks—in some cases, independent central banks—that controlled interest rates. Federal Finance Minister Theo Waigel and Bundesbank president Helmut Schlesinger, although present at Bath, did not have the power to alter German interest rates; this was a decision that could only be taken by the Bundesbank Council (the board together with the presidents of the Land Central Banks). Under these circumstances, the pressure placed on Schlesinger by Norman Lamont, who chaired the Bath meeting, was ineffective if not counterproductive.[50]

In addition, efforts to arrange a joint realignment over the weekend of September 11–12 were complicated by rules requiring the chairman of the community's monetary committee to communicate Germany's desire to the other members and to convene the relevant meeting. The committee chairman was the director-general of the French Treasury, Jean-Claude Trichet. Although Trichet was kept informed of German desires (German officials having briefed him just prior to their meeting with the Italians), he did not arrange—nor does it appear that he suggested—a meeting of the committee.[51] The suspicion is that the French feared that a meeting would create pressure for the franc to be included in a general realignment, something the government, the referendum looming, wished to avoid.

In sum, incentive and institutional problems prevented ERM members from responding to pressures in a coordinated fashion. If Europe could not finesse these difficulties, it is hard to imagine that East Asia or Latin America could do better.

## 8.8 The EMS Crisis in Light of Its Emerging Market Successors

A standard way of gauging what is distinctive about a crisis is to take early warning indicators constructed on the basis of previous crises and see whether they predict out of sample. This is the approach used by Bussiere and Mulder (1999), for example, to see whether the models estimated by Sachs, Tornell, and Velasco (1996) for the Tequila Effect predict the Asian crisis, and whether the models estimated by Berg and Patillo (1998) and Tornell (1999) for the Tequila Effect and the Asian crisis accurately forecast the financial upheavals of 1998–1999.[52] In this section, I undertake the same exercise in reverse.

In what follows, I utilize the preferred model of Bussiere and Mulder, which fits the data for the Tequila Effect and Asian crises and does a reasonably good job of forecasting which countries got into trouble in 1998–1999. Because this model appears to be the best performer in terms of its ability to summarize the macroeconomic and financial causes of the financial crises of 1994–1999, it is a logical point of departure for analyzing what, if anything, was different about the European crises of 1992–1993.

Bussiere and Mulder derive their index of crisis risk by regressing exchange market pressure (a weighted average of exchange rate changes and reserve changes) on five indicators: the current account as a percent of GDP, export growth, the percentage change in international reserves, the deviation of the real exchange rate from trend, and short-term foreign debt relative to reserves (all lagged one year).[53] This spare list of variables does a surprisingly good job of predicting which countries experienced exchange market pressure in 1998–1999. But does it do as well at predicting Europe's crises in 1992? The first column of table 8.4 shows the predicted levels of exchange market pressure for European countries in 1992, using the coefficients estimated by Bussiere and Mulder on data for Latin America and East Asia in 1994–1997. Strikingly, Finland, the United Kingdom, and Sweden, three of the first countries whose currencies were attacked, are at the top of the list. For Finland, the only country in the European sample to experience a Latin American-style terms-of-trade shock in 1990–1991, the predicted level of exchange market pressure is similar to that forecast by the same model for Brazil and Argentina in 1998. The levels of pressure predicted for the next countries on the list, the United Kingdom and Sweden, are considerably lower, roughly analogous to that experienced by Mexico in 1998. These results suggest considerable similarity between the 1992 crisis in Europe and its emerging market successors.

On the other hand, certain countries, notably Italy, rank surprisingly low on the list. The explanation is Italy's low level of short-term external debt, by emerging-market standards. The difference of course is not that Italy, and European countries generally, issued less short-term debt—to the contrary—but that the debt in question was domestic, not international.[54] When both domestic and international obligations are added into the debt ratio, the same model generates the ranking in the second column of table 8.4. Italy, whose debt problem was notorious, moves to the head of the list. Less reassur-

**Table 8.4**
Predicted Levels of Exchange Market Pressure, European Countries, 1992

| Five variable index | Five variable index, total debt | Three variable index |
|---|---|---|
| 29.12 Finland | Italy | Finland |
| 9.34 United Kingdom | France | Spain |
| 6.21 Sweden | Finland | Sweden |
| 0.29 Denmark | United Kingdom | United Kingdom |
| −1.01 Netherlands | Belgium | Italy |
| −5.39 Austria | Sweden | Austria |
| −5.61 Ireland | Spain | Germany |
| −6.03 France | Denmark | France |
| −9.15 Spain | Germany | Ireland |
| −10.49 Italy | Ireland | Netherlands |
| −13.90 Norway | Netherlands | Norway |
| −14.87 Germany | Austria | Denmark |
| −17.87 Belgium | Norway | Belgium |
| −21.36 Portugal | Portugal | Portugal |

*Source:* See text.

ingly, this version also predicts a high level of exchange market pressure in France, a country that did not suffer a crisis in 1992.[55]

It can be argued that both the level of short-term debt and the percentage change in reserves are better regarded as consequences than causes of crises. Seeing a crisis looming for other reasons, market participants will begin drawing down a country's reserves and shortening the maturity of their credits, generating spurious forecasts that seem to validate subsequent events. This is an argument for dropping short-term debt and reserve losses from the forecasting model. The third column of table 8.4 shows the consequences of doing so.[56] In some sense, this version generates the most plausible predictions: Finland is again the country whose fundamentals predict the most serious crisis, followed by Spain, Sweden, the United Kingdom, and Italy, which come closely clustered together. The only troubling aspects of this ranking are that Italy, which was identified as a target by currency speculators well in advance of the United Kingdom, Sweden, and Spain, does not exhibit a higher predicted level of exchange market pressure, and that Ireland and Portugal, two countries that also experienced problems in 1992, are not higher on the list.

This suggests the following implications. First, the three current account related variables—export market growth, the evolution of the real exchange rate, and the current account deficit—go a good way toward explaining which countries suffered crises in 1992. Current account centered explanations for their crises cannot be dismissed, in other words. Second, however, to understand why the crisis was particularly acute in certain countries—Italy in particular—one must add a role for capital account centered problems that could manifest themselves because of a heavy load of short-term debt. Third, several countries that experienced speculative pressure in 1992—Portugal and to a lesser extent Ireland—should not obviously have done so given their fundamentals, or so this model suggests. Portuguese officials complained of guilt by association with Spain—that investors were unable to tell the escudo and peseta apart. Irish officials made similar arguments with respect to the United Kingdom. There is some support here for their laments.

## 8.9 The Aftermath of the Crisis

How deep was the crisis-induced recession, and how vigorous was the subsequent recovery? As alternative metrics, I consider the crises in emerging markets and in European countries pursuing different post-crisis monetary policy operating strategies.

### European versus Emerging Markets

Conventional wisdom has it that currency crises are more disruptive in emerging markets, where financial markets are thin, debt is denominated in foreign currency, and confidence is fragile. Table 8.5 shows that GDP growth falls by 3 percentage points between the years preceding and following a crisis in the typical emerging market, but not at all in the typical OECD country.[57] For our six European countries in 1991–1992, the comparable figure is 1.6 percentage points. In this respect, our EMS cases look as much like emerging markets as developed countries (they are almost exactly midway between the two).[58]

How do the subsequent recoveries compare? The cumulative percentage increase in output between 1992 and 1995 was 3.4 percent for our six European countries (See table 8.6). The comparable figure

**Table 8.5**
GDP Growth before and after Currency Crises, 1970–1998

| Country group | $t-1$ | $t$ (Crisis year) | $t+1$ | Change from $t-1$ to $t+1$ |
|---|---|---|---|---|
| LDC crises except Mexico 1995 crisis | 3.95 | 2.06 | 0.61 | −3.34 |
| Mexico 1995 crisis | 4.41 | −6.17 | 5.15 | 0.74 |
| OECD crises except EMS 1991–1992 crises | 3.16 | 2.91 | 3.16 | 0.00 |
| EMS 1991–1992 crises | 0.44 | −0.88 | −1.19 | −1.63 |

*Source:* World Bank, *World Development Indicators*, author's calculations.
*Note:* Values are country-group averages (except for Mexico 1995, which shows actual value). First row includes 45 emerging market crises (excluding Mexico 1995). Third row includes 22 industrial-country crises (other than the 1991–1992 EMS crises). Fourth row includes the following crises: Finland 1991, Italy 1992, Portugal 1992, Spain 1992, Sweden 1992, and United Kingdom 1992.

**Table 8.6**
Cumulative Percentage Increase in GDP over 3 Years Following Currency Crises, 1970–1998

| Country group | $t$ (Crisis year) | $t+1$ | $t+2$ | $t+3$ | Sum from $t$ to $t+3$ |
|---|---|---|---|---|---|
| LDC crises except Mexico 1995 crisis | 1.93 | 1.91 | 3.12 | 4.38 | 11.34 |
| Mexico 1995 crisis | −6.17 | 5.15 | 6.76 | 4.80 | 10.54 |
| OECD crises except EMS 1991–1992 crises | 2.91 | 3.16 | 3.44 | 2.08 | 11.59 |
| EMS 1991–1992 crises | −0.88 | −1.19 | 2.19 | 3.29 | 3.41 |

*Source:* World Bank, *World Development Indicators*, author's calculations.
*Note:* Values are country-group averages (except for Mexico 1995, which shows actual values). First row includes 38 emerging market crises (other than Mexico 1995). Third row includes 22 industrial-country crises (other than the 1991–1992 EMS crises). Fourth row includes the following crises: Finland 1991, Italy 1992, Portugal 1992, Spain 1992, Sweden 1992, and United Kingdom 1992.

**Table 8.7**
Growth of Real Domestic Demand and Its Components Following Crises (percentage changes)

| | Year immediately following crisis | $t+1$ | $t+2$ | $t+3$ | $t+4$ |
|---|---|---|---|---|---|
| *Total domestic demand* | | | | | |
| Italy | −5.5 | 1.9 | 1.7 | 2.9 | 3.7 |
| United Kingdom | 2.1 | 3.3 | 1.9 | 2.5 | 2.8 |
| Finland | −6.4 | −6.4 | 2.9 | 5.8 | 5.0 |
| Sweden | −5.6 | 1.4 | 1.7 | 1.7 | 1.5 |
| Portugal | −0.9 | 1.2 | 3.2 | 3.4 | 3.6 |
| Spain | −4.2 | 1.1 | 3.2 | 2.4 | 3.0 |
| Mexico | −13.9 | 6.5 | 8.3 | 6.4 | 5.9 |
| *Net external demand* | | | | | |
| Italy | 4.6 | 0.3 | 1.5 | −0.1 | −0.5 |
| United Kingdom | 0.1 | 0.4 | 0.7 | −0.1 | −0.1 |
| Finland | 2.1 | 4.3 | 0.8 | −0.5 | −0.7 |
| Sweden | 2.9 | 0.9 | 1.9 | 0.9 | 0.6 |
| Portugal | −0.1 | −0.5 | −1.3 | −1.0 | −1.5 |
| Spain | 3.3 | 1.0 | −0.4 | −0.2 | −0.5 |
| Mexico | 8.5 | −1.2 | −1.4 | −0.9 | −0.9 |
| *Private consumption* | | | | | |
| Italy | −2.5 | 1.6 | 1.2 | 2.2 | 2.5 |
| United Kingdom | 2.6 | 3.0 | 2.0 | 2.3 | 2.6 |
| Finland | −4.9 | −3.9 | 2.0 | 5.1 | 4.8 |
| Sweden | −3.7 | 0.5 | 0.5 | 0.9 | 1.7 |
| Portugal | 0.4 | 0.2 | 1.2 | 1.9 | 2.4 |
| Spain | −2.2 | 0.8 | 1.8 | 2.3 | 3.0 |
| Mexico | −9.5 | 2.3 | 5.0 | 4.4 | 4.3 |
| *Capital formation* | | | | | |
| Italy | −13.1 | −0.1 | 5.6 | 7.5 | 7.2 |
| United Kingdom | 0.6 | 3.7 | 2.2 | 4.8 | 4.7 |
| Finland | −16.9 | −18.6 | 2.8 | 14.7 | 13.9 |
| Sweden | −17.6 | −0.4 | 12.4 | 9.0 | 4.5 |
| Portugal | −4.8 | 3.5 | 7.5 | 8.0 | 7.5 |
| Spain | −10.6 | 1.4 | 8.4 | 6.1 | 5.3 |
| Mexico | −29.0 | 17.7 | 19.2 | 15.4 | 13.3 |

**Table 8.7**
(continued)

| | Year immediately following crisis | $t+1$ | $t+2$ | $t+3$ | $t+4$ |
|---|---|---|---|---|---|
| *Government consumption* | | | | | |
| Italy | 0.7 | 0.0 | −0.4 | 0.3 | 0.3 |
| United Kingdom | 0.3 | 2.0 | 0.7 | 1.4 | 1.4 |
| Finland | −2.2 | −5.3 | −0.4 | −1.0 | −1.5 |
| Sweden | −0.6 | −1.0 | −1.1 | −0.7 | −1.1 |
| Portugal | 0.6 | 1.4 | 2.0 | 1.5 | 1.3 |
| Spain | 2.3 | −0.3 | 0.9 | −0.9 | 0.0 |
| Mexico | −1.3 | 3.7 | 4.2 | 3.2 | 3.1 |

*Source:* OECD, *Economic Outlook*.

for Mexico is 10.5 percent. Thus, although Mexico's recession was deeper, its recovery was faster.[59] Mexico's experience is not atypical of post-1970 emerging markets, but the 1991–1992 EMS cases are atypical of OECD countries, a point to which I return below.

Another perspective is provided by the evolution of demand. Real domestic demand rose less rapidly than real GDP in all six European countries but also in Mexico, whereas real external demand (real exports minus real imports) rose more quickly in each case (table 8.7). Just as in Mexico two years later, in other words, external demand provided much of the stimulus for recovery. In terms of the shift in the current account (as a share of GDP) between the pre- and post-crisis periods, the six European nations again lie in between the OECD countries and emerging markets (table 8.8).

To be sure, the factors underlying this pattern were not the same. In Mexico, the weakness of domestic demand was attributable to private consumption and investment, reflecting the financial fragility of firms and the incapacity of the troubled banking sector. In Italy, Portugal, Sweden, and the United Kingdom, domestic demand was limited by the slow growth of government consumption as countries sought to eliminate budget deficits and meet the Maastricht convergence criteria for monetary union (again, see table 8.7). As Gordon (1999) emphasizes, this contractionary fiscal impulse is part of the explanation for why growth in the European crisis countries was

**Table 8.8**
Current Account Adjustment before and after Currency Crises, 1970–1998

| Country group | $t-1$ | $t$ (Crisis year) | $t+1$ | Change from $t-1$ to $t+1$ |
|---|---|---|---|---|
| LDC crises except Mexico 1995 crisis | −5.26 | −3.90 | −1.17 | 4.09 |
| Mexico 1995 crisis | −7.05 | −0.55 | −0.70 | 6.35 |
| OECD crises except EMS 1991–1992 crisis | −1.33 | −1.66 | −1.70 | −0.37 |
| EMS 1991–1992 crises | −2.56 | −2.87 | −1.48 | 1.08 |

*Source:* World Bank, *World Development Indicators*, author's calculations.
*Note:* Values are country-group averages (except for Mexico 1995, which shows actual value). First row includes 36 emerging market crises (other than Mexico 1995). Third row includes 17 industrial-country crises (other than the 1991–1992 EMS crises). Fourth row includes the following crises: Finland 1991, Italy 1992, Portugal 1992, Spain 1992, Sweden 1992, and United Kingdom 1992.

relatively sluggish in the immediate post-crisis years, as table 8.6, above, shows.

Every crisis is different, as emphasized at the beginning of section 8.1. What is striking about Europe's from this perspective is that the macroeconomic consequences resemble those in the typical emerging market as much as they do other developed-country cases. One can imagine several explanations. First, the EMS crises were the first postwar industrial country events of their kind to take place in an environment of fully free capital mobility, increasing the scope for reserve losses and financial dislocations. Second, Europe's crises were clustered in time to a greater extent than was typical of the industrial countries prior to 1992. This too is plausibly a function of the integration of capital markets insofar as contagion is greater in a world of high capital mobility. This meant that no one country could export its way out of its difficulties by selling products to other EU member states that also succumbed the crisis, magnifying the output effects. And third, banking and financial systems were hit to an extent unusual for developed-country crises. Banking systems were already in a delicate state when the crisis struck. Again, this is plausibly a function, in part, of financial deregulation and capital account liberalization in the preceding period, a combination that allowed European banks to fund themselves externally and lever up their bets.

**Peggers versus Targeters**

Our six European countries pursued several different post-crisis monetary strategies. Portugal and Spain remained in the Exchange Rate Mechanism at substantially lower parities. Finland and Italy floated before eventually reentering the ERM in October and November 1996. (Finland didn't "reenter," to be precise, but substituted ERM membership for its earlier ECU peg.[60]) Sweden and the United Kingdom continued to float.

Viewed analytically, these alternatives were really only two: floating and hard currency pegs. The middle ground of shadowing the Deutschmark in the manner of pre-1992 Sweden and Finland was no longer attractive or, it would appear, viable.[61] By the time Italy and Finland (re)joined the ERM, the participating countries had affirmed their intention of completing the transition to monetary union in short order—precisely because the crisis had shown that even collective pegs could be unstable. With EMU looming closer, Italy and Finland, for whom participation in the monetary union was of particular value, became still more committed to defense of their currency pegs than before.[62] As public debt ratios and unemployment rates began to decline, reflecting countries' efforts to satisfy the convergence criteria (and the fortuitous fact of Europe's recovery from its 1992–1993 recession), their capacity to defend their pegs was enhanced. With the inauguration of monetary union on January 4, 1999, this process of hardening exchange rate pegs was complete. The first two years of the euro have not been without their blemishes, but one thing monetary union has done is to banish from Europe the problem of currency crises that bedeviled the continent in the early 1990s.

The United Kingdom and Sweden, meanwhile, have continued to float. Their relatively happy experiences can be attributed to the speed with which they substituted an alternative monetary policy operating strategy for the exchange rate target. Both embraced inflation targeting as a way of anchoring expectations and communicating to the markets the intentions of the monetary authorities. In Britain's case, the chancellor of the exchequer announced an inflation target of 1–4 percent three weeks after Black Wednesday.[63] Three weeks after that, the chancellor and the central bank worked out the details of their new monetary policy operating strategy. The Bank of England began publishing a quarterly *Inflation Report* containing its inflation forecast, the new yardstick of policy. Although the

chancellor still controlled the instruments of monetary policy (the Bank of England not being independent), he committed to doing so in a manner consistent with the new inflation-targeting regime and the bank's forecasts. The bank, for its part, took it upon itself to evaluate the conduct of monetary policy, not just in meetings with Treasury officials but publicly.

Thus, barely six weeks after the crisis, the United Kingdom had in place the rudiments of an inflation-targeting regime.[64] The authorities selected the retail price index net of mortgage payments as the measure of inflation, and the Office of National Statistics was made responsible for calculating the series. After early experience made clear that the authorities were capable of controlling the inflation rate quite closely, the target range was replaced by a single target of 2.5 percent, but with thresholds on either side. The practice of monthly meetings between the chancellor of the exchequer and the governor of the Bank of England was formalized. Beginning in 1994, the minutes of these monthly meetings were released two weeks after the next meeting.[65] The final step was the Labour Government's decision in 1997 to grant operational independence to the Bank of England and the creation of a Monetary Policy Committee responsible for policy decisions. In the event the target was missed, the Bank was required to explain why, what policy actions would be taken to correct the discrepancy, and when inflation was expected to return to target.

Sweden's adoption of inflation targeting was almost as quick, coming just two months after the floating of the krona.[66] The new regime was announced following consultations between Riksbank staff and outside experts. However, the requirement for the Riksbank to orient policy toward its new target was deferred to the beginning of 1995, reflecting the desire to avoid an overly stringent monetary policy while the effects of the krona's depreciation fed through to domestic prices and unemployment remained high. The hope was that even a deferred commitment would stabilize expectations, despite the fact that no guidelines were articulated for the conduct of monetary policy in the interim.

The government retained legal control of the Riksbank, making its governing board effectively an extension of the Parliament, although the board set both the inflation target and monetary policy instruments in practice, avoiding the problems of divided accountability that characterized British inflation targeting. The central bank targets

a 2 percent interval for inflation centered on 2 percent. It publishes an *Inflation Report* quarterly, in which it relates its policies to the inflation target.[67] It targets headline rather than core inflation, this being the measure relevant to unions and employers' associations. The tolerance interval around the inflation target of 2 percent is narrower than the British at plus or minus 1 percent. Bernanke et al. (1999) interpret this in terms of greater concern for the credibility of the inflation target, reflecting the delay in implementation and persistent political battles over the conduct of monetary policy.[68]

One can argue that the United Kingdom and Sweden were in a relatively favorable position to adopt inflation targeting. In both cases, adoption of the new policy followed a period of successful disinflation, which made it relatively easy to hit the new target. Because unemployment was rising in both countries, wage pressure was subdued. Both countries had long-established central banks with accurate models of inflation, and the advanced development of their financial markets implied stable links between the instruments of monetary policy and the level of prices. Neither had debts or deficits on a scale that threatened to undermine the credibility of monetary policy. Thus, what was possible for the United Kingdom and Sweden may be more difficult to achieve in other countries.

Moreover, neither the United Kingdom nor Sweden provides a totally clean experiment with inflation targeting. The fact that the two countries were still in recession when the new regime was adopted complicates interpretation of their experiences. Their central banks were not independent. In Britain, the exchequer set the instruments of monetary policy until May 1997 (as noted above), while the Bank of England provided the inflation forecasts and used public statements to apply anti-inflationary discipline to the chancellor. In Sweden, the independence of the central bank similarly remained limited for most of the 1990s. Four of the seven members of governing board of the Riksbank, who were responsible for operational matters in monetary policy, were appointed by the governing party or parties, the other three by the opposition.[69] The governor was chosen by the board for a five-year term.[70] Finally, at the beginning of 1999, a new Riksbank Act (adopted in November 1998) mandated three important changes in these procedures. First, policy instruments were no longer formally determined by the governing board appointed by the Parliament. The governing board instead appointed six members of an executive board (one of whom is

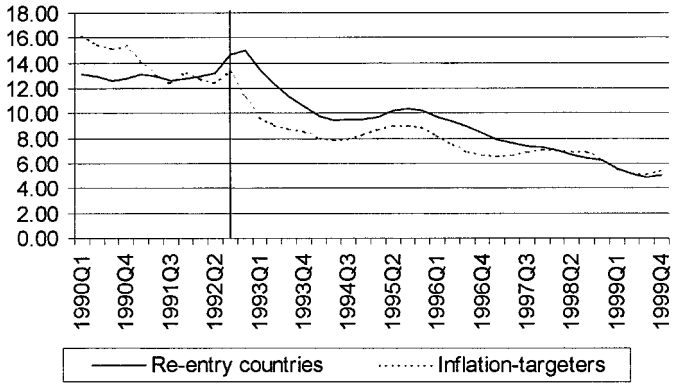



**Figure 8.3**
Interest Rates in Re-Entry and Inflation Targeting Countries
*Source:* International Monetary Fund, *International Financial Statistics*.

chairman and governor of the Riksbank) with wide responsibility for policy.[71] Second, the goal of price stability was written into the Riksbank Act (although the law also stated that the central bank shall "promote a safe and efficient payments system"). And third, the requirement of a written report on monetary policy to the Parliamentary Standing Committee on Finance, at least twice a year, was written into the law.[72]

For what it is worth, the comparison with Finland and Italy (where, helpfully for the analysis, recession and unemployment were of roughly comparable magnitude) is shown in figure 8.3 (for interest rates) and figure 8.4 (for inflation). Interest rates did not decline immediately, as previous researchers (e.g., Laubach and Posen 1997) noted. There is, however, some evidence in figure 8.3 that interest rates fell more quickly in the two inflation targeters.

What about the speed of recovery? The cumulative percentage increase in real GDP between 1992 and 1995 was 8.4 percent for the two inflation targeters (Sweden and the UK), 8.0 for the two ERM "re-entrants" (Italy and Finland), and 6.0 percent for the two exchange rate targeters (Spain and Portugal) when we take simple arithmetic averages. Although this conclusion will hearten the proponents of inflation targeting, it is important to bear in mind the small sample from which it is derived.

In sum, the evidence from Europe does not obviously favor inflation targeting over a hard currency peg. It suggests that both are vi-

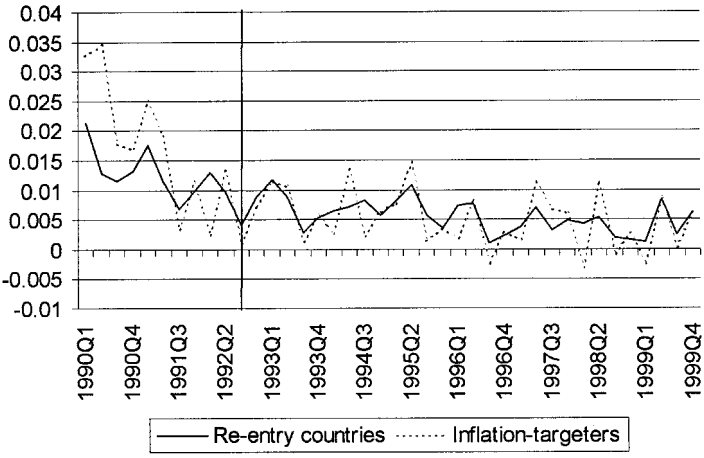



**Figure 8.4**
Inflation Rate
*Source:* International Monetary Fund, *International Financial Statistics*.

able monetary strategies. In addition, it is consistent with the notion that intermediate arrangements—soft pegs and managed floats not backed by a credible, transparent alternative monetary policy operating strategy—are not viable in a world of high capital mobility. As a result of its crisis, Europe moved from a hybrid exchange rate-cum-monetary regime to hard pegs (leading ultimately to monetary unification) and relatively free floating backed by inflation targeting. Its experience supports the presumption that this is the direction in which other regions, such as Latin America, are also heading.

## 8.10 Conclusion

The 1992 EMS crisis was different from the typical industrial-country crisis that preceded it. It was more virulent. It was more contagious. It was more disruptive to output. Both capital flows and financial fragility played more prominent roles. In these senses, it was a harbinger of the Tequila Effect and the Asian flu.

But however impressive the 1992 crisis by the standards of industrial countries, the associated output losses and financial distress were more limited than in Mexico in 1995 or Korea in 1998. There may be parallels between the EMS crisis and its emerging-market successors, in other words, but these should not be pushed too far.

Two lessons follow. First, with financial deregulation and capital account liberalization, the crisis problem has grown more severe. Crises can erupt less predictably, and their effects can be more virulent. Second, to defend themselves, emerging economies need to develop the liquid capital markets, reputations for following sound and stable policies, and capacity to regulate their financial markets and institutions that distinguish their developed-country counterparts. Progress in financial deepening and development will enable them to rationalize their exchange rate systems—to float independently of their larger neighbors, or to peg their currencies once and for all—thereby further reducing crisis incidence. At that point, they will be able to confidently assert that the benefits of financial liberalization exceed the costs.

# 9 Understanding Asia's Crisis

## 9.1 Introduction

A framework for understanding currency and financial crises will convince only if it sheds light on the Asian crisis—a crisis that illustrates well the difficulty of using simple models to make sense of complex economic events. It shows how counterproductive it is to think of Asia's financial collapse as a single event. The causes and consequences differed across countries. New financial crises unfolded upon old ones; by the spring of 1998, the IMF's managing director, Michel Camdessus, routinely referred to "crises within crises." To be sure, these difficulties were related. But attempting to explain them all in terms of a single set of factors or to use them as turf on which to run a horse race between competing theoretical models is unlikely to be helpful. Rather, the Asian crisis suggests that understanding twenty-first-century crises will require one to weave together strands from different approaches. Correspondingly, proposals for reform must address the problems highlighted by each of the relevant models.

## 9.2 Background

One sign that the Asian crisis was complex and distinctive is that the period leading up to it was characterized not by economic difficulties but by robust rates of economic growth. Table 9.1 shows that GDP growth rates in 1996 ranged from 8 percent in Indonesia to more than 6 percent in Thailand. This achievement continued a pattern that had held since the early 1980s. Rapid growth was fueled by high rates of saving and investment (as high as 40 percent), sound macroeconomic policies, and outstanding rates of export growth.

**Table 9.1**
Growth, Inflation, Equity Prices, and Current Account Balance, 1990–1997

| | Real GDP | | | Consumer prices (annual percentage change) | | | Equity price index | | | Current-account balance (as a percentage of GDP) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1990–1995 | 1996 | 1997 | 1990–1995 | 1996 | 1997 | 1990–1995 | 1996 | 1997 | 1990–1995 | 1996 | 1997 |
| Indonesia | 7.2 | 7.8 | 4.6 | 8.7 | 8.0 | 6.6 | 5.7 | 15.0 | −76.1 | −2.5 | −3.7 | −2.9 |
| Thailand | 8.9 | 6.4 | −0.4 | 5.0 | 5.8 | 5.6 | 9.1 | −45.8 | −78.7 | −6.7 | −7.9 | −2.0 |
| South Korea | 7.8 | 7.1 | 5.5 | 6.6 | 4.9 | 4.4 | −0.6 | −35.7 | −69.8 | −1.2 | −4.8 | −1.9 |
| Malaysia | 8.8 | 8.6 | 7.8 | 3.7 | 3.5 | 2.7 | 15.2 | 17.0 | −73.5 | −5.9 | −4.9 | −5.1 |
| Philippines | 2.3 | 5.7 | 5.1 | 11.0 | 8.4 | 5.1 | 27.0 | 14.6 | −63.2 | −3.8 | −4.7 | −5.2 |
| Singapore | 8.6 | 6.9 | 7.8 | 2.7 | 1.3 | 2.0 | 10.6[a] | −5.2 | −35.0 | 12.7 | 15.5 | 15.2 |
| Hong Kong | 5.0 | 5.0 | 5.2 | 9.3 | 6.0 | 5.7 | 37.8 | 33.5 | −20.3 | 3.3[b] | −1.7[b] | −3.8[b] |
| China | 10.6 | 9.7 | 8.8 | 12.4 | 8.3 | 2.8 | 13.8[c] | 81.5 | 32.5 | 0.9 | 0.9 | 2.3 |
| Taiwan | 6.4 | 5.7 | 6.8 | 3.8 | 3.1 | 0.9 | −9.2 | 46.5 | −8.3 | 4.0 | 4.0 | 2.7 |

*Sources:* Bank for International Settlements (BIS) 1998, table III.1; *Emerging Stock Markets Factbook*, International Finance Corporation, World Bank (various years).
*Notes:* a. From company reports and stock exchange of Singapore, various issues. b. Balance of goods and nonfactor services. c. Average for 1991–1995.

Government budgets were in surplus, and economies were successfully restructured along export-oriented lines. References to the East Asian "miracle" became commonplace.[1]

Looking back after the fact, it is now possible to discern disquieting signs. The growth of export revenues decelerated in 1996, reflecting slower growth of demand in the region's principal export markets, a slowdown in the global electronics industry, and competition from mainland China.[2] (Figure 9.1 shows the rate of growth of East Asian export markets in the period leading up to the crisis.) Current account deficits were large in Thailand and Malaysia (refer to table 9.1). Equity prices declined, foreshadowing lower profits in the manufacturing sector. Indonesia, South Korea, Thailand, and even Singapore had large amounts of short-term debt relative to foreign-exchange reserves (see table 9.2). Legions of financial analysts now justify their livelihood by pointing to these leading indicators of problems that came later. But this is wisdom after the fact.

The one exception is Thailand. Not only had Thailand's current account deficit risen to an alarming 8 percent of GDP, but its export performance was disappointing. By pegging the baht to a basket with a heavy weight on the U.S. dollar, which was itself strengthening against other major currencies, the Thai authorities allowed their trade-weighted real exchange rate to be pulled up significantly (see fig. 9.2). Although the currency-pegging policy was not limited to Thailand, only there did leading investment analysts expect a sustained slowdown in exports (Radelet and Sachs 1998a; Park and Rhee 1998). Reflecting these problems, Thai equity prices trended downward (see fig. 9.3) and the real estate bubble burst. With the country's finance companies heavily exposed to the property and stock markets, the decline in asset values posed an obvious threat to their solvency and, in turn, to the government's commitment to maintaining the currency peg.

The managing director of the IMF wrote warning letters to the Thai authorities. International Monetary Fund officials traveled to Bangkok to convey the message in person. The markets, if not the Thai officials, took heed. One hedge fund manager reported to me that he was first alerted to problems in Thailand by a presentation at the annual meetings of the Fund and the World Bank in September of 1996.[3] There was pressure against the baht as early as July of that year following the collapse of the Bangkok Bank of Commerce. In the nine months leading up to its July 2, 1997, devaluation, the baht

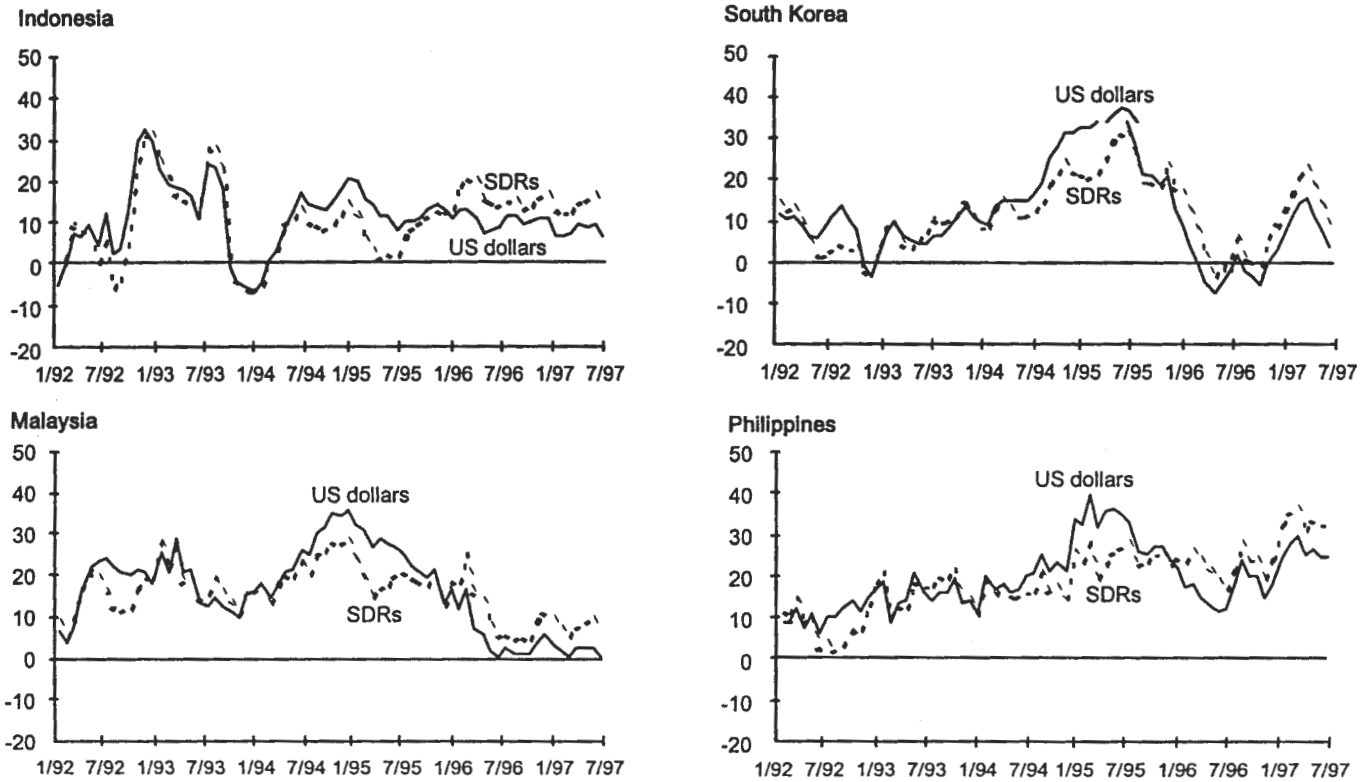
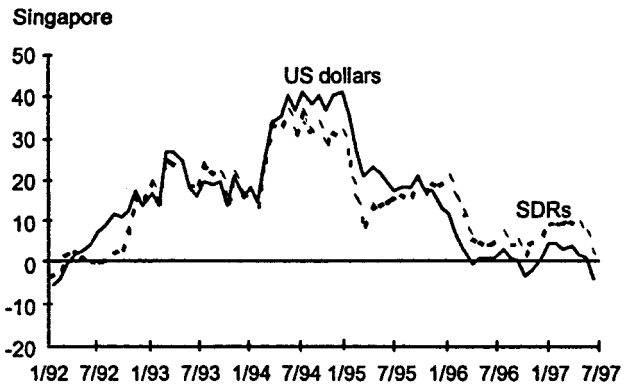
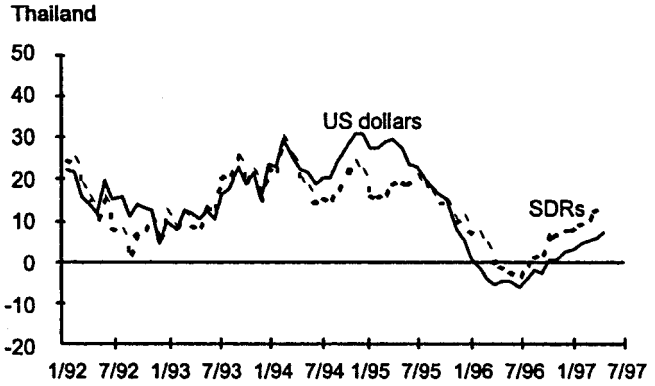



**Figure 9.1**
Growth of Export Markets of the East Asian Economies,[a] January (percentages)
*Note:* a. Percent change in export revenues from 12 months earlier; 3-month moving averages.



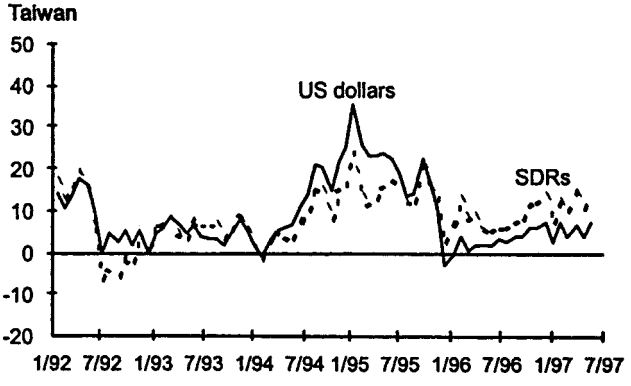




**Figure 9.1** (continued)

**Table 9.2**
Short-term Debt, Second Quarter 1997

| | Short-term debt (billions of US dollars) | Total reserves (billions of US dollars) | Short-term debt ratio (as a percentage of total reserves) |
|---|---|---|---|
| Indonesia | 34.25 | 20.34 | 168 |
| South Korea | 67.51 | 34.07 | 198 |
| Malaysia | 11.18 | 26.59 | 42 |
| Philippines | 7.74 | 9.78 | 79 |
| Singapore | 175.23 | 80.66 | 217 |
| Taiwan | 18.87 | 90.02 | 21 |
| Thailand | 45.57 | 31.36 | 145 |

*Sources:* Bank for International Settlements (BIS) 1998; IMF, *International Financial Statistics*.

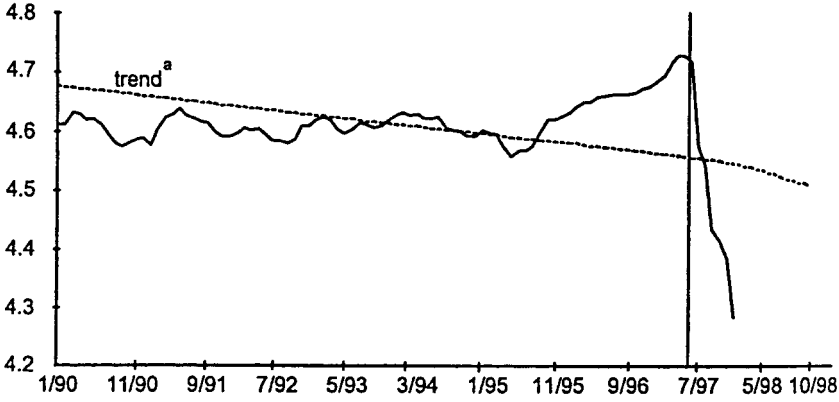



**Figure 9.2**
Thai Baht Real Exchange Rate, January 1990–October 1998
*Source:* Chinn and Dooley 1998.
*Note:* a. Linear trend from January 1979 to June 1997.

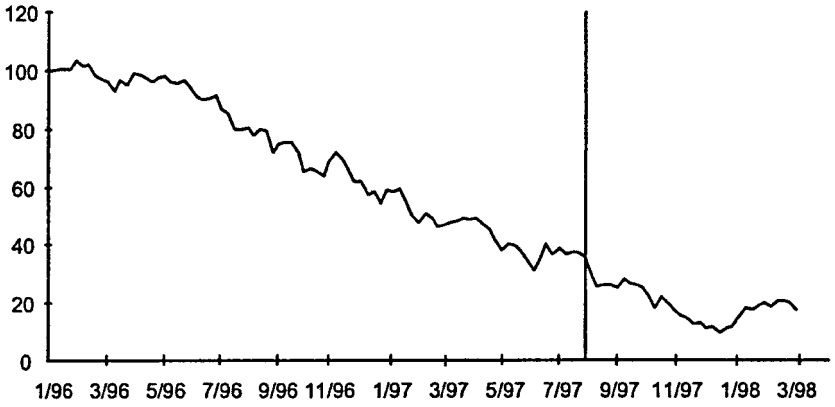



**Figure 9.3**
Thai Equity Index, January 1996–March 1998
*Source:* World Bank, *Emerging Stock Markets Factbook.*

was hit by three more speculative sell-offs. But even in Thailand, there was no indication that the market anticipated the severity of impending problems in the spreads on syndicated bank loans, in the spreads on bond issues on primary and secondary markets, in the sovereign debt ratings issued by Standard & Poor's and Moody's, or in the forecasts of the leading commercial and investment banks.[4]

## 9.3 Chronology

The crisis opened with Thailand's devaluation on July 2, 1997, and deepened with the spread of difficulties to neighboring countries in Southeast Asia. Although the Thai, Indonesian, Malaysian, and Philippine currencies all depreciated by 24 to 33 percent in the third quarter of 1997, the crisis could still be seen at this time as limited to these countries. This was no longer true starting in October, with the devaluation of the Taiwan dollar, which led to a speculative attack on Hong Kong (whose economic structure was similar to Taiwan's and which competed with it in many markets), and with the spread of the crisis to South Korea. The first half of 1998 was dominated by the continued deterioration of economic, financial, and political conditions in Indonesia, with strongly negative impacts on investor confidence and, hence, on the prospects for the other crisis economies. The final phase was ignited by the worse-than-expected

economic performance of Japan, which came to light in the second quarter of 1998, and by Russia's default in August and the spread of turmoil to still other emerging markets.

**The Trigger**

Given the palpable nature of Thailand's difficulties and the subtler problems of its neighbors, it was possible at first to see the devaluation of the baht as an isolated event. The fact that the large international investors (hedge funds, commercial banks, investment banks) with short positions against the baht did not typically also have large short positions against other Southeast Asian currencies is a sign that this is how they perceived the situation.[5] The fact that the Thai authorities responded to mounting speculative pressure by intervening in the forward market rather than by attempting to correct the fundamentals made the devaluation seem both unavoidable and fully justified.

Following its devaluation, the baht continued to depreciate at an alarming rate. On July 29, the Chavalit government approached the IMF for help. Within two weeks, Japan convened a meeting of supporting countries who agreed to supplement the resources provided by the Fund. But Thailand's weak government was unprepared to take bold measures either to reassure investors or to halt debt-servicing payments and reflate the economy. Increases in gasoline taxes designed to raise revenue for use in recapitalizing the banking system were reversed in response to public protests, heightening uncertainty about the orientation of policy. The finance minister resigned on October 19. The baht continued to decline, losing nearly 50 percent of its value against the U.S. dollar by the end of the year despite the installation of a new government committed to the terms of the IMF agreement. Only in early 1998, after the new government demonstrated its resolve by moving on the issue of bank restructuring, did the baht begin to recover some of the ground lost previously and did the equity market stabilize.

**The Spread**

Although Thailand's difficulties hardly came as a surprise to informed observers, the same cannot be said of their extent and, especially, their repercussions in other countries. The stock market fell and pressure against the currency was felt almost immediately in Indonesia, Malaysia, the Philippines, Singapore, and Taiwan. The

Philippines responded on July 11 by abolishing its fluctuation band for the peso, and Indonesia widened its band for the rupiah later that same day. Along with Thailand, Indonesia was most strongly affected. Its stock prices, currency values, and international reserves fell sharply, and the Suharto government was forced to abandon its defense of the widened fluctuation band for the rupiah after a little more than four weeks.

The spread of the crisis to Indonesia was unexpected because the country's growth had been unusually rapid and its macroeconomic fundamentals were strong. More generally, it was hard to see what the countries hit by the contagion had in common other than physical proximity. Levels of income and economic development were disparate. Some, such as Malaysia and Singapore, did modest amounts of business with Thailand, but others, such as Indonesia and Hong Kong, sold virtually nothing there. Some countries depended heavily on exports of primary commodities, whereas others produced and sold high-tech goods. Their industrial structures ranged from the large industrial groups of Indonesia to the small export-oriented firms of Taiwan. Except with the benefit of hindsight, the virulence and scope of the contagion was, in truth, a surprise.[6]

With the crash of the Hong Kong stock market in October and the spread of instability to South Korea, the crisis went global. The world's eleventh largest economy, South Korea was far larger than those stricken previously. Its banks had extensive investments around the world. Market participants being cognizant of these facts, fears mounted for the stability of currencies as far away as Russia and Brazil.

Just as the spread of the crisis to Indonesia had been a surprise, so too was the virulence with which it infected South Korea. South Korea had been recovering from a slowdown in 1996, when the prices of semiconductors (its single biggest export item) had declined sharply. The government had brought down the current account deficit from 5 percent of GDP to a more manageable level of 2 percent. But slower growth and depreciated currencies elsewhere now raised questions about whether this progress could be sustained. They heightened fears about the financial difficulties of the country's industrial conglomerates. The Hanbo Group (the fourteenth largest conglomerate, or *chaebol*) failed in March, the Kia Group (the eighth largest *chaebol*) in July. As business failures mounted, concern spread

for the viability of the banks to which the *chaebol* were linked. South Korean banks thus found it increasingly expensive to fund themselves abroad. Meanwhile, foreign investors suffering losses elsewhere in Asia liquidated their investments in South Korea in order to rebalance their portfolios and raise cash, intensifying the pressure on the financial system.

South Korea's negotiation of an IMF package, an exceptional step for an OECD country, brought only temporary respite. Revelations through the publication of leaked IMF documents that the country's short-term debt was significantly higher than previously thought, combined with the government's reluctance to close troubled banks, undermined confidence among international investors.[7] Commercial banks refused to renew their maturing short-term loans and took their money out of the country even faster than the IMF and G-7 governments pumped it in. With short-term foreign debt maturing at the rate of $1 billion a day, it seemed inevitable that South Korea's reserves would be exhausted by the end of December.

The week between Christmas and the New Year saw emergency negotiations between the foreign commercial banks with credits to South Korea and the newly elected government of Kim Dae Jung, under the stewardship of G-7 central banks. Forced to acknowledge their collective-action problem, U.S., Japanese, and European banks agreed to roll over their short-term loans, giving the government time to negotiate a more comprehensive financial restructuring package. On January 28, South Korea and the banks reached an agreement on rescheduling $24 billion of debt and on a plan to replace the bank loans with long-term bonds. Inducing investors to take up those bonds required the country to maintain high interest rates, with adverse implications for the economy. The consequences became known in May, when it was announced that the South Korean economy had shrunk by nearly 4 percent in the first quarter of 1998.

**The Crisis within the Crisis**

Yet the dominant events of the first months of 1998 were not those in South Korea but rather those affecting Indonesia and Japan. The IMF had unveiled a $23 billion rescue package for Indonesia in October. With the situation there continuing to deteriorate, the Suharto government and the Fund signed a second agreement on economic reform in January. Against the backdrop of the government's con-

tinued indecision regarding the fate of major public-investment projects and insolvent banks, investor doubts rendered IMF loans and conditions less than effective.[8] The rupiah fell to Rp17,000 to the dollar on January 22 (down more than 80 percent compared to a pre-crisis level of Rp2,434), before recovering. Indonesian banks and corporations having been left unable to service their foreign-currency debts, the country was forced to suspend debt-service payments. Banks stopped lending, and trade credits evaporated. The economy ground to a halt.

Against this backdrop, evidence of the severity of Japan's economic difficulties had a devastating impact on confidence. Japanese corporate leaders warned at the beginning of April of the gravity of the economic situation. Moody's downgraded Japan's sovereign debt on April 3. Asia's "locomotive" having stalled, investor confidence in the other crisis countries suffered. Indonesia was hit hardest. A third agreement on economic reform with the IMF had little effect. In early May, the continued deterioration of economic and financial conditions spilled over into street demonstrations, forcing President Suharto's resignation two weeks later. Hopes that this might set the stage for stabilization and recovery were then dashed by more bad news from Japan. On June 8, the yen fell below 140 to the U.S. dollar. On June 12, the government reported that first-quarter GDP had fallen by more than 5 percent at an annual rate. Fears that further weakening of the yen might so aggravate the competitive difficulties of Japan's Asian neighbors that they (and China) would succumb to another round of competitive devaluations prompted U.S. and Japanese intervention in the foreign exchange market to prop up the Japanese currency.

When the first anniversary of the Asian crisis was "celebrated" on July 2, 1998, there were still few signs of the kind of recovery that had developed in Mexico within six months of the 1994–1995 peso crisis. Although most Asian currencies had recovered from their early 1998 troughs, there were still few firm indications of economic growth. The IMF forecast renewed growth in South Korea and Thailand in 1999, but even this was far from assured. It seemed highly unlikely that Indonesia, mired in debt and political problems, would glimpse the light at the end of the tunnel even then. Anti-government riots continued to flare up, raising questions about the sustainability and direction of future policy.

### The Crisis Goes Global

The last in this series of events was the most dramatic, or at least it had the most far-reaching repercussions. In mid-August, Russia surprised the markets by devaluing the ruble and at the same time unilaterally suspending payments on most of its debts. The impact on confidence was devastating for investors who had come to see Russia as too big and important to fail. Its default consequently triggered a fundamental reevaluation of the risks of lending to emerging markets and of the price of risk more generally. It ignited a collective scramble out of risky assets in favor of safe havens such as U.S. Treasury securities. Once this flight to quality was under way, investors who had purchased Brady bonds in order to hedge their Russian exposure were forced to liquidate their Latin American holdings in order to raise liquidity and meet margin calls; the crisis thus immediately leapfrogged from Russia and Asia to Latin America. The simultaneous collapse of the prices of virtually all risky assets put institutional investors at risk: it precipitated the collapse of the U.S. hedge fund Long-Term Capital Management and created fears for the stability of other hedge funds, hedge fund counterparties, and the markets in which they had positions.

These events prompted fears of a global recession, or even a depression, eliciting a series of extraordinary policy responses to contain the crisis. The U.S. Federal Reserve Board cut its lending rate three times, including an exceptional reduction between its regularly scheduled meetings; this led other G-7 central banks to follow suit. The IMF provided an unusually large, front-loaded package of financial assistance to Brazil in an attempt to create a firebreak wide enough to prevent the crisis from spreading further. The U.S. Congress finally voted additional funding for the IMF. Japan accelerated its program of banking-sector recapitalization and restructuring and announced additional fiscal stimulus. Together, these measures sufficed to restore calm to financial markets, although not to restore the flow of capital to emerging markets. Whether that calm would endure remained, at the time of writing, very much an open question.

## 9.4 Causes

The Asian crisis that was the trigger for this series of events is best understood as a financial crisis with self-fulfilling features afflicting countries whose governments lacked the economic and political

wherewithal to defend their currencies. The weakness of governments, in turn, reflected three sources of vulnerability.

**Macroeconomic Imbalances**

Macroeconomic factors contributed to this vulnerability, however strange this might seem for countries whose growth was proceeding at 5 to 8 percent a year. The region's rapid growth was sustained in part by capital inflows that had as by-products increasingly overvalued real exchange rates, accompanied in some cases by ballooning current account deficits. The appreciation of real exchange rates was not large, but current account deficits were sources of vulnerability. They could be transformed into serious problems if foreign investors decided one morning that the deficit would no longer be financed. Eliminating a large current account deficit requires the large-scale redeployment of resources from nontraded- to traded-goods sectors, something that can occur smoothly, without a recession, only if it is allowed to take place gradually over time. Eliminating that deficit quickly, in contrast, requires radically compressing demand, disrupting production, and almost certainly inducing a recession. If capital suddenly stops flowing in, bridge financing is required to avoid this, and if foreign reserves are not sufficient to provide capital, attracting it requires high interest rates.

**Financial Sector Weaknesses**

This is where Asia's second source of vulnerability came into play, in the form of the weakness of the financial system. Financial systems in the crisis countries were in a delicate state, and high interest rates only served to compound their problems. In particular, the now higher interest rates needed to attract foreign capital and stabilize the balance of payments threatened to destabilize the banking system. Because banks are in the business of liquidity transformation, higher interest rates raised their funding costs relative to their incomes. Passing on those higher funding costs to their customers precipitated loan defaults that further damaged their balance sheets. Put another way, sustaining capital inflows required draining liquidity from domestic financial markets, but draining domestic liquidity threatened to knock the props out from under the banking system. International investors were understandably skeptical that governments were prepared to stay the course. Rudiger Dorbusch

**Table 9.3**
Short-term Borrowing as a Percentage of Total Capital Inflow (percentages)

| | Between 6/90 and 6/94 | Between 6/94 and 6/97 |
|---|---|---|
| Indonesia | 78.72 | 56.71 |
| South Korea | 78.26 | 63.79 |
| Malaysia | 91.90 | 53.96 |
| Philippines | 12.17 | 69.50 |
| Thailand | 80.92 | 56.08 |

*Source:* Calculations based on data in Chang and Velasco 1998.

put the point colorfully, as usual (1998, 16): "To keep the money coming in to finance the Ponzi game and hold the exchange rate, interest rates had to go up to reward foreign lenders for the risk, but that made real estate and banks even worse. To keep banks alive, interest rates had to go down. The government could not have it both ways. They cut rates, made it free to speculate against the currency and that is what happened."[9] After Samprasong Land missed a payment on its foreign debt in February 1997, the Bank of Thailand lent more than $8 billion to distressed financial institutions through its Financial Institutions Development Fund, despite mounting pressure on the baht, which it supported by intervening in the foreign exchange market. Speculators drew the obvious conclusion.

**Short Maturity of Debt**

This leads to the third element of the story, the short-term nature of Asian banks' and corporations' foreign funding. Between 1990 and 1996, roughly 50 percent of net private portfolio capital inflows into Thailand took the form of short-term borrowing (see Bhattachrya, Claessens, and Hernandez 1997). Sixty-two percent of net capital inflows in South Korea consisted of short-term borrowing in the years 1994–1997, compared with 37 percent in 1990–1993 (Y. Park 1998, 14) (see table 9.3). Net interbank lending rose from $14 billion in the five years ending in 1994 to $43 billion in the subsequent seven quarters. Forty percent was denominated in yen, the rest in dollars. More than two-thirds of these loans matured in less than a year (BIS 1998, 122–123).

Hence, the Asian economies had not just a *flow* problem—a continued need to attract capital *inflows* to finance their current account

deficits—but a *stock* problem as well. They had accumulated large stocks of short-term debt denominated in foreign currency that needed to be rolled over regularly. If confidence were disturbed, it would be necessary to raise interest rates to induce foreign investors to renew their maturing loans. Given the weakness of the banks, there were obvious questions about the willingness and ability of governments to do so. To the contrary, the authorities might feel compelled to guarantee the foreign liabilities of the banks, creating additional claims against their thinly stretched foreign exchange reserves and ensuring that the banking crisis also provoked a currency crisis.[10]

These three elements—modest macroeconomic imbalances, serious banking sector problems, and mismanagement of the maturity structure of the debt—placed governments in an untenable position. Painful policies were required to sustain confidence if it were disturbed, but financial systems could not bear the pain. There was nothing inevitable about the crisis, except in Thailand perhaps, in the sense that better luck (and better policies) might have enabled countries to grow out of their current account deficits, lengthen the maturity structure of their debts, and strengthen their banking systems before a shock to confidence occurred. As it turned out, Thailand's devaluation disturbed investor confidence before its neighbors succeeded in escaping the zone of vulnerability, and the rest, as they say, is history.

## 9.5 Delving Deeper

This interpretation suggests that the turmoil in Asia in 1997 was a self-fulfilling crisis in which countries had entered a zone of vulnerability where governments were unable to sustain a credible defense of their currencies. In particular, the combination of modest macroeconomic imbalances, banking-system weaknesses, and the short maturity of foreign debts resembled problems in Mexico and in other countries that had felt the Tequila Effect three years before.[11]

A deeper question is how the crisis countries allowed themselves to get into this bind in the first place. The obvious answer is that their crucial blunder was failing to upgrade bank supervision and regulation when liberalizing their financial systems, a failure that left them unable to raise interest rates and mount a sustained defense of the currency (see, e.g., Goldstein 1998). Specifically, the inadequacy

of supervision and regulation allowed the banks to rely excessively on high-cost foreign funding, to overcommit to the property market and industry, and to saddle themselves with nonperforming loans. Banks took on excessive short-term debt denominated in foreign currency because they were allowed to continue operating despite a weakened financial condition and the perverse risk-taking incentives that this implied.

What remains to be explained is why the authorities were prone to these policy mistakes. Why did they fail to strengthen financial supervision and manage risks to avert such disastrous outcomes? And why were the markets so inclined to provide the short-term foreign funding that ultimately proved so disastrous?

**Banks as Instruments of Industrial Policy**

The answer to these questions is that banks enjoyed government guarantees that promised to bail them out of any and all difficulties, which in turn encouraged them to take on excessive risk. Such guarantees were part and parcel of an economic development strategy in which the banks were the instruments of industrial policy. The banks were given franchises—alternative channels of intermediation were suppressed—in return for committing to accept government instructions regarding credit allocation.[12] Guarantees were the banks' quid pro quo for allowing themselves to be used as the instrumentality for public policy—as governments' quasi-fiscal agents. In this bank-led financial system, banks were too big and too important to fail. Knowing that they would not be allowed to fail, owners and managers had an incentive to take on additional risk.

One can see how this provided opportunities for crony capitalism. It was devilishly hard to determine whether the decision to extend credit to a particular industry or enterprise reflected the priorities of the economics ministry or the self-interests of political leaders' extended families. So long as there was an abundance of high-return projects waiting to be financed, the distinction was of little moment. But once high-return investments had been exhausted and the period of extraordinarily rapid growth drew to a close, that distinction became critically important, for now the extension of preferential credits in disregard of market signals placed the solvency of the banks at risk. This may not have been exactly what Malaysian Prime Minister Mahathir Mohamad meant when he said that rapid growth, like high water, submerges rocks that can otherwise punch holes

**Table 9.4**
Foreign Liabilities of the Banking System 1990–1996 (as a percentage of GDP)

| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|
| Indonesia | 6.5 | 5.2 | 6.2 | 6.2 | 6.5 | 6.0 | 5.6 |
| Thailand | 5.0 | 4.9 | 5.9 | 11.1 | 21.6 | 28.4 | 26.8 |
| South Korea | 4.1 | 4.9 | 4.8 | 4.5 | 5.5 | 6.9 | 9.3 |
| Malaysia | 7.0 | 9.1 | 12.7 | 19.5 | 9.2 | 7.4 | 9.2 |
| Philippines | 6.2 | 4.4 | 5.6 | 5.5 | 6.7 | 8.8 | 17.2 |

*Source:* Radelet and Sachs 1998a.

in the sturdiest boat, but the comment could not have been more apposite.

When the water began to recede, revealing the rocks below, the banks navigated the shoals by borrowing abroad and only ended up in whiter water. Governments consorted in this decision to roll the dice. The Thai and South Korean governments liberalized the capital account exactly backwards. South Korea maintained stringent controls on FDI inflows into the country and limited opportunities for foreigners to purchase bonds and equities issued by South Korean corporations. It restricted the ability of those corporations to borrow on international markets.[13] The banks, meanwhile, were freed to borrow abroad, rendering the *chabeol* dependent on their debt. This policy was not one of incompetence as sometimes suggested; it was a logical outgrowth of the government's cultivation of a bank-centered financial system. Similarly, this is the only way to understand the decision of the Thai government to promote the growth of the Bangkok International Banking Facility (BIBF), which permitted Thai banks to borrow offshore and onloan the receipts to domestic customers in the form of loans denominated in foreign currency.[14] Thus, the foreign liabilities of the South Korean banking system more than doubled between 1993 and mid 1997, reaching nearly 10 percent of GDP. In Thailand, following the establishment of the BIBF, this ratio reached a remarkable 28 percent of GDP in 1995 (Radelet and Sachs 1998b, 25) (see table 9.4).[15]

### Accommodating Global Credit Conditions

It takes two to tango, of course. These Asian policies would not have had such powerful effects had they not coincided with global conditions encouraging U.S., European, and Japanese banks to lend. The consequences of Asian financial weaknesses could be contained so

long as intermediaries there had limited access to funding. What changed in the mid 1990s was not just the relaxation of regulatory limits on their borrowing abroad but also structural and macroeconomic changes in the rest of the world that allowed Asian banks to freely indulge their appetites for foreign funding.

Financial deregulation in Europe was one of these changes: it encouraged European banks to seek higher yields in other parts of the world, by removing regulatory limits on the ability of European commercial and investment banks to branch into new lines of business, notably in emerging markets. More important, low interest rates and yields in the major money centers encouraged institutional investors to borrow in the United States or Japan in order to purchase higher-yielding bank deposits or fixed-income securities in middle-income Asia.[16] The appearance of the "carry trade" in Malaysia in 1991–1992 coincided with the U.S. Federal Reserve Board's policy of low interest rates to stimulate the recovery of the U.S. economy from its early 1990s recession and to strengthen the U.S. banking system.[17] It was fueled by the decline of money-market rates to unprecedentedly low levels in Japan as that country descended into its mid-1990s economic funk.[18]

Understanding the flow of capital to East Asia does not require invoking technical terms such as the "carry trade" when one observes that there was an incentive to borrow where interest rates were low and invest where they were high so long as the exchange rate was pegged. Capital flows reflected the tendency toward interest parity, a condition that should hold in an environment of high capital mobility. An implication of this high capital mobility was that the authorities in capital-importing countries had little ability to restrain the growth of domestic credit once the U.S. Federal Reserve Board opted for a more expansionary monetary policy to revive the U.S. banking system (table 9.5). Because exchange rates were linked, monetary policies were linked. As David Hale (1997, 1) put it, "As a result of the exchange rate link which east Asia had to the US dollar, America's expansionary monetary policy helped to encourage rapid credit growth in countries such as Thailand, Malaysia, Indonesia and the Philippines."

Thus, the exchange rate is a key part of the story. The operation of exchange rate bands and governments' stated commitment to their maintenance means that there was little perceived exchange rate risk to deter capital inflows. Larger capital inflows meant larger current

**Table 9.5**
Bank Credit to the Private Sector, 1981–1997[a]

| | Annual rate of expansion[b] (in percent) | | As a percentage of GDP |
|---|---|---|---|
| | 1981–1989 | 1990–1997 | 1997[c] |
| Indonesia | 22 | 18 | 57 |
| Thailand | 15 | 18 | 105 |
| South Korea | 13 | 12 | 64 |
| Malaysia | 11 | 16 | 95 |
| Philippines | –5 | 18 | 52 |
| Singapore | 10 | 12 | 97 |
| Hong Kong | 13 | 8 | 157 |
| Taiwan | 15 | 13 | 138 |

*Source:* Bank for International Settlements (BIS) 1998, table VII.1.
*Notes:* a. Annual average. b. Deflated by consumer prices. c. 1997 data are preliminary.

account deficits, given the difficulty of sterilizing these inflows, and more real exchange rate appreciation. Both the deficits and the large real appreciation were sources of vulnerability when financial market conditions were disturbed. Moreover, the absence of exchange rate variability left nothing to insulate money and credit conditions from those prevailing abroad. The loose monetary policies appropriate for a U.S. economy recovering from a banking crisis and a Japanese economy still mired in one were not appropriate for Asian economies in which the problem was instead the risk of overheating. There, higher real interest rates were needed because there existed many attractive investment projects that could not all be undertaken at once. High interest rates were the rationing mechanism to force the market to choose among them. But the pegged exchange rate made it all but impossible to keep interest rates at a sufficient premium over foreign levels. Excessive credit expansion and an unsustainable real estate boom were the inevitable results.

To be sure, pegging the currency was not the only option for Thailand, Malaysia, Indonesia, the Philippines, and South Korea. By the time the crisis stuck, South Korea had already moved cautiously in the direction of greater flexibility, and Indonesia, Malaysia, and the Philippines, as we have seen, did so soon after Thailand's devaluation. But limiting the flexibility of the exchange rate vis-à-vis the country's principal export markets was a logical policy for governments whose economic development strategies had been predicated

on the promotion of exports. It was part of the bargain with export-oriented industries. Pegging to the dollar was also seen as a way of facilitating external financing of domestic investment projects (see Corsetti, Pesenti, and Roubini 1998). It was another legacy of Asia's development strategy that had outlived its usefulness.

**Long-Term Historical Forces and Short-Term Financial Policies**

Thus, Asia's crisis can only be understood in terms of a conjuncture of long-standing historical forces and short-term financial policies. Ultimately, the explanation for the crisis lies in the region's history and economic development trajectory, which relied on bank-centered financial systems, the use of the banks as instruments of industrial policy, and close connections between banks and politicians, all of which were designed to sustain high rates of investment and rapid economic growth. This was not a formula that could work forever: by the second half of the 1990s, it had been in place for several decades and was showing growing signs of strain. At another level, the explanation lay in financial errors committed in the mid 1990s. Growth may have been slowing, but the day of reckoning was delayed by the selective liberalization of capital accounts to facilitate short-term financial flows, aided and abetted by the low level of interest rates in the major money centers and by the migration of U.S. and European investment banks to middle-income Asia. These developments on the borrowing and lending sides enabled the newly industrializing countries to borrow their way out of their difficulties for a time. In the end, however, this only set them up for a harder fall.

## 9.6 Why Was the Crisis So Severe?

Although these insights help one understand the speculative attacks, they do not explain the full-blown economic and financial meltdown that followed. Something more is needed to account for the exceptional severity and scope of the crisis.

**Unhedged Foreign Exposure**

One factor, surely, was the extent of the foreign currency exposure of the banking and corporate sectors. Mexico had foreign exposure as well, in the form of the notorious *tseobonos*, but these were liabilities of the government, not of firms and banks. When the peso began to

decline, this created financial problems first and foremost for the Mexican government. In Asia, in contrast, the gravest problems were those created for the private sector. With so many banks and firms involved, the absence of an effective mechanism for coordinating debtor-creditor negotiations was a more serious problem than when there had been only the government on the debtor's side of the table. In comparison with Mexico, investors could look forward to a much longer period during which the debt overhang would continue to discourage potential leaders.

Critically, the foreign debts of Asian banks and firms were unhedged. The exchange rate having been pegged for so long, borrowers saw little reason to insure themselves against its depreciation by purchasing relatively expensive currency futures and forwards. Ironically, Asian governments' very success at pegging their exchange rates was one factor behind the severity of the crisis, for it lulled domestic banks and corporations into a false sense of security. When the exchange rate began to move, it threw the banks and firms with the heaviest foreign exposures into bankruptcy.

One of the classic preconditions for a contractionary devaluation is the existence of a stock of foreign currency denominated debt, the service on which grows heavier as the exchange rate declines.[19] The operation of this mechanism is clearly evident in Asia. As the exchange rate fell, debt denominated in foreign currency became more expensive in domestic currency terms, leaving domestic residents poorer. Firms, facing a heavier burden, invested less. Banks, facing a heavier burden, lent less. As demand fell, there was downward pressure on output. Meanwhile, more domestic output had to be devoted to servicing the same external debt. This meant freeing up a larger share of domestic resources for debt-servicing purposes, which required using policy to restrict demand still further. But this only depressed output still more, in turn putting further downward pressure on the exchange rate and further elevating debt servicing costs in a vicious spiral.[20]

**The Scramble for Cover**

In addition, banks and firms that had previously left their foreign exposures unhedged scrambled for cover when the exchange rate began to move. Not only did they find it more costly to purchase the foreign exchange needed to meet their current obligations, but they also scrambled after additional foreign exchange to protect

themselves against the possibility of future exchange rate depreciation, pushing the exchange rate down in a self-fulfilling prophecy. Once it became clear that governments' stated commitments to stabilize exchange rates were worthless, banks and firms with debts denominated in foreign currency sought cover at any price.[21]

**Other Sources of Positive Market Feedback**

The scramble for cover was not the only reason why the initial decline in Asian exchange rates and asset prices fed on itself. The collapse of East Asian asset values and the fall of the Nikkei tightened the screws on already distressed Japanese banks, which responded by calling in their loans. Once asset prices began to fall, hedge funds and other investors who had purchased emerging-market securities on margin were forced to raise cash to pay back their borrowed funds. The dynamics of margin calls forced them to sell into a falling market, and the further the market fell, the more frequent the margin calls became.

In addition, when Moody's downgraded Thailand, South Korea, and Indonesia's sovereign debts in December to below-investment-grade status, many portfolio managers were required to liquidate their holdings of those securities. The assumption that the debts of corporate and financial issuers cannot have a better credit rating than the sovereign (the "sovereign ceiling") meant that these other securities became junk bonds as well. Finally, a number of bond contracts contained acceleration provisions allowing creditors to call for immediate repayment in the event that the issue was downgraded (Radelet and Sachs 1998a, 13). The existence of these options was not well known to other investors or, for that matter, to officials.

**Cascading Defaults**

Another factor contributing to the severity of the crisis was the absence in most Asian countries of adequate bankruptcy and insolvency procedures and independent judiciaries. Anticipating that the firms to which they had lent would experience serious financial problems and lacking confidence that they would be treated fairly under Asian countries' insolvency codes, creditors scrambled to liquidate their claims in an asset grab race. Even where forbearance was in their collective interest, they had an incentive to scramble for the enterprise's remaining assets before these were stripped by insiders and other more politically influential claimants. And when

borrowers began to default, the inability of lenders to repossess collateral produced a cascade effect where the debtor's nonperformance threatened to force its creditors into default. Where those creditors included banks, banking panics resulted. Specialists suggest that the dangers posed by inadequate bankruptcy procedures may not be apparent in periods of rapid growth when few firms experience financial distress, but that they will surface with a vengeance if and when growth slows. Asia's experience is consistent with this view.[22]

**The Contagion**

Yet another factor contributing to the severity of the crisis was the speed and extent of the contagion. Exporting its way out of the crisis may have been possible for one stricken country, but it was not possible for an entire group of crisis economies, all of which could not significantly boost their exports to one another and to the same third markets. This suggests that one channel for contagion was competitive devaluation operating through bilateral and third-country trade linkages (for evidence, see chapter 6; Glick and Rose 1999). Thailand may have exported little to Indonesia and Malaysia, but these countries all sold into the same markets in other parts of the world. Thailand's devaluation therefore worsened the balance of payments prospects of all its neighbors and competitors.

That said, trade links seem insufficient to explain the speed and virulence with which the crisis spread, and contagion seems to have infected countries that exported primary commodities and high-tech products equally, without discriminating among them.

This points to the operation of other channels, notably the generalized revision of expectations prompted by the devaluation of the baht and reinforced by the spread of financial upheavals to Indonesia and Malaysia.[23] Not only did the Thai devaluation reveal that promises regarding Asian exchange rate pegs could not be taken at face value, but it alerted investors to the existence of deeper problems. Morris Goldstein (1998, 18) refers to this as the "wake-up-call" hypothesis. The term is both evocative and revealing of the limits of the interpretation. Rarely is an effort made to explain why this particular wake-up call was so loud and startling. As commonly invoked, this explanation for the contagion simply begs the question.

Guillermo Calvo and Enrique Mendoza (2000) suggest that globalization itself explains why investors were sleeping so soundly.

Globalization makes it possible to diversify investment portfolios internationally. But diversification reduces the incentive for each investor to sink the costs of learning about conditions in each national economy, because investments there now account for only a small fraction of his or her portfolio. Lacking information, investors are more likely to draw inferences from the actions of other investors—that is, to run with the herd.[24] Unfortunately, it is not clear why investors do not solve this problem by turning to mutual funds and other collective investment vehicles that are in the business of acting as delegated monitors because of the existence of information costs. Nor is it clear why the Thai devaluation should have been regarded by investors with stakes in other Asian countries as having such important information content.

A more compelling potential explanation goes back to the bank-based nature of Asia's financial system.[25] The region had developed few financial *markets* on which information was impounded into the prices of exchange-traded financial assets. Rather, this business was done by banks possessing relatively favorable access to information on their customers' financial position. Those banks were understandably reluctant to share their proprietary knowledge with their competitors. They were entrusted, for better or for worse, to act as delegated monitors and generated few price signals such as those provided in other economies by bond and equity markets. Because there was little independent information on the quality of loans, bad news served to discredit them as a group.

Moreover, the lack of transparency of bank balance sheets, reflecting the failure of supervisors to require banks to follow rigorous auditing and accounting practices, heightened the difficulty of distinguishing good credit risks from bad ones, most obviously in Thailand, but in South Korea as well. Lengthy delays were allowed to occur before banks revealed information about their nonperforming loans.[26] Information on individual banks and loans being lacking, the revision of confidence was general. In this information-impacted environment, bank runs could lead to systemic banking crises and spill contagiously across countries.

### Japan's Deepening Slump

If these are not enough explanations for the singular severity and scope of the crisis, finally there was the role of Japan. In 1994–1995, when Mexico experienced its crisis, its principal trading partner, the

United States, was growing strongly. In 1992–1993, when much of Europe was in crisis, demand in Germany was strong, reflecting the effects of German unification. But in 1997–1998, the opposite was true of the relevant regional power, Japan, which traded more than any other G-7 member with the crisis countries and which was growing, as it had for the whole of the 1990s, more slowly than any other G-7 economy. This further limited the ability of the crisis countries to export their way out of their difficulties and had obvious adverse impacts on investor confidence.

Similarly, the weakness of Japanese financial institutions left them little margin for error when their East Asian investments stopped performing. Japanese banks short of capital and required to meet the Basel Standard responded to problems in Thailand and Indonesia by liquidating their assets in other Asian countries, opening another channel for contagion.

## 9.7 Implications

This interpretation of the crisis has five lessons, all closely related to one another. First, large current account deficits are not benign. Deficits have to be financed, placing a country at the mercy of its creditors. However admirable the uses to which foreign funds are put, the returns need to be balanced against risks in the form of a sudden curtailment of foreign lending and the need to eliminate that deficit overnight. Those of us who live in California appreciate the advantages of earthquake insurance. Policymakers need to similarly appreciate the importance of insuring themselves against financial tremors by avoiding excessive deficits.

Second, how the current account is financed is not a matter of indifference. Dependence on short-term funding, and short-term funding denominated in a foreign currency in particular, is risky business.[27] If investors lose confidence for any reason and hesitate to roll over their short-term claims, the issuer's insolvency can be cast into doubt. If those short-term foreign claims are claims on the financial system, macroeconomic stability will be threatened. And if those claims are denominated in foreign currency (or if the exchange rate is pegged), there will be little that the government and the central bank can do about it.

Third, banks are a special source of vulnerability. Banks are particularly important in developing countries as a source of financial

intermediation services. The securitized markets that are the modern alternative have more demanding information requirements and, historically, are later to develop. This dependence means that banks will be regarded as too big and important to fall. The knowledge that the government stands ready to run to their rescue is in turn a source of moral hazard that encourages excessive foreign funding of domestic banks. This provides a rationale on classic second-best grounds for policies to offset this distortion—for relating bank capital requirements to the source of their funding as well as the riskiness of their loans and more generally for regulating the flow of short-term foreign funds into the banking system. Regrettably, this is precisely the opposite of what Asian governments, seeking to use the banks as instruments of industrial policy and conduits for the transfer of foreign funds, did in the years leading up to their crisis.

Fourth, developing countries, with few exceptions, should move toward greater exchange rate flexibility.[28] A more flexible exchange rate gives banks and corporations an incentive to hedge their foreign exposures, which better positions them to cope with financial turbulence if and when it occurs. In Asia, currency depreciation was painful because it came all at once and banks and corporations were unprepared. Had governments allowed the exchange rate to exhibit more flexibility when capital was still flowing in, banks and corporations would have hedged more of their exposure, and the subsequent sharp depreciation would not have been so disruptive. Asia is not evidence that greater exchange rate flexibility is undesirable, but it provides a graphic example of the importance of initiating that transition before problems arise.

Finally, it will not always be possible to prevent or predict financial crises. Although investments in crisis prevention have a high payoff, there will be always financial surprises, implying the need for better mechanisms for containing them. Unfortunately, the two options currently available for responding to crises—extending ever-bigger bailouts and standing aside and letting nature run its course—are equally unacceptable. This is why it is essential to create a third alternative.

# IV Policy Implications

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# 10 Capital Controls: Capital Idea or Capital Folly?

## 10.1 Introduction

Since the Asian crisis erupted, undermining the legitimacy of the Suharto government, Indonesia has been wracked by unrest. In some cities, the authorities responded with an emergency curfew, prohibiting people from going out at night. Some observers have gone so far as to suggest that Indonesia would be a safer place if those measures were maintained indefinitely.

In neighboring Malaysia, meanwhile, Prime Minister Mahathir Mohamad has imposed a curfew on capital. Once the home of one of the world's most highly capitalized stock markets and open financial markets, Malaysia now controls all purchases and sales of its currency, the ringget, for purposes related to international financial transactions. Not just banks and stock brokers are affected: citizens are prohibited from taking as little as $100 out of the country, and the law is enforced by random searches at the airport.

Mr. Mahathir argues that this infringement of the civil liberties of Malaysia's citizens, like a dusk-to-dawn curfew, is needed to protect its economy and society against marauding hedge funds mugging innocent bystanders. It would be madness, in his view, to leave currency speculators unrestrained, unnecessarily jeopardizing the health and well-being of the Malaysian economy.

This once-radical view has found support in some surprising quarters. For example, in 1998, Paul Krugman authored a widely cited article arguing that emergency conditions warranted emergency measures. Warning that the crisis countries of Asia were experiencing a full-scale meltdown, he urged them to consider using controls as shelter behind which to reflate their collapsing economies. His

statement was viewed, rightly or wrongly, as giving Mr. Mahathir intellectual cover for his radical initiative. Harvard's Dani Rodrik, meanwhile, issued a blanket indictment of capital market liberalization. Rodrik argued that there is in fact no evidence that countries with free capital flows grow faster, whereas it is self-evident that international financial liberalization exposes them to the danger of debilitating crises.

This apostasy flies in the face of all that is sacred to economists and has predictably provoked harsh criticism of those voicing such unconventional views. The normal presumption in economics is that markets know better than governments and that, left to their own devices, they allocate resources reasonably well. Yet the suspicion remains that there is something different about international financial markets. The founding fathers of the Bretton Woods System, Harry Dexter White and John Maynard Keynes, certainly thought so: the Bretton Woods Agreement negotiated under their guidance, although encouraging economic liberalization generally, authorized—indeed, encouraged—countries to retain restrictions on international financial transactions. Only in recent years, responding to pressure from the IMF and the United States, have governments, first in Europe and Japan and now in various emerging markets, finally abandoned capital controls. The Asian crisis now suggests, or so it would appear, that this was a serious mistake.

Not that it is clear why international financial transactions should be treated differently from other transactions, or why the normal presumption that markets know better than bureaucrats is invalid in this case. Is it that the transactions in question are financial, or that they are international? Are capital controls justified as emergency measures in a period of unprecedented crisis, or should they be retained as permanent protection against unreliable financial markets? Should they be considered by all financially exposed economies or only emerging markets? Unfortunately, the discussion to date has confused these issues more than it has illuminated them.

## 10.2 The Case for Financial Liberalization

The most basic insight of modern welfare economics is that self-interested economic actions maximize the collective interest—or, to put the point more simply, that markets allocate resources in socially desirable ways. Although they may not work perfectly, all the evi-

dence, be it from import substitution in Latin America in the 1950s and 1960s or from central planning in the Soviet Union, is that they produce better outcomes than heavy-handed bureaucratic control.

There is no obvious reason why this presumption should apply less to financial than other markets. Indeed, studies by the World Bank have consistently shown that countries with more developed financial markets grow faster. Experience with policies of financial repression in developing countries and with state monopolies over financial transactions in the Eastern Bloc clearly shows that stifling financial markets can jeopardize growth.

If domestic financial markets have clear benefits, it is not clear a priori why the benefits of international financial markets should be less. International financial transactions transfer resources from high-saving to low-saving countries. They allow economies experiencing business-cycle disturbances to smooth the time profile of consumption and investment. They allow firms and households to diversify away country-specific risks.

The presumption in favor of markets being so strong, any counterargument had better be based on incontrovertible evidence. Rodrik's evidence is widely cited: using data for a cross-section of countries, he finds no association between capital flows and economic growth, which, he argues, seals the case against capital account liberalization. This is what Jeffrey Frankel refers to as fail-safe econometrics: The secret of empirical work is to define your hypothesis so that failure to find significant results can be interpreted as support. Statisticians can fail to find a relationship between capital account liberalization and growth not because none exists but because they have inadvertently omitted from their analysis other variables that are negatively associated with growth but positively associated with the decision to open the capital account. It is plausible that countries that decide to keep their capital accounts open and closed differ from one another in other ways, including ways for which the statistician finds difficult to control.

In a sense, those who argue that today's developing countries should resist capital account liberalization are adopting something of a double standard. All of today's advanced industrial countries have opened their capital accounts. All of them have rendered their currencies convertible for capital account transactions. Doing so is the logical culmination of the process of developing a deep, mature, and efficient domestic financial system. In a fundamental sense,

domestic and international financial liberalization go together, because it is hard to liberalize domestic financial transactions and at the same time keep a lid on cross-border transactions. Some would argue that capital account liberalization is also a concomitant of political liberalization: capital controls necessarily infringe on the economic freedom of residents and are not a policy of a country in which most readers of this paper would themselves prefer to live. There is a valid argument, as we shall see below, that developing countries should control capital flows while they build deep and diversified financial systems, upgrade prudential supervision, and strengthen their monetary and fiscal institutions—in other words, for using them as transitional measures—but not that such countries should permanently pursue different policies toward the capital account than those that became high-income countries before them.

## 10.3 Controls as Prudential Measures

Markets may be the best mechanism we have for allocating financial resources, but history has also shown that they can be dangerously unstable. Like a trapeze artist, the financial system can perform miraculous tricks but experience a bone-shattering fall if allowed to perform without a net. Banks in particular share the trapeze artist's vulnerability. Their investments are less liquid than their deposits; this is what we mean when we say that banks provide "liquidity-transformation services." They operate in an imperfect information environment; one of their basic functions is to develop long-term relationships with their clients as a way of acquiring proprietary information about their borrowers' credit worthiness. But the fact that other financial market participants will not have equally good information about those customers means that banks can raise funds in a crisis only by disposing of assets at fire-sale prices and doing further damage to their balance sheets. Banks do extensive business with one another; hence, problems in one create problems in others. For all these reasons, a sudden loss of depositor confidence can produce a systemwide panic that brings the entire banking system to its knees.

Securities markets share many of the same vulnerabilities. Investors are prone to quick collective reactions. Being imperfectly informed about market conditions, they tend to infer information

about the fundamental value of their investments from one another's actions. Economists use the term "information cascades" to denote this phenomenon, which in practice simply means that investors move in a herd, stampeding in and out of markets. Moreover, investors take positions on credit, so that when the market moves against them, they are required to put up additional collateral. They can thus be forced to sell in a falling market, amplifying asset price volatility. A large price fall can bring bank and nonbank intermediaries down with it, disrupting the supply of credit to the economy as a whole. The case of Long-Term Capital Management reminds us that this scenario is no mere hypothetical.

These are all reasons why governments limit the difficulty of the tricks that banks and other financial market participants are allowed to attempt. To limit banks' exposure to market and credit risk, they impose ceilings on concentrated investments and positions in foreign exchange. They limit the amount of margin money, or leverage, that equity markets participants are allowed to use, and they do not allow banks to perform intermediation services without a net. The financial safety net, which takes the form of deposit insurance and the existence of a lender of last resort, is designed to catch financial market participants when they fall.

This is where an open and unregulated capital account poses special risks. Banks enjoying government guarantees and seeking to lever up their bets can do so more readily when the capital account is opened. If they borrow in foreign currency, they strip the authorities of their ability to act as lenders of last resort: a central bank can't print foreign currency, and its capacity to provide commercial banks the foreign exchange they need to make good on their foreign obligations is limited to its stock of international reserves. Even if the liabilities of the banks are denominated in domestic currency, a central bank trying to peg the exchange rate will find itself between a rock and a hard place. It will have to choose between draining liquidity from the markets to defend the exchange rate, or injecting liquidity to defend the banks. It will not be possible to do both.

These are arguments for using capital controls to backstop other forms of prudential regulation—as reinforcement for other, more conventional measures to limit systemic risk and to prevent banks and other intermediaries from taking on additional risk in response to the provision of the financial safety net. In a market economy,

prudent risk management is first and foremost the responsibility of bank owners and managers themselves; because they are the ones making the investment decisions, they should bear the consequences. This is why banks are required to hold capital and issue subordinated debt—so that their owners and important creditors have something to lose. The second line of defense against excessive risk taking is the regulators, who monitor and supervise the banks and need to take prompt corrective action when they see evidence of fraud, incompetence, or gambling for redemption. But where risk-management practices are underdeveloped and the regulators lack administrative capacity and insulation from political pressures, it may be necessary to build a third line of defense—to limit excessive risk taking that threatens systemic stability by limiting the ability of the banks to borrow abroad. Where limits on bank borrowing can be circumvented by having corporations do the borrowing and onlend the proceeds to the banks, this will mean controlling or taxing, à la Chile, all capital inflows, whether the borrower of record is a bank or someone else.

These arguments do not justify any and all regulations that governments might be tempted to impose to prevent their citizens from borrowing abroad. Capital controls can be justified on prudential grounds only if they do not arbitrarily discriminate in favor of some banks and residents over others. They are justifiable only where financial markets are thin, the private sector's risk-management practices are underdeveloped, and the regulators' capacity to supervise the financial sector is limited—in other words, where the conventional defenses against systemic risk are not enough. In practice, these last three preconditions, and therefore the argument for capital-inflow taxes or controls, apply to the vast majority of developing countries. For emerging markets, an open capital account should be the exception, not the rule.

Eventually, financial markets will deepen, bankers will acquire more sophisticated risk-management skills, and regulators will gain experience, competence, and independence. At that point, restrictions on foreign borrowing should be removed, and the economy can graduate to the club of high-income countries with financial systems fully open to international transactions. But here, as in other forms of financial regulation, it is smart to err in the direction of caution—to be absolutely sure that the necessary preconditions are in place before opening the capital account. After Mexico in 1994 and

Asia in 1997, do we really need a third reminder of the dangers of premature and precipitous financial liberalization?

## 10.4 Controls as Emergency Measures

One country after another, from Thailand to Indonesia, to Korea and now Brazil, has been forced to respond to the crisis in emerging markets and the resulting recessionary pressures by cutting its budget deficit, not increasing it as the textbook Keynesian advice would suggest. The single greatest discovery of the Keynesian revolution, namely the importance of fiscal stabilizers, has thus been thrown out the window. Some would say this simply reflects bad advice by the IMF, which required budget cuts in the Asian crisis countries as a condition for disbursing official funds, and which then demanded the same of Brazil despite forecasts of recession there. In fact, the Fund is merely mirroring market sentiment. Were a country such as Brazil to respond to slower economic growth by cutting taxes and increasing public spending, investors would flee, the currency would crash, and the resulting investment collapse and financial distress would only make the recession worse. Thus, market discipline is perverse. As Krugman (1998, p. 2) puts it, "Brazil, we are informed, must suffer a recession because of its unresolved budget deficit. Huh? Since when does a budget deficit require a recession (which itself will, of course, make the deficit that much harder to bring down)?"

This is at least part of the rationale for the capital controls imposed by Mr. Mahathir—to provide the leeway to implement a more expansionary fiscal policy and offset an impending recession. It is the realization that has led "otherwise respectable economists" to suggest the use of capital controls to stem capital flight and thereby preserve governments' freedom to pursue counter-cyclical fiscal policies. Controls have costs—they require a burdensome administrative bureaucracy, reduce the pressure for policy reform, and interrupt access to foreign sources of investment finance—but their benefits may still dominate if they allow the stabilizing use of macroeconomic policy instruments to be regained.

Whether this is a sensible argument hinges on which of two models of market discipline one believes. If investors are irrational and inclined to panic when the government activates its macroeconomic stabilizers, then it can be sensible for countries to use controls to protect themselves from such irrationality. If, on the other

hand, investors respond negatively because they correctly anticipate that it is governments themselves that are prone to respond perversely to the crisis, then the solution is not to use controls to relax market discipline but for the government to clean up its act. The argument goes like this. Some governments lack fiscal discipline, and they are perennially battling the consequences. Like an overweight man, they are continually trying to teach themselves to stay away from the refrigerator. If the fat man says, "I've had a lousy day; I'm going make myself feel better by having a piece of cake," his friends are likely to revise downward their estimates of the likelihood that he will stick to his diet. Governments with a history of fiscal laxity that have a lousy macroeconomic day and respond by increasing their budget deficits similarly run the risk of being re-evaluated in this way—of being seen as having reverted to their bad old habits of running budget deficits and living beyond their means. If investors rationally expect budget deficits to be monetized, then deficits today imply inflation tomorrow, encouraging the rational investor to take the first opportunity to get his money out of the country.

This explains the supposedly paradoxical fact that deficit spending in the United States strengthens the currency, whereas deficit spending in Brazil weakens it. In the U.S. case, no one expects the Fed to monetize the deficit; hence, additional government spending pushes up demand, pushes up the real interest rate, and pushes up the real exchange rate. In the Brazilian case, however, monetization is a *real* possibility (pun intended), implying more inflation and ultimately the need to devalue the currency.

It is also why the other textbook advice for responding to a recession—devaluing the currency in order to switch spending toward domestic goods—can have such catastrophic effects in emerging markets. Countries weaning themselves from inflation often do so by pegging the exchange rate, which ties the hands of the central bank and signals the government that the inflation tax will no longer be available. The currency peg is thus the lock on the refrigerator. Countries that devalue are seen as having removed the lock from the refrigerator and relapsing to the bad old days of inflationary excess, which leads investors to flee.

The first-best solution in this case is not to impose capital controls but to eliminate the problems leading to the excesses in monetary and fiscal policies in the first place. The most convincing way of signaling that not just current policies but also future policies will be

sound and stable is to reform the economic and political arrangements by which they are made. A large literature now shows that better policymaking institutions produce better outcomes. For monetary policy, more independent central banks are better able to resist political pressures to monetize budget deficits and generally run lower inflation rates. For fiscal policy, there are parallel arguments for creating an independent national fiscal council constitutionally empowered to set a ceiling for each year's budget deficit, along with automatic, legally mandated procedures for what will be done if deficit spending threatens to broach that limit. Less ambitiously, fiscal reforms that vest more agenda-setting power in the hands of the prime minister or finance minister, thereby reining in the common-pool problem that arises in the presence of autonomous spending ministries (none of which has an incentive to fully take into account the impact of its additional spending on the deficit as a whole), have been shown to be associated with smaller deficits and debts. Similarly, measures that enhance the transparency of budgeting make it easier for voters to detect politicians who place self-serving goals above the national interest.

With these fundamental institutional reforms in place, markets will not conclude that deficits today necessarily mean deficits tomorrow, or that monetary expansion today means monetary expansion tomorrow. The freedom to use fiscal and monetary policies counter-cyclically will be regained, and capital mobility will no longer be a threat.

## 10.5 Conclusion

Developing countries have special financial problems. Their monetary and fiscal institutions lack credibility. Their regulators lack administrative capacity. Their financial markets are shallow. They cannot borrow abroad in the domestic currency. However much one tries to assume away these problems, the fact of the matter is that these are the defining characteristics of an underdeveloped economy, and so long as they are present, there are arguments for special measures, including capital controls, to limit risks to the financial system and to free up the use of monetary and fiscal policies in a slump.

With time, developing countries will develop. Their financial markets will deepen; their macroeconomic and regulatory institutions

will grow more robust. With these and other institutional preconditions in place, they will graduate to the club of high-income countries. This will have important social and economic benefits, not the least of which is that remaining restrictions on international financial transactions can come off. The most critical point of all is therefore that any recourse to capital controls in the meantime should not be taken as an excuse to slow down the fundamental processes of institutional development and policy reform.

# 11 Taming Capital Flows

## 11.1 Introduction

There are two extreme views on the question of international capital flows. One is that redeploying capital from rich to poor nations promises to dramatically enhance economic efficiency. Assume, following Robert Lucas (1990), that output per person in the United States is 15 times that in India and that production in both countries obeys a Cobb-Douglas production function with a common intercept and an elasticity with respect to the capital/labor ratio of 0.4. Therefore, the marginal product of capital in India is fully 58 times its value in the United States. A little capital mobility goes a long way; it has the capacity to produce a lot of additional output. Moreover, for those who insist that output per person is lower in India than the United States not simply because India has a less capital per worker but also because its government follows more distorting policies, capital mobility applies pressure for reform. It promises to intensify the pressure for governments to follow sound and stable policies by imposing harsh penalties, in the form of capital flight, on those failing to do so. It promises to align domestic interest rates with world interest rates, just as free trade promises to align domestic prices with prices in the rest of the world.

At the opposite extreme, analysts such as Dani Rodrik (1998b) and Jagdish Bhagwati (1998) dispute these conclusions chapter and verse. There is no evidence, they insist, that opening an emerging market to foreign financial inflows significantly raises its output or rate of growth. If output per person differs, this is not so much because capital/labor ratios differ but because the parameters of the production function—the intercept capturing overall efficiency and also the elasticity with respect to the capital/labor ratio—differ

across countries, reflecting differences in cultural context, institutional inheritance, and technological capacity. Even if the marginal product of capital differs in different uses, it cannot simply be assumed that financial liberalization will result in resources being redeployed from low- to high-marginal-productivity uses, financial markets being riddled with information asymmetries. The analogy between free trade and free capital mobility, in other words, is fundamentally flawed. To the extent that international capital markets are a source of market discipline, that discipline is arbitrary and erratic. International investors are prone to overlook weaknesses in the domestic policy environment until they are abruptly brought to their attention, at which point markets overreact. Creditors panic, and the country suffers a devastating financial crisis. The punishment, as Guillermo Calvo and Enrique Mendoza (1996) put it, is disproportionate to the crime.

The policy advice that flows from these positions is straightforward. Throw open the capital account, adherents to the first view advise, the sooner the better, or be prepared to bring up the rear of the Penn World Tables. Liberalize the capital account at your peril, those who subscribe to the second view warn, or run the risk of repeated crises.

Then there is the messy middle. Output per worker differs across countries for both sets of reasons elucidated above. A higher capital/labor ratio therefore promises to raise output, but not necessarily to the extent implied by Lucas's identical-technologies logic. To be sure, capital account liberalization also heightens countries' vulnerability to crises, but their incidence is neither arbitrary nor capricious. The problem for policy is thus to find an appropriate balance of risks and returns—that is, to liberalize flows just to the point where the benefits, in terms of additional stimulus to growth, continue to dominate the risks, in the form of susceptibility to financial disruptions. It is to find policies toward the capital account with the capacity to shift the frontier of feasible growth-stability combinations outward. It is not whether or not to live with international capital flows; rather, it is how to tame them.

## 11.2 The Messy Middle

Inhabitants of the messy middle find it hard to accept that inward foreign investment is without benefits. Foreign investment was inte-

gral to the development of the overseas regions of recent European settlement in the nineteenth century, when it financed the construction of railways, ports, and urban infrastructure. It came bundled with managerial and technological knowledge. Significantly, the majority of this capital transfer took the form of portfolio investment (Bordo, Eichengreen, and Irwin 1999). It is not obvious from this experience, in other words, that whereas direct investment has benefits, portfolio investment has only costs. Twentieth-century history points to the same conclusion: all of the now-rich economies have open capital accounts and borrow and lend internationally. Why should sauce for the goose not be sauce for the gander?

Moreover, the notion that international financial liberalization is costly is hard to square with evidence that domestic financial liberalization is efficiency enhancing.[1] In principle, the case for domestic financial liberalization should carry over to international capital markets. Indeed, capital account liberalization itself contributes to the process of financial-sector deepening that has proven integral to economic development. By intensifying competition, it undermines rent seeking and monopoly distortions in domestic financial markets.

Rodrik's (1998b) evidence to the contrary is widely cited. For a cross-section of developing countries, he finds no correlation between capital account liberalization and growth. But it is not easy to know what to make of the absence of a correlation. It could be, as Rodrik infers, that capital account liberalization has costs as well as benefits, and that the one just neutralizes the impact of the other on the rate of growth. But it also could be that omitted variables mask a significant causal relationship lurking behind Rodrik's zero correlation. Statisticians can fail to find a relationship between capital account liberalization and growth not because none exists but because they have omitted other variables that are negatively associated with growth but positively associated with the decision to open the capital account. Using a different sample and a different specification, Rossi (1999) obtains the opposite result, finding that the presence of controls on capital inflows is associated with significantly slower growth.

But neither is it easy to swallow the opposing view that capital account liberalization is always and everywhere benign. In the presence of other distortions, removing barriers to capital inflows can reduce welfare (Brecher and Bhagwati 1982), as predicted by the

theory of the second best. In particular, government guarantees for domestic banks and other enterprises can lead to excessive inflows into the sectors receiving the guarantees, creating a serious misallocation of resources (McKinnon and Pill 1997).

The large literature on information asymmetries casts particular doubt on the presumption that financial liberalization results in a superior allocation of resources by showing that this specific distortion can create adverse selection and moral hazard.[2] Adverse selection can occur when lenders have imperfect knowledge of borrower quality and borrowers who are bad credit risks have a strong incentive to seek out loans. When incomplete information prevents lenders from being able to evaluate credit quality, they will only be willing to pay a price for a security that reflects the average quality of firms issuing securities, where that price is likely to be less than the fair market value for high-quality firms but above fair market value for low-quality firms. Because owners and managers of high-quality firms realize that their securities are undervalued (equivalently, credit costs are excessive), they will not wish to borrow on the market. The only firms that will wish to sell securities will be low quality, because they know that the price of their securities is greater than their value. Because high-quality firms will issue few securities, many projects with a positive net present value will not be undertaken, whereas other projects whose net present value is lower than the opportunity cost of funds will in fact be financed. Under these circumstances, a liberalized capital market will not deliver efficient resource allocation.

Moral hazard can occur under asymmetric information because borrowers are capable of altering their behavior after the transaction has taken place. Borrowers will wish to invest in relatively risky projects in which they do well if the project succeeds but the lender bears most of the loss if the project fails; lenders, in contrast, will wish to limit the riskiness of the project. Hence, borrowers will attempt to alter their projects in ways that increase their risk after the financial transaction has taken place, and information asymmetries will facilitate their efforts to do so. Under these circumstances, many of the investment projects actually undertaken will be excessively risky. Lenders, anticipating this, will be reluctant to make loans, and levels of intermediation and investment will be suboptimal.

Finally, information asymmetries can aggravate financial instability and heighten crisis risk. This makes it no coincidence that the

1990s were a decade not just of capital account liberalization but also of financial crises. In markets with incomplete information, lenders may engage in herding, which results in sudden market movements.[3] Herding can be rational in the presence of information cascades, when agents optimally infer information from the actions of other agents and therefore act alike. It can arise in an environment of incomplete information when incompletely informed investors infer that a security is of lower (or higher) quality than previously thought from the decisions of other, presumably better informed, investors to sell (or buy) it. It is clear how such behavior can work to amplify price movements and precipitate crises. Insofar as information asymmetries are likely to be particularly severe where geographical and cultural distance is greatest, there is a special reason to be wary of this phenomenon in international markets. Calvo and Mendoza (2000) provide a model of this form of herding: their argument is that financial globalization, by increasing the menu of assets available to investors and promoting portfolio diversification, reduces the returns to investing in acquiring information on individual assets and thereby aggravates incomplete-information problems.[4] It is therefore conducive to herding and volatility.

Herding can also be rational when the payoffs to an agent adopting an action increase in the number of other agents adopting the same action. Obstfeld (1996) presents a model in which individual currency traders are too small to exhaust the central bank's reserves and force the devaluation of the currency but in which simultaneous sales of that currency by several traders can have that effect. Krugman (1996) shows how this payoff externality can result in herding. There may be particular reasons to worry about this phenomenon when small economies are brought face to face with large market participants through capital account liberalization. To put the same point more concretely, emerging markets may be at risk of being destabilized by herding by a small number of hedge funds conscious of one another's actions.[5]

To be sure, crises have occurred in countries with both open and closed capital accounts. But there is an accumulation of evidence that capital account liberalization heightens the risk of currency crises (see, e.g., Rossi 1999) and that it raises the costs when things go wrong.[6] "The greater frequency and cost of currency and twin crises," as the World Bank (1999, 125–26) dryly puts it, "have been associated with surges in international capital inflows—especially

private-to-private flows—to developing countries and the growing integration of these economies with world financial markets." This is not to imply that currency speculators strike randomly. Like an infectious disease, they are likely to pick off the weak, not the strong. But as with any plague, even robust health is no guarantee of survival.

All this suggests that optimal policy is neither to throw open the capital account nor to nail it shut. The question is not whether to liberalize but how to do so in a way that maximizes the benefits and minimizes the costs.

## 11.3 National Responses

Emerging markets can hope for multilateral assistance and for reforms of the international financial architecture, but at the end of the day they must fend for themselves. For inhabitants of the messy middle, this means adopting the following guidelines for policy.

### Open the Capital Account Only After Financial Markets Have Been Liberalized and Decontrolled

This may seem obvious, the point having been made in the 1980s (see, e.g., McKinnon and Mathieson 1981; Edwards 1984), but it is worth repeating in light of the international community's indifference and even encouragement of premature capital account opening in the 1990s.

The 1980s version of the argument was that if capital flows are liberalized when domestic interest rates are capped, as has repeatedly been the case in developing countries, then capital account liberalization is a recipe for capital flight (as in Argentina in the early 1980s). The 1990s version pointed instead to the need to first strengthen the domestic financial sector, remove implicit guarantees, and impose hard budget constraints on domestic financial institutions. If bank capitalization is inadequate, management will have incentives to engage in excessive risk taking and use the offshore funding available through the capital account to lever up its bets. If banks' liabilities are guaranteed by the authorities, on the grounds that widespread bank failures would be devastating to a financial system heavily dominated by banks, foreign investors will not hesitate to provide the requisite funding. A simple explanation for why

the resolution costs of banking crises were larger in the 1990s than in earlier decades and larger in emerging than advanced economies is the coincidence of these domestic financial weaknesses with premature capital account opening.

Liberalization of the capital account thus should not precede the recapitalization of the banking sector, strengthening of prudential supervision and regulation, and the removal of blanket guarantees. The danger is that maintaining barriers to capital flows and foreign financial competition will diminish the pressure for restructuring. But recent experience in Asia and elsewhere casts doubt on the notion that capital account liberalization, which increases the urgency of complementary financial reforms, will necessarily deliver meaningful reform before crisis strikes. Crisis itself can breed reform, of course, but at a price.

**Liberalize Foreign Direct Investment First**

Foreign Direct Investment (FDI) is the form of foreign investment that most plausibly comes packaged with managerial and technological expertise. It is the form of foreign investment least likely to aggravate weaknesses in the domestic banking system. It is less footloose than portfolio capital and less likely to flee in a creditor panic. All this points to the wisdom of liberalizing inward foreign investment early in the capital account opening process.

Again, this advice would seem obvious but for the large number of governments that have failed to heed it. As of 1996, 144 of 184 countries surveyed by the IMF still maintained controls on FDI. One element of the South Korean crisis was the government's reluctance to allow inward FDI and its readiness, in the face of foreign pressure, to instead open other components of the capital account. Admittedly, Thailand's lifting of most restrictions on inward FDI in import-competing industries in the 1970s and on export industries in the 1980s did not prevent a serious crisis. But the problem there was that the country also opened the capital account to portfolio flows without strengthening its financial system and rationalizing prudential supervision.

Skeptics such as Dooley (1996) question whether FDI is any more stable than other forms of foreign investment. Data on the volatility of flows (see World Bank 1999) do not suggest a strong contrast with portfolio capital. But there is an obvious sense in which a foreign

direct investor cannot easily unbolt machines from the factory floor in order to participate in a creditor panic. To be sure, direct investors have a particular incentive to hedge by purchasing other financial assets that they can liquidate in a crisis. They can borrow on domestic markets in order to sell short the domestic financial assets needed to take positions in anticipation of a currency crash. The implication is that the share of inward foreign investment in the form of FDI will offer some protection against financial instability in the early stages of capital account liberalization—that is, before the rest of the capital account has been opened and direct foreign investors, like others, can take positions on securities markets to hedge their exposures. But the more open the capital account, the easier it becomes to arbitrage different instruments, and the less the share of FDI in total capital inflows is likely to matter.

The case for liberalizing FDI early in the process of opening the capital account extends to the banking system. Entry by international banks is a way of upgrading management and its risk-management capacity in particular. The same knowledge spillovers that figure in discussions of other forms of FDI apply to the financial sector. Insofar as home-country regulation applies, opening the banking sector to foreign investment should raise the average quality of prudential supervision. Insofar as international banks are better capitalized, they are on unlikely to engage in excessive risk taking. For all these reasons, permitting early entry by foreign banks can contribute to the upgrading of domestic financial arrangements that should be a precondition for further capital account liberalization (Demirgüç-Kunt, Levine, and Min 1998).

Two caveats should be noted. First, foreign entry tends to squeeze margins and intensify the pressure on weak domestic intermediaries. If gambling for redemption is a problem, that problem is likely to worsen as entry gets underway. Thus, the stabilizing impact of opening the banking system may be less initially than subsequently. This points again to the need to strengthen the domestic financial system at the start of the process of capital account opening. Second, entry by foreign banks will undermine the effectiveness of measures to limit portfolio flows. International banks with local branches and an ongoing relationship with domestic broker-dealers will find it easier than other international investors—hedge funds, for example—to borrow the domestic securities needed to short the currency, controls or not.

**Liberalize Stock and Bond Markets Next**

Intuitively, foreign investment in securities poses fewer risks than short-term foreign deposits. Because bank deposits are a contractual obligation to repay at par, the withdrawal of foreign deposits can jeopardize the stability of the banking system. When foreign investors liquidate their positions in stock and bond markets, in contrast, their actions simply show up in the prices of securities. In reality, of course, things are not so simple. A stock- or bond-market crash can damage the balance sheet position of banks and others who themselves hold stocks and bonds. It can make life difficult for entities, including the government, with funding needs and for whom the prices of their liabilities are an important signal of credit worthiness. But the single most reliable predictor turned up by the copious literature on leading indicators of currency crises is the term structure of portfolio capital inflows (Rodrik and Velasco 1999). This suggests liberalizing foreign access to domestic stock and bond markets before freeing banks to fund themselves abroad.

Unfortunately, securitized markets are almost always and everywhere late to develop. Their informational requirements are formidable. This is why developing countries rely disproportionately on banks for intermediation services, banks having a comparative advantage through their long-term relationships with clients in bridging information gaps. Creating an active stock market requires putting in place a regulatory framework requiring disclosure, discouraging insider trading, and protecting the rights of minority shareholders. This is not easily done in countries with limited administrative capacity, which helps to explain the relative undercapitalization of securities markets in, inter alia, Eastern Europe and the former USSR (Eichengreen and Rühl 1998). Corporate bond markets develop only once a deep, liquid, and reliable market has first grown up in a benchmark asset, typically treasury bonds. That in turn requires a government with a record of sound and stable macroeconomic and financial policies. Where that record is lacking, banks are captive customers for government bond placements, which is not good for their balance sheets and in return for which they receive other favors, which give rise to the domestic financial-sector problems alluded to above.

Thus, opening domestic securities markets to foreign investors does not mean that they will beat down the doors instead of waiting for access to the banking system.

**Liberalize Offshore Bank Borrowing Last**

Not to repeat, but this is the most fundamental lesson of the Asian crisis and, in a sense, of the entire literature on sequencing capital account liberalization. It is the message of South Korea's crisis, which cannot be understood without reference to the decision to give the banks access to foreign funding before liberalizing other components of the capital account.

Equally, it is important to avoid creating artificial incentives for bank-to-bank lending. Thailand, as already noted, opened other components of the capital account before giving banks access to offshore funds. But it then created the Bangkok International Banking Facility, under which Thai banks borrowing offshore (and onloaning the proceeds in foreign-currency terms) received favorable tax and licensing treatment. In part, this policy was an attempt to develop Bangkok as an international financial center. In part, it reflects the government's tendency to use the banks as an instrument of industrial policy. Either way, it is indicative of policies that are incompatible with capital account liberalization.

**Rely on Market-friendly Instruments for Managing the Capital Account**

Advice like the preceding might be taken as encouragement for governments to micro-manage the liberalization process, but efforts to fine tune the capital account carry their own dangers. They threaten to create a burdensome administrative bureaucracy conducive to rent seeking and corruption. The development of financial markets makes it progressively easier for participants to evade the authorities' efforts by relabeling positions and repackaging obligations. Interventions that rely on markets instead of bureaucrats minimize these risks. This is the genius of the Chilean approach to capital-import taxes. A 30 percent non-interest-bearing deposit for one year on all capital imports falls more heavily on investors with short horizons than on those prepared to stay for the duration. It is transparent and insulated from administrative discretion. There is less scope for evasion than of taxes on some forms of foreign investment but not others.

Admittedly, there is an enormous debate over the effectiveness of these measures. Some warn that avoidance is still a problem. Others observe the lack of evidence that Chile's taxes limited the overall level of foreign borrowing. The second objection can be dismissed on

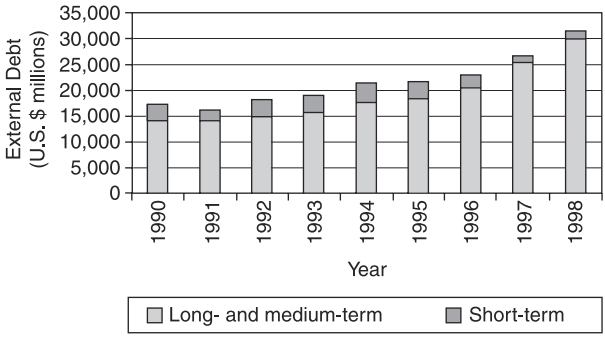


**Figure 11.1**
Chile's External Debt

the grounds that the goal was never to limit the level of foreign borrowing but to alter its average maturity, and on the maturity front the evidence is compelling (see figure 11.1 and Gallegos, Hernandez, and Schmidt-Hebbel 1999).[7] As for the first objection, it is important to recall that such a measure, to effectively lengthen the maturity structure of the debt, need not be evasion free. The last word on this subject should go to Chile's finance minister, who has asked (I paraphrase), "If these capital-import taxes are so easily evaded, then why do we have so many non-interest-bearing foreign deposits at the central bank?"

The same point applies to the outflow side: taxes are more efficient and less damaging to investor confidence than administrative controls. Thus, Malaysia in its wisdom has moved from comprehensive outflow controls to an exit tax on foreign capital satisfying a minimum-stay requirement. But not too much should be expected of outflow controls in times of crisis, given the strong incentives that then exist for avoidance.

### Align Domestic Institutions and Policies to the Capital Account Regime

This point will now be obvious, but it is important to draw out its implications. These include adapting exchange rate and monetary policies to the openness of the capital account. This means abandoning pegged-but-adjustable rates, crawling bands, and target zones for a currency board, dollarization, or, at the other extreme, a more flexible rate. Pegs and bands create irresistible one-way bets for

speculators, which they can fund at low cost when the capital account is open (and when interest rates in the major money centers are as low as they have been in Tokyo in recent years). Eliminating this one-way bet by creating scope for the currency to appreciate as well as to depreciate is no panacea, as the experience of Australia—a country with a floating rate but also a sour experience with hedge funds—serves to remind (Reserve Bank of Australia 1999). Still, eliminating one-way bets should help.

For a more flexible exchange rate not to be unacceptably volatile, supporting reforms will have to be put in place. Fiscal policy must be sound and stable; otherwise the currency will be destabilized by unpleasant fiscal and monetary arithmetic, as in Brazil in 1998. This requires institutional reform that creates confidence about future fiscal policies, not just one-off tax increases and spending cuts. A large literature has demonstrated that more hierarchical fiscal institutions that vest agenda-setting and veto power in the hands of the finance minister or prime minister outperform decentralized systems that allow spending ministries and subcentral governments a free ride (Alesina and Perotti 1999; von Hagen and Harden 1994). A more freely floating exchange rate also means buttressing the independence of the central bank to insulate it from pressure to manipulate monetary policy to political ends. To gain market confidence so that capital flows in stabilizing directions, the central bank needs to articulate a clear and coherent monetary rule such as inflation targeting.

These are of course many of the same prerequisites for a currency board. Fiscal institutions and policies must be strengthened to eliminate the fiscal-dominance problem. Bank regulation must be strengthened. The analog to central bank independence is enshrining the currency board in a statute or constitutional amendment.

This is an ambitious agenda. It points again to the scope of the reforms that must be put in place for capital account liberalization to be a happy experience.

### A Caveat on Building Reserves

Martin Feldstein (1999) encourages emerging markets to accumulate reserves as insurance against the disruptive domestic financial effects of abrupt capital outflows. Alan Greenspan (1999) similarly suggests that countries hold foreign exchange reserves equal to all the short-term debt scheduled to fall due over the next 12 months. They point

to the success of countries with substantial reserves (Taiwan, for example) in withstanding the Asian crisis.

There are reasons to question this advice. First, even large reserves à la Taiwan are small relative to the liquidity of the markets. A confidence crisis can cause investors to try to transfer abroad not only short-term foreign liabilities but the whole of M2. Converting these claims into foreign currency is likely to be impossibly expensive for a government or central bank seeking to support a currency peg.

Moreover, as Dooley (1997) suggests, large reserves can provide dangerous encouragement to the carry trade. Normally, interest rates are lower in the major money centers than in an emerging market that has recently stabilized and opened its capital account, encouraging foreign investors to funnel money into the country. The larger the reserves, the more confidence investors will have that they will be able to get out without suffering losses when sentiment turns and the banking system comes under pressure. Hence, the greater will be bank-to-bank lending, and the higher will be the social costs of a banking crisis.

Holding reserves against short-term external liabilities is expensive, because U.S. treasury bonds bear lower interest rates than Thai or Korean bank deposits. As Grenville (1999, 6) puts it, Greenspan's advice "raises the issue of why this short-term debt was useful in the first place, if the proceeds of the short-term borrowing have to be stacked away in reserves (at a lower rate of return than the cost of borrowing)." The implication is straightforward: if short-term foreign borrowing comes with risks that are expensive to insure against, wouldn't it be better to avoid it in the first place?

## 11.4 International Responses

Problems of capital mobility and capital account liberalization can also be addressed at the international level. The Asian crisis directed attention to the urgency of the task and spawned a large literature on strengthening the international financial architecture. It is important to be clear about what can be expected of this endeavor. There is not going to be radical reform resulting in dramatic changes in the international financial landscape. Global markets will not lead to global government in our lifetime. There is no appetite for the creation of new supranational institutions and agencies with the power to supersede national regulatory authorities. Proposals such

as Eatwell and Taylor's (2000) for a World Financial Authority are useful for clarifying one's thinking about the nature of the problem, but the entity they envisage is not going to materialize tomorrow.

This is not to dismiss the feasibility of international responses, which to my mind come under two headings.

**Giving Sanction**

International initiatives can encourage the approach to capital account liberalization described above. They can give sanction to the retention of controls by countries that have not yet upgraded their domestic financial systems and put in place the other prerequisites for capital account liberalization. They can avoid encouraging precipitous liberalization, as the Interim Committee of the IMF came close to doing in the mid 1990s. They can encourage the use of Chilean-style inflow taxes and more flexible exchange rates by countries opening their capital accounts. They can make clear that the IMF and the international community will no longer extend assistance to governments seeking to prop up shaky currency pegs.

In fact, there have already been significant steps in this direction. The Interim Committee and IMF Board have stepped back from the kind of strong statements favoring rapid capital account liberalization released at, inter alia, the Bank–Fund annual meetings in 1997. An amendment to the IMF's Articles of Agreement that would have committed countries to a rapid transition to full capital account convertibility is no longer in the cards. A series of G22 reports has acknowledged the dangers of precipitous liberalization and cautiously endorsed Chilean-style taxes and more flexible exchange rates for emerging-market economies.[8] The U.S. government has lent its support to this approach. The new U.S. position was signaled by then U.S. Treasury Secretary Rubin in his April 21, 1999 speech, in which he displayed new toughness on the need for greater exchange rate flexibility (the headline in the next day's *Financial Times* was "US Urges End to IMF Funds to Back Pegged Currencies"), and new sympathy for the use of capital-import taxes ("Mr. Rubin also went further than previously in accepting that a Chilean-style tax on short-term capital inflows could be appropriate," the *Financial Times* correspondent also wrote).

This is progress. But more is required. The U.S. Treasury needs to overcome the "Wall Street complex" that prevents it from coming out more strongly in favor of Chilean-style inflows taxes. Among

other things, this will make clear that U.S. pressure to open protected banking markets is motivated by the desire to stabilize national financial systems and not by the desire to advance the interests of the American banking industry. The IMF needs to make clearer its support for the adoption of more flexible exchange rates. This requires it to embrace inflation targeting or another alternative as a monetary-policy operating strategy.

Finally, the assertion that international assistance will no longer be provided to prop up shaky currency pegs needs to be made credible by developing other ways of resolving financial problems. At present, the temptation to provide support to avert a devaluation is irresistible because the alternatives are unpalatable. A developing country that devalues often finds it impossible, sans aid, to keep current on its interest and amortization of foreign-currency-denominated debts. But suspensions and restructurings are prohibitively messy and painful, given current contractual provisions. This creates an argument for introducing renegotiation-friendly provisions into loan contracts as a way of facilitating orderly workouts. These ideas are controversial; the critics warn that the addition of so-called "collective action" clauses to loan contracts may make it more difficult for less credit-worthy sovereigns to borrow. Be that as it may, in the absence of such initiatives it simply is not credible to assume that the IMF can stand aside when currency and financial problems arise.

**Applying Peer Pressure**

In addition, the international community can exert peer pressure for reforms that will minimize the risks of capital account liberalization. This is the logic behind the current push for codes of conduct and international standards in areas such as monetary and fiscal policy, prudential supervision, securities-market regulation, auditing and accounting, bankruptcy and insolvency procedures, and corporate governance. These initiatives can be seen as efforts to define minimally acceptable standards for financial practice and regulation for all countries seeking to be active on international financial markets.

The Basel Committee of Banking Supervisors, whose 1988 Capital Accord established a minimum (weighted) capital requirement of 8 percent for international banks, pioneered this approach. By applying peer pressure and creating a focal point, it encouraged countries to strengthen capital standards for their internationally active

banks. At the same time, the 1988 accord points up the limitations of the standard-setting approach. Given an arbitrary set of standards, banks responded by pushing assets and liabilities with high weights off balance sheet through securitization. Nothing has compelled countries such as Japan, where capital has not been written down to reflect the extent of nonperforming loans, to conform with the spirit as opposed to the letter of the accord.

Analogous problems threaten to undermine the effectiveness of international standards in other areas. The International Accounting Standards Committee (IASC) can promulgate standards for minimally acceptable accounting practices, but it cannot force countries to comply. It is not yet clear who will monitor performance or what sanctions will be imposed in the event of noncompliance. Given the extent of disagreement over the features of an acceptable bankruptcy code or set of corporate governance arrangements, there is the danger that such standards will degenerate into a lowest common denominator and destroy the incentive to do better.

For international standards not to be counterproductive, the monitoring and sanctioning problems will have to be addressed. The IMF needs to monitor compliance in its Article IV surveillance and program reviews. It should condition its loans on steps to comply. (This would have the additional advantage of creating an internationally agreed to basis for the Fund's conditionality, diffusing the objection that its microeconomic and structural interventions are arbitrary and capricious.) It can make compliance with standards a prerequisite for qualifying for its Contingent Credit Lines.

The Basel Committee, for its part, can key capital requirements to compliance with the relevant standards. The proposal to revise the Capital Accord to base those requirements on credit ratings provided by Moody's, Standard & Poor's, and IBCA-Fitch are a step in this direction. But given the rating agencies' spotty record, it would be safer for regulators to diversify their sources of private-sector expertise. They could encourage the relevant self-organizing private-sector bodies to issue compliance ratings for each of the relevant standards—the IASC for accounting, International Organization of Supreme Audit Institutions for auditing, Committee J of the International Bar Association for bankruptcy, the International Corporate Governance Network for corporate governance, and so forth—and key capital requirements to their determinations.

## 11.5 Conclusion

For occupants of the messy middle, capital account liberalization is neither panacea nor plague. What it is, is unavoidable. Domestic financial liberalization makes it that much more difficult to stop capital flows at the border. So long as domestic financial transactions are tightly controlled, it is easy to regulate international transactions. Once domestic financial liberalization becomes irreversible, controlling the international transactions of banks and nonbank intermediaries is much less straightforward.

Changes in information and communications technologies similarly make it more difficult to operate effective controls. Securitization and the proliferation of derivative instruments undermine any effort to impose selective controls meant to apply to some types of capital flows but not others. Consequently, any attempt to halt flows at the border must become increasingly comprehensive, onerous, and, one fears, distortionary.

The fundamental issue, then, is how best to cope with this brave new world of capital mobility. Several decades of experience with currency and financial crises have shown that the best way of learning to swim is not by jumping into the deep end of the pool. This means not freeing capital flows before progress has been made in liberalizing domestic financial markets and strengthening prudential supervision. It means liberalizing foreign direct investment first, access to stock and bond markets second, and offshore bank funding last. It means putting in place exchange rate, monetary, and fiscal policies that do not destabilize the capital account. It means reforming monetary and fiscal institutions to assure the markets of the capacity to deliver desirable monetary and fiscal outcomes not just now but in the future.

This perspective suggests that less-developed countries are well advised to follow different policies toward the capital account than their more developed counterparts until they join the ranks of the latter, at which point they can and should remove their remaining restrictions on capital flows. Holding-period taxes à la Chile should be retained as a form of prudential supervision, for example, until banks' risk management practices and regulatory oversight have been upgraded, at which point the country in question can join the club of financially developed countries open to international capital flows.

This leaves the question of whether countries whose domestic financial markets are small relative to global markets—or even relative to the position-taking capacity of a small number of hedge funds—need to follow fundamentally different policies than their larger counterparts not just over the transition but in the steady state. Do they need to retain Chilean-style holding-period taxes indefinitely, not just over the transition? Should they contemplate more radical alternatives such as dollarization? As Marx, that sage observer of financial capitalism, would have put it, the question is whether the developed countries really offer the developing a vision of their future.

# Notes

## Chapter 1

1. In neither case was their skepticism of the merits of capital mobility uncontested. Thus, Friedman (1953) famously challenged the generality and accuracy of the indictment of capital flows in Nurkse 1944, whereas a variety of notable economists differed from Keynes and White on the desirability of creating a postwar monetary and financial regime that suppressed international capital flows.

2. A subsequent extension of this approach to political factors on which the effects of capital account liberalization may be contingent is in Quinn, Inclán, and Toyoda 2001.

3. Andy Rose and I have a parallel project on the causes of banking crises in emerging markets (Eichengreen and Rose 2000).

4. Another paper in this series (Eichengreen, Rose, and Wyplosz 1996) also gets the credit, or perhaps the blame, for coining the "first and second generation" terminology used to denote successive currency-crisis models.

5. See Glick and Rose 1999.

6. My formulation was heavily influenced by Morris Goldstein's 1998 book.

## Chapter 2

Prepared as a background paper for the World Bank's *Global Development Finance 2000*. For helpful comments, I thank Ashoka Mody, William Shaw, and Jeffrey Williamson.

1. Bordo, Eichengreen, Klingebiel, and Martinez Peria 2001.

2. This episode is the subject of chapter 7, below.

3. And somewhat lower levels in the 1970s.

4. Maddison 1995, tables 2–4.

5. To quote the subtitle of Delargy and Goodhart's 1999 paper on the subject.

6. See inter alia Eichengreen 1996b.

7. On changes over time in the extent of contagion, see Bordo and Murshid 2001 and Mauro, Sussman, and Yafey 2000. The comparative analysis reported in this paragraph is from Bordo, Eichengreen, Klingebiel, and Martinez Peria (2001).

8. Again relative to creditor-country GDP.

9. According to the estimates of Davis and Gallman (2001), the fraction ranged from 86 percent in Australia to 92 percent in Canada. The proceeds of many of those government bond issues of course in turn went into the construction of population-sensitive infrastructure. Twomby finds that "railroadization" (kilometers of railroads in operation divided by GDP) was perhaps the single most important determinant of portfolio capital inflows.

10. Although there were incentives not to build ahead of demand, it was also important not to allow potential competitors to preempt the market. Railroads frequently attempted to collude, holding off from building in advance of settlement and cultivation, but such collusion typically broke down, as the competitors sought to preempt the most attractive markets. Hence, railroad construction tended to cluster in time, as did the external finance to underwrite it.

11. This example of positive-feedback dynamics is only one of several such interactions that might be cited. It should not be taken to imply that immigration, as opposed to capital flows, provided the exogenous motive force for the Kuznets Cycle. The identity of the exogenous impulse and the endogenous response remains controversial (Fenoaltea 1988).

12. Maddison 1995, tables 2–4.

13. For whom the ratio of value to volume of exports was least.

14. As a result, the single-factoral terms of trade did not move strongly against Britain despite technical change that shifted outward the supply curve of manufactured goods, which in turn maintained political support for the free-trade regime (Lewis 1978, chapter 7).

15. As argued by O'Rourke and Williamson 1999, chapter 13.

16. Parliamentary Debates, House of Commons, 5$^{th}$ ser., 64, 1448–1449. His predecessor Lord Palmerston had put it more bluntly some years before when he observed that "The British Government has considered that the losses of imprudent men who have placed mistaken confidence in the good faith of foreign Governments would prove a salutary warning to others."

17. Feis 1930, 85.

18. Lipson 1985, 50. British- and French-led intervention in Egypt in 1879, following the Egyptian government's default on the Rothschild loan offered to investors in England and France the year before, further illustrates the point.

19. Nearing and Freeman 1925, 133.

20. See Flandreau 1998.

21. Cassis 1990, 145.

22. Thus, in addition to administrative services, the London and Westminister provided short-term loans to colonial governments and intervened as necessary to support the market in their bonds.

23. A fact that Davis and Gallman invoke to explain the relative backwardness of the Australian financial system and the economy's developmental difficulties. An exception was the penetration by colonial banks of the British market, where they estab-

lished offices and funded themselves by taking deposits, in turn investing in pastoral development and residential construction. By the end of the 1880s, estimates are that at least a quarter of all Australian deposits were held by residents of Britain. When the pastoral and construction booms collapsed after 1889, so did, predictably, the balance-sheet position of the banks, triggering runs and leading to restructurings. British depositors cut their connections with Australian banks, and the latter cut their's with the long-term market (Merrett 1989).

24. In the case of Britain, the country with the most highly developed securities markets, it was even less (Platt 1986).

25. On the late-twentieth century pattern, see Calvo, Leiderman, and Reinhart 1992.

26. Winkler 1933 catalogs the entire population of creditors' protective committees.

27. These are figures for 1920–31, from Madden, Nadler, and Sauvain 1937 and Atkin 1977.

28. This is Lewis' (1938, 383) reference to experience in Peru.

29. Marichal 1989, 190 and *passim*.

30. The large literature on violations of the "rule of the game" is a reminder that this generalization is overbroad, but such qualifications do not overturn the essential point.

31. One corollary of the fact that higher domestic interest rates were responsible for curtailing U.S. capital outflows in 1928 was that capital-importing countries such as Germany, Brazil, Argentina, Canada, and Poland were first to feel the pinch and enter the Great Depression. Once the U.S. followed, the economic context was turned on its head. The collapse of output meant the collapse of the ability to service loans. The debt crisis of the 1930s followed in short order.

32. Both grew by 33 percent, according to League of Nations figures, whereas Maddison's revisions suggest that trade grew even more slowly than manufacturing output. Lamartine Yates 1959, 32; Maddison 1995, tables 1–4.

33. The incentives for emerging markets were clear: rather than borrowing to build the infrastructure to export, the state of Brazil borrowed to build coffee stockpiles and take existing production off the market. Fishlow 1986, 75.

34. United Nations 1949, 15.

35. Sessions 1992, 21.

36. Costigliola 1984, 130.

37. The European belligerents further encouraged the process by selling American securities in New York to finance wartime imports.

38. Estimates of the relative importance of FDI and portfolio investment vary. According to Lewis (1938, chapter 21), the United States' holdings of foreign securities tripled between 1920 and 1929, while its foreign direct investments doubled. The share of portfolio investment was comparable for the United Kingdom but less for the smaller creditor countries of continental Europe.

39. The transcripts of the hearings of the Foreign Bond Investigation of 1931–1932, headed by Senator Hiram Johnson, are a particularly graphic source of contemporary criticism.

40. Bernanke and James (1991) list three dozen banking crises between 1929 and 1936. Only countries where the banking system was widely branched and highly concentrated and where the authorities were quick to adopt reflationary policies to offset the corrosive effects of debt deflation retained their immunity (Grossman 1994).

41. Bordo et al. (2001) estimate that the output losses from banking crises averaged 14.2 percentage points of GDP between the wars, versus 8.3 percentage points before 1913; the comparable figures for banking crises were 10.5 and 8.4 years, respectively.

42. The same phenomenon was evident in the transition economies in the early 1990s: because their banking and financial systems were relatively underdeveloped, the macroeconomic effects of their banking and financial crises were mild by the standards of other regions.

43. This was true even in the United States, which abrogated the gold clauses in domestic debt contracts in 1933.

44. Here is one parallel with the 1920s and 1930s, when countries' fates had been tied to what Carlos Díaz-Alejandro dubbed as "the commodity lottery." Díaz-Alejandro 1984b.

45. Winham 1986, 363.

46. Unprecedented, that is, for the post–World War II period.

47. See Eichengreen and Fishlow 1996.

48. The phrases are from Guttentag and Herring 1985.

49. Kahler 1986, 20.

50. The regulators, their fingers now on the pulse of the banking system, allowed no banking crises in the 1950s and 1960s. More precisely, there were no banking crises in the advanced-industrial countries before the 1980s. There were a few such crises in the developing world—for example, in Brazil in the 1960s.

51. Nor is it a surprise that the U.S. government took the lead in developing other ways of dealing with the crisis.

52. The shortfall reflected political resistance by the debtors to continued policies of austerity after a decade of hardship, making it difficult to agree on the requisite conditionality.

53. Although this raised worries of overheating, which were more than justified in hindsight.

## Chapter 3

Commissioned for *The World Bank Economic Review*. For helpful comments, I thank Stijn Claessens, Geoffrey Garrett, Michael Klein, Aart Kraay, David Leblang, Gian Maria Milesi-Ferretti, Dennis Quinn, Frank Warnock, Charles Wyplosz, and the editor and anonymous referees of the review.

1. The intertemporal approach to capital mobility owes its origins to Fisher (1930). Influential modern treatments that resuscitated this approach and summarized its implications include Sachs (1981) and Frenkel and Razin 1996.

2. This focus on cross-country ("large n") studies dictates what I take up and what I leave aside. It also serves to differentiate my survey from other reviews of the literature on capital controls and capital account liberalization (e.g., Dooley 1996; Williamson and Mahar 1998; Cooper 1999; Edwards 1999; Neely 1999). At the opposite end of the empirical spectrum lie case studies of particular episodes. Although this "small n" approach allows one to consider a particular episode in great detail, it is likely to run headlong into an identification problem, because many things will have been changing in the country in question in the period under consideration. "Hybrid studies" attempt to strike a balance between these approaches by pooling detailed information on the capital account regime for several countries and years. An example is Reinhart and Smith (1999), who focus on five cases where restrictions on capital account transactions were imposed or tightened—Brazil in 1994, Chile in 1991, Colombia in 1993, the Czech Republic in 1995, and Malaysia in 1994—and analyze a four-year window surrounding the event. Similarly, Edison and Reinhart (1999) use daily financial data to examine four capital control episodes: Brazil in 1999, Malaysia in 1998, Spain in 1992, and Thailand in 1997. Four countries offer more degrees of freedom than one, to be sure, but it is still hard to know how far one can generalize from a handful of cases.

3. Along with narrative accounts of the main changes in policies toward the exchange rate and current and capital account payments from 1967, this report also included a table summarizing the various exchange arrangements and restrictions adopted by member countries. The Fund does not detail how it goes from its narrative accounts to the summary table. Prior to 1967, the publication provided exclusively qualitative descriptions of the restrictions in place and important modifications thereto. Some investigators (e.g., Quinn 1997) have attempted to build up indices of capital account liberalization for the earlier period from this information. In the second half of the 1990s, the IMF began providing more detailed breakdowns of the various policy measures. Starting with its 1996 *Annual Report*, the Fund disaggregated controls on export proceeds into "surrender requirements for export proceeds" (requiring exporters to surrender to the authorities foreign exchange earned from exporting) and "repatriation requirements for export proceeds" (requiring them to do so even when these payments were made to overseas accounts). Starting in 1997, it distinguished controls on capital inflows and outflows. These changes in categorization create concordance problems for investigators seeking to create time series for capital account liberalization. Thus, Glick and Hutchison (2000) use surrender requirements for export proceeds, which are more restrictive than repatriation requirements for export proceeds, as equivalent to the pre-1996 export surrender measure, and code a country as having capital account restrictions in place in 1997 or 1998, when the *Annual Report* listed controls as in place for five or more of these capital account subcategories and "financial credit" was one of the categories restricted.

4. Restrictions on current account transactions affect the ability of the private sector to obtain foreign exchange for payments related to merchandise imports and to retain foreign exchange earned through exporting, and limit the ability of foreign direct (and other) investors to repatriate interest earnings and other profits. The argument for using them is that current account transactions can be used to evade restrictions on capital-account-related payments (by resort to leads and lags and over- and under-invoicing of exports and imports), and that surrender requirements, bilateral payments restrictions, and multiple exchange rates, which may then be used to close off these avenues of evasion, therefore contain information on the intensity of controls.

5. Leading in turn to creative attempts to supplement them. Some investigators have done so using sources such as the International Finance Corporation's *Emerging Market Facts Book* and World Bank country reports. Thus, Levine and Zervos (1998) and Levine (1999), who are concerned to identify *major* changes in restrictions on capital flows, consult all these sources and count only episodes corroborated in more than one publication and described there as "major" or "significant." Kraay (1998) takes a different approach to identifying major episodes of capital account liberalization: relying exclusively on *Exchange Arrangements and Exchange Restrictions*, he identifies instances of major liberalization episodes as years that are preceded by five consecutive years of capital controls and followed by five consecutive years of no controls.

6. Similar arguments are made about the black market premium, which is sometimes used as a measure of current and capital account restrictions, namely, that it distorts the pattern of trade, is associated with serious macroeconomic policy imbalances, and tends to widen in response to political shocks. Thus, Sachs and Warner's (1995) measure of economic openness depends mainly on the black market premium (one of its four components), as Rodriguez and Rodrik (2000) show. Rodriguez and Rodrik argue that this index is unlikely to be a good measure of openness per se because it tends to be associated with macroeconomic and political instability. Similar arguments can be made about capital controls themselves, namely, that countries with serious policy imbalances are most likely to resort to the instrument; the implication is that any effect superficially associated with the measure conflates the influence of those underlying conditions and that of the policy instrument itself.

7. Such a high degree of differentiation necessarily relies on the discretion and judgement of the coder. Quinn addresses this problem by having each observation coded twice by two separate coders and then attempting to reconcile differences.

8. Johnston et al. (1999) have constructed a still more detailed index for 41 industrial, developing, and transition economies, but only for 1996. This uses the detailed breakdown of 142 individual types of exchange and capital controls (aggregated into 16 categories) first published in *Exchange Arrangements and Exchange Restrictions* in 1997. Johnston et al. measure the existence and intensity of controls by normalizing the number of actual categories of controls (separately for controls on current payments and transfers on the one hand and capital controls on the other) by the number of feasible measures. Unfortunately, the number of countries for which they provide these estimates is limited, reflecting the limited coverage of the 1997 edition of *Exchange Arrangements and Exchange Restrictions*. In addition, the time dimension is lost due to the absence of comparable data for prior years.

9. It is likely to be useful only for distinguishing countries wholly closed to capital flows, where payments on capital account will be zero, from their more open counterparts, the notion here being that only countries with draconian controls that render them wholly closed to international financial markets will display neither inflows or outflows at a point in time.

10. In addition, the measure captures more than just statutory controls; for example, if a large firm that trades on, say, the Manila Stock Exchange is held mainly by one or two Filipino investors, their share would enter the International Finance Corporation's Global index, but its weight in the International Finance Corporation's Investable would be based on the portion of the shares available to foreigners.

11. A disadvantage of this simple implementation is that no changes in the estimated degree of market integration are allowed to occur over time. Harvey (1995) and

Bekaert and Harvey (1995) implement rolling- and switching-regression methods that, subject to further assumptions, permit the degree of market integration to vary over time.

12. If assets are priced according to a multifactor model rather than the one-factor model with constant risk exposures that Bekaert assumes, then emerging markets might display cross-section differences in their risk exposures and, in turn, in the correlation of expected returns with the U.S. market, even if those markets are otherwise integrated internationally.

13. See, for example, Frankel and MacArthur 1988; Giavazzi and Pagano 1988; Cody 1990; Obstfeld 1993; Marston 1993, 1995; and Holmes and Wu 1997. Dooley and Isard 1980; Ito 1983; and Wong 1997, among others, take a similar approach by using the black market exchange rate premium.

14. Authors justify their disregard of the country risk premium by focusing on high-quality debt securities for which default risk is close to zero. They disregard currency risk by focusing on covered interest parity.

15. In addition, focusing on cases where a significant onshore-offshore differential is quoted also has the consequence, not obviously desirable, of shifting attention from policies *designed* to limit capital mobility to policies *effective* in limiting capital mobility. Although many countries may put in place measures to limit capital flows, only where such policies are effective will a consequential offshore market develop and a significant onshore-offshore differential be observed. Focusing on cases where controls were effective—because, for example, the country had the administrative capacity to enforce them—again runs the risk of limiting the analysis to countries that are not representative. And it disregards much of what is interesting in the debate, namely, the capacity of the markets to neutralize the intended effects of statutory measures.

16. This is a theme of Ariyoshi et al. 2000.

17. Similarly, countries with macroeconomic problems that may threaten the stability of a peg (a weak current account, a large budget deficit, sudden increases in interest rates, for example) have a disproportionate tendency to maintain controls, outflow controls in particular (Johnston and Tamirisa 1996).

18. Moreover, by facilitating the use of rate ceilings and other administrative measures that cap interest rates, controls limit the cost of borrowing for those at the head of the financial queue, including the government itself and any private-sector borrowers that it favors.

19. Epstein and Schor (1992) find that left-wing governments are more likely to maintain controls. Although Garrett, Guisinger, and Sorens (2000) also conclude that left-wing governments are more likely to resort to controls, the effect is statistically insignificant at standard confidence levels. Only when high-income countries are removed from the sample is the association robust. Although Quinn and Inclán (1997) also find some evidence that left-wing governments are more likely to retain controls, this effect is much more pronounced in the 1960s and 1970s than the 1980s. Alesina, Grilli, and Milesi-Ferretti (1994) reach even more negative conclusions: they find little discernible effect of ideological orientation either before or during the 1980s once one controls for other characteristics of governments—coalition verus majoritarian, cabinet durability, and turnover—that plausibly reflect the time horizon of the government and therefore its propensity to put off tax increases to another day in favor of resorting to the inflation tax.

20. For a discussion of this common unobserved shocks problem, see chapter 6.

21. At the same time, the research described in this section suggests the kinds of circumstances and events—disenchantment with financial liberalization, disaffection with flexible exchange rates, ineffective democratic governance—that could conceivably reverse the trend toward capital account liberalization sometime in the future.

22. I return to the distinction between partial and comprehensive capital account openness and restrictions in section 3.6 on crises below.

23. Quinn's measure of capital account openness enters negatively, in other words, whereas the interaction between capital account openness and per capita income enters positively.

24. Using a different methodology, Quinn (2000) reaches a similar conclusion. He estimates bivariate vector autoregressions using growth rates and his measures of capital account liberalization, individually for a large number of middle- and low-income countries. He finds scant evidence that capital account liberalization has had a positive impact on growth in the poorest countries, but some positive evidence for middle-income countries, especially those that have other characteristics likely to render them attractive to foreign investors.

25. Kraay uses the ratio of M2 to GDP and the ratio of domestic credit to the private sector relative to GDP as ex ante proxies for the level of financial development, and one minus the average number of banking crises per year as an ex post indicator of financial strength. As an indicator of the strength of bank regulation, he uses a measure based on whether banks are authorized to engage in nontraditional activities such as securities dealing and insurance. To capture the broader policy and institutional environment, he uses a weighted average of fiscal deficits and inflation, the black market premium, and indices of corruption and the quality of bureaucracy.

26. Note that the test here is for whether the effects of capital account openness are *conditional* on these measures of institutional development. The latter are not simply used as additional controls in the growth equation; rather, they are entered interactively.

27. The measure in question is actual (gross) inflows and outflows. Because the interaction term is then gross inflows and outflows times net inflows and outflows, one suspects that it is dominated by cases where investment reacted to surges of capital inflows. In addition, one worries about the near-tautological nature of using a variable that essentially captures whether or not capital flowed in as a way of determining whether the policy affected investment. Kraay's findings also appear to be sensitive to the estimator used and sample period considered: he obtains different results depending on whether he estimates his investment equation by ordinary least squares or instruments his measures of capital account restrictions to control for their endogeneity.

28. The literature on the link between financial development and growth is vast—vaster even than on the topic surveyed here. Attempting to review the controversies and contributions would not be realistic. The reader may refer to Levine 1997 for a full-scale review of the topic.

29. Edwards (2001) is an exception in this regard, as noted above.

30. The argument being that banks are in the business of internalizing transactions that cannot take place at arm's length due to such market imperfections (Baskin and Miranti 1997).

31. Along with the seigniorage-related rationale reviewed above.

32. Quinn (1997) reports a positive association between public spending and capital account liberalization but concludes that the correlation is not robust.

33. On the association of short-term debt with crises, see Rodrik and Velasco 1999. Readers whose sensitivities have been heightened by the preceding discussion of the causality problems that arise in other contexts will not be surprised that the same issue arises here. Rather than short-term debt causing crises, in other words, it has been argued that anticipations of crises lead to a shortening of the maturity structure of the debt.

34. Studies that reach this conclusion include Soto 1997, De Gregorio et al. 2000, and Valdés Prieto and Soto 1998.

35. China's controls took the form of restrictions on borrowing by Chinese entities, restrictions on portfolio outflows by Chinese citizens and inflows by foreigners, and a ban on futures trading in renminbi. Although cautioning that controls were probably only one of several factors making for the resiliency of the Chinese economy, Fernald and Babson (1999) conclude that "Without a freely accessible onshore futures market, it is difficult to speculate against the future value of the renminbi, and controls on outflows make it harder for Chinese investors to convert their renminbi if they expect the currency to weaken" (p. 13).

36. For example, Thailand introduced partial controls in May 1997, prior to its crisis, before extending their coverage on several subsequent occasions: in June, July, and September 1997, and January 1998. That Glick and Hutchison relate the presence or absence of controls in one year to crises in the next may convince some readers that they have finessed this problem; surely controls imposed fully a year before a crisis are not the response of the authorities to subsequent difficulties. In fact, however, the length of time between the observation of controls and the occurrence of a crisis is *at most* a year and in practice can be considerably less. That is to say, Glick and Hutchison relate the presence or absence of controls *at the end* of year t to the presence or absence of a crisis *any time* in year $t + 1$.

37. The fact that outflow controls tend to be the dominant variety in crisis-prone countries may therefore be another part of the explanation for why previous cross-country studies have found a positive association between controls and crisis incidence.

## Chapter 4

Prepared for the conference celebrating Assaf Razin's sixtieth birthday, held at Tel Aviv University, March 25–26, 2001. The authors thank Dennis Quinn and Andrew Warner for help with data and Anne Krueger and Dani Rodrik for comments.

1. The classic illustration is that a borrower will know more than a lender about his own desire and motivation to repay, although the point is more general. This is why banks and other financial institutions play a prominent role in the modern economy: by virtue of their investments in monitoring technologies characterized by economies of scale and scope, they aspire to bridge gaps in the information environment that decentralized markets cannot. These observations are widely cited in support of the notion that information asymmetries are pervasive in financial markets.

2. Although this conclusion is not uncontroversial, we think that the bulk of the evidence points in this direction. See in particular Borensztein, De Gregorio, and Lee 1995; Aitken and Harrison 1999; and Bradstetter 2000.

3. In contrast, the IMF measure of capital account openness bears no association to growth, as mentioned above.

4. Quinn has also made available his 1958 estimates to other investigators, but these are irrelevant to the current exercise.

5. Including only the 1988 value but instrumenting it using the 1973 index, as Edwards does in some of his analysis, does not obviously solve this problem.

6. Edwards's two sets of estimates use, alternatively, the Quinn index for 1988 and the difference between Quinn's 1973 and 1988 values.

7. In addition, heavy weights on high-income countries, which were also the relatively fast-growing countries in some of the subperiods we consider (see below), increases the danger of finding a correlation between capital account liberalization and growth because of reverse causality (insofar as the high-income countries were the ones most likely to open the capital account).

8. In addition, Edwards derives his results from estimates of a two-equation system, where the dependent variables are GDP growth and total factor productivity growth and the list of independent variables is the same across equations. Because the second dependent variable is derived (in part) from the first, errors in GDP growth are likely to produce (positively correlated) errors in TFP growth. When the correlation between the error terms in the two equations is taken into account via systems estimation, the econometrician may therefore obtain a spuriously strong correlation with the independent variables.

9. Details on the data underlying this and subsequent tables appear in the data appendix.

10. We also augmented the list of controls to include distance from the equator, because this variable is included among the instrumental variables we experiment with below, and because others (e.g., Rodrik 2000) have argued that it has an independent impact on economic growth. Although this variable often enters with a significant coefficient, adding it only reinforces our results (as we explain below).

11. These regressions are not reported but are available from the authors on request.

12. The coefficient on the level of the Quinn index by itself (column 3) is negative but insignificantly different from zero, lending no support to the hypothesis that liberalization damages growth in low-income countries. It is, however, the case that we can reject the null that both coefficients (that on the level of the Quinn index and the interaction term) are zero at the 95 percent confidence level.

13. The results are essentially the same, although a little weaker, when we use membership in the OECD in place of per capita GDP when constructing the interaction term. In the weighted least squares regressions, all interaction terms are insignificantly different from zero at conventional confidence levels.

14. Edwards's key results—those obtaining nonlinear effects for capital account liberalization (negative at low levels of per capita income, positive at high levels)—are derived using three-stage least squares.

15. This was true both of the individual coefficients and, when Quinn openness was entered in levels and interacted with per capita GDP, of the pair. That is, the relevant F-statistic did not lead us to reject the null that the two coefficients were effectively zero. Note that this is where the decision of whether or not to include distance from the equator as an explanatory variable for growth could matter. It is reassuring, therefore, that adding it to the list of independent variables altered none of the results reported here.

16. This is our reading of the abbreviations in the instrument list at the bottom of his table 10.

17. In addition, we worry about the validity of the instruments, specifically whether lagged liberalization and financial depth, which move slowly and are correlated with current liberalization and financial depth, are in fact capturing the exogenous component of these international financial policies. See the discussion above.

18. In principle, it would be possible to extend this sample beyond 1992 using data from other sources. But given the far-reaching changes in capital account restrictions that occurred in the 1990s, our measure of the structure of capital controls, circa 1988, would then capture little of the reality of capital account policies in the last subperiod. Because we do not have Quinn-like data on the capital account regime in the 1990s, we concluded that it makes sense to stick with a sample that ends in 1992.

19. We thank Dennis Quinn for sharing these data with us.

20. We report results using only the Quinn measure of openness, because when we substitute the IMF measure we obtain uniformly insignificant effects. We concentrate on unweighted regressions throughout. The use of weights and instrumental variables alters our results only slightly: the coefficients tend to be slightly less well determined, although the pattern of signs remains the same.

21. Investment retains its consistently positive effect on growth, although the effects of human capital are somewhat weaker than before. The catch-up effect is weak in both the second and third periods, reflecting the heavy impact of the debt crisis of low- and middle-income developing countries starting in 1982 and their delayed post-1987 recovery.

22. Again, for details on this and the other variables used in the analysis, see the data appendix.

23. Again, estimating these equations by instrumental variables changed nothing.

24. At the 90 and 95 percent levels, respectively.

25. One of the coauthors is reminded of all the money deposited in Swiss banks by depositors from countries that rate low according to the law-and-order index and have porous capital accounts.

26. We also fail to reject the null that the two coefficients are jointly zero at conventional confidence levels.

27. See, for example, Edwards 1994 and Johnston 1998.

28. We thank Andrew Warner for providing these data.

29. Rodriguez and Rodrik (2000) note that the state monopoly of major exports variables is derived from a World Bank index of the degree of distortions caused by export

marketing boards and is positive only for sub-Saharan African countries, whose growth performance was particularly disappointing in the sample period. Because there are only two sub-Saharan African countries in our (much smaller) sample, it is not plausible in our case that this is the proper interpretation of the results we obtain when we use the Sachs-Warner openness measure.

30. Only in the first subperiod, 1973–1981, is its coefficient not significantly greater than zero at the 95 percent confidence level.

31. As noted above, Sachs-Warner openness involves two additional criteria—whether a country had a socialist economic system and the state had a monopoly of major exports—which are likely to matter importantly for certain countries. We return to this point below.

32. This is similar to the approach taken by Rodriguez and Rodrik (2000), who find in growth regressions covering a longer period that most of the explanatory power resides in the black market premium.

33. Note that the Barro-Lee tariff and nontariff data do not vary with time. The same is true of the Sachs-Warner index (which makes use of the Barro-Lee measures), aside from a few selected changes imposed by its architects.

34. We refer to this in table 4.6 as "black market premium 1."

35. This is "black market premium 2." We divide the premium by 100 so that the coefficients on this variable are scaled the same as for "black market premium 1."

36. Denoted "black market premium 3." Again, we divide this measure by 100 to make it as comparable as possible with "black market premium 1."

37. We see the same pattern when we consider the individual subperiods, although the coefficients, predictably, are less well defined than when we pool the data. We discuss the subperiod results later in this section.

38. These are discussed in the next paragraph. To conserve space, we report only the results for "black market premium 1." Those using the other measures of the black market premium are essentially identical.

## Chapter 5

This paper was written in the course of many visits: Eichengreen to the Federal Reserve Board; Rose and Wyplosz to the IMF; and Rose to the U.S. Department of Treasury, European Center for Advanced Research in Economics (ECARE), and Institute for International Economic Studies (IIES). For sterling research assistance we thank Chang-Tai Hsieh. We have floated some of our ideas by Michael Dooley, Jeffrey Frankel, Paul Krugman, and participants at the 1995 Federal Reserve Bank of San Francisco/Center for Economic Policy Research Conference, IIES, and University of California, Santa Cruz; we are grateful for their frank remarks. The comments of David Begg, Bernard Dumas, Axel Weber, and the Economic Policy Panel have helped to fix many problems.

1. See, for example, Bank for International Settlements 1993, Commission of the European Communities 1993, Committee of Governors of Central Banks 1993a,b, Goldstein et al. 1993.

2. See, for example, Dornbusch and Werner 1994.

3. The IMF has recently moved toward a consensus in favor of close monitoring of countries with potential financial crises, by means of an early warning system; see the *Financial Times*, April 27, 1995.

4. Similarly, governments that give in to speculative attacks are not always clearly punished by higher interest rates or inferior economic performance subsequently.

5. Krugman's model is an adaptation of the Salant and Henderson (1978) model of buying attacks on commodity price stabilization schemes.

6. For models that treat the pre-attack behavior of wages, prices, and real exchange rates, see Goldberg 1993 and Willman 1988. On the consequences of capital controls in the Krugman model, see Wyplosz 1986. Penati and Pennacchi (1989) analyze speculative attacks in a model of optimal portfolio choice. Models that treat uncertainty explicitly include Flood and Garber 1984b and Claessens 1991.

7. See, for example, Connolly and Taylor 1984 and Connolly 1986.

8. See, for example, Cumby and van Wijnbergen 1989 and Penati and Pennacchi 1989 on developing countries, and Thomas 1994 on Italy and France.

9. See also Portes 1993 and Obstfeld 1994.

10. One exception to this generalization is inflation differentials, which do display some association with realignment expectations in the Rose-Svensson study (consistent with the findings of the literature). Thomas (1994) finds that some measures of fundamentals significantly predict realignment expectations for France but not for Italy. Their effect is stronger when the deviation of the exchange rate from the central parity is included in the specification. In any case, Thomas concurs with Rose and Svensson; the effect of fundamentals is uniformly small.

11. Again in 1995, the realignment of the Portugese escudo was blamed on exchange market difficulties culminating in realignment in neighboring Spain.

12. Honohan and Conroy (1994) document the strong effect of the sterling/Irish punt rate on the Irish punt/DM rate during the EMS period, which is consistent with the predictions of models of spillover effects. Their analysis is less than an ideal test, however, for it focuses on the impact on interest differentials rather than realignment expectations (interest differentials purged of the contribution of expected exchange rate movements within the band) and because their specification does not also include other obvious fundamentals. More generally, a prediction of these models, which we can test using our data, is that exchange market crisis and events should be clustered in time.

13. Barnett and Ho (1995) generalize this point about the possibility of multiple equilibria.

14. In the Flood and Garber (1984b) and Obstfeld (1986) formulations, the contingent nature of the money supply rule opens up the possibility of self-fulfilling attacks. But the same general result obtains if one assumes contingent processes for other policy instruments. For example, Dellas and Stockman (1993) show that multiple equilibria can obtain if an attack induces a government to impose capital controls on a regime of otherwise free international capital mobility. Uribe (1995) similarly shows that if the authorities adopt a real exchange rate rule, increasing the devaluation rate when the

real exchange rate is below its long-run level and vice versa, there is again scope for self-fulfilling expectations.

15. Obstfeld describes a number of other channels through which an attack on a currency that forces the authorities to raise interest rates may thereby induce them to abandon the exchange rate peg: the impact of higher interest rates on the cost of public debt service, an induced increase in non-performing bank loans and hence bank failures, and a rise in the cost of indexed mortgage debt. Jeanne 1994 provides a survey and synthesis of the relevant literature.

16. Similar dynamics arise in Obstfeld's 1994 optimizing model because the cost of servicing the public debt depends positively on the interest rate. Hence, a loss of confidence that must be met by interest rate hikes can so worsen the fiscal position as to provoke a self-fulfilling attack. See also Lehment 1994.

17. See Gerlach and Smets 1995 and Eichengreen and Wyplosz 1993. The latter report a survey of foreign exchange traders, the results of which can be interpreted in terms of this focal-point notion.

18. One might think that this possibility is especially plausible if intervention is coordinated with other countries. This information effect is distinct from the impact of foreign borrowing and foreign support generally on the exchange reserves of the government under attack. Buiter (1987) shows that foreign borrowing does not unambiguously delay the timing of an attack; besides increasing the resources at the authorities' command, borrowing increases a country's foreign indebtedness, implying a larger eventual devaluation and therefore a greater incentive for an early attack on a country with Krugman-like imbalances in fundamentals.

19. Lehment 1994 provides a model of these dynamics.

20. Assuming multiple speculators adds the questions about coordination addressed in the previous paragraph. Chen's framework is an application of the Markov differential game model of patent races of Budd et al. 1993.

21. Mélitz applies this model to the attack on the French franc in the summer of 1993, when French interest rate reductions did not elicit the expected German response, causing market participants to revise their views of the depth of Germany's commitment to the maintenance of the franc/DM rate and the monetary union project.

22. Alesina and Tabellini (1989) find that left-wing governments are more inclined to impose capital controls, which is one of the events in response to which capital outflows and a speculative crisis may occur.

23. We attempt to shed some empirical light on this issue below.

24. Our political variables have many missing observations.

25. In fact, our results were largely unchanged when we substituted the United States for Germany for the pre-1971 period. Note that when we cull devaluations and other foreign exchange market "events" from *EAER*, we consider the behavior of a currency vis-à-vis the center country, Germany. For example, when the Dutch guilder was revalued against the ECU but not against the Deutschmark in the second half of the 1980s, we classify this as an event.

26. Our control group excludes all observations both for actual events and for observations defined as crises, using the methodology we develop below. We also exclude

observations within a two-sided, one-quarter window of each event and crisis to avoid double counting. Although there are 81 (potentially non-independent) devaluations in our sample, the number of observations in any individual panel may be lower because of missing data. In this sense, the sample is not directly comparable across panels. Making our panels comparable would involve the sacrifice of many observations and much precision.

27. Although we only show M1, the behavior of M2 is similar.

28. This reasoning relies on both uncovered interest parity and an absence of mean reversion when the exchange rate is constrained within a band; however, both of these are questionable assumptions.

29. This is especially plausible if the "interest rate defense" imposes costs *per se* through, for example, politically painful unemployment, as Bensaid and Jeanne (1994) suggest. The "contagion effect" is the spread of such attacks across countries as well as across time; we explore this further below.

30. Our result is *not* an artifact of our choice of Germany as the base country; similar results hold if we treat the United States as the base country before 1973, and Germany thereafter. This is perhaps to be expected, because the United States was commonly viewed as a "weak center" during the collapse of the Bretton Woods, whereas Germany was a "strong center" during the EMS speculative attacks of 1992–93.

31. We thank Torsten Persson for this point.

32. Flood and Rose (1999) show that "fundamentals" (dictated by different monetary models) do not vary across exchange rate regimes; here we show that they do not vary between regime transitions and tranquility.

33. It is also important to recall that our regime transitions, like realignments, are not necessarily declared in *EAER* with respect to the Deutschmark.

34. This seems *prima facie* reasonable; we think recently of British mortgage rates and Italian government debt in September 1992, Swedish financial woes in November 1992, and French unemployment rates in August 1993.

35. Further, not all speculative attacks may be picked up by our measure of crises. For example, an attack countered successfully by a very brief "interest rate defense" (in which domestic interest rates are raised for a brief period of time) may not be captured.

36. In Eichengreen, Rose, and Wyplosz 1996, we conducted sensitivity analysis in order to gauge how much difference different weighting schemes make. There we found that our central conclusions were largely robust to our choice of weighting scheme. We also found that our procedure picks up an intuitively reasonable sample of speculative attacks.

37. On reflection, this seems unsurprising, because opposition parties frequently state that they will not change the exchange rate regime, often for fear of being blamed for precipitating a speculative attack.

38. In order to deal with the small-sample problems of multinomial logit estimation, we need to reduce the number of regressors (16 macroeconomic variables alone are shown in most of the figures). One way around the problem is to estimate a tightly parameterized theoretical model that would make few demands on the available data.

(As discussed above, this is the strategy adopted by the small existing literature, e.g., Blanco and Garber 1986.) The problem is that poor estimates would then constitute rejection of a single model, when we are more interested in developing a stylized picture of different exchange rate episodes. Our approach is to save degrees of freedom by representing leads and lags of regressors using moving averages in a reduced form. Thus, instead of including separately the first, second, third, and fourth lags of, for example, inflation differentials in our regressions, we include only a single term which is the average inflation differential in the preceding year. All models are estimated using maximum likelihood.

39. The interpretation of individual coefficients is blurred for two reasons. First, coefficient interpretation in multinomial logit is always tricky. Second, the non-structured nature of our estimation means that each coefficient represents the partial effect of the regressor on the likelihood of the cell's occurring instead of tranquility; that is, holding all other effects constant. But the co-movements we observed earlier around realignments may make partial correlation coefficients uninteresting.

40. We also estimated ad hoc refinements of these models to focus attention on two phenomena of interest. First, the basic "fundamentals-based" speculative attack model focuses attention on two underlying causes of speculative attacks: government budget deficits and credit growth in excess of income growth. We estimated models that omit other regressors so as to try to isolate these effects. But it is not the case that lags of either factor are substantially more noticeable in a more parsimonious model. Second, we searched for systematic changes in the same regressors before and after actual exchange rate events, in an attempt to identify the policy switches indicated by the "self-fulfilling" speculative attack model. We met with a similar lack of success, further confirming our view that there do not seem to be policy switches after exchange rate episodes.

41. See Eichengreen et al. 1995, from which the following discussion is drawn.

## Chapter 6

The authors are grateful to Shirish Gupta for research assistance; the National Science Foundation for financial support; and Torben Andersen, Takatoshi Ito, Ronald McKinnon, Gian Maria Milesi-Ferretti, and the participants at the East Asia Seminar on Economics for comments.

1. A similar argument is developed by Andersen (1994), building on escape-clause models of exchange rate policy. In his model, the government is prompted to abandon its currency peg by a shock coming from outside the currency market. An exogenous deterioration in domestic competitiveness that increases domestic unemployment, for example, may give the authorities an incentive to opt for a more expansionary policy that reduces unemployment through surprise inflation. Andersen argues that his model provides a plausible description of exchange rate policy in Northern Europe in 1991–1992 when the collapse of Soviet trade with the Nordic countries first aggravated unemployment in Finland, leading its government to adopt a more expansionary policy that required abandoning the currency peg, and that then spilled over to the exchange rates of the rest of Scandinavia.

2. An illustrative application of this model would be to the ERM crises of 1992–93. The story would go as follows. There was a widespread belief at the time that the ERM

could not continue to operate indefinitely without a realignment. And yet its extraordinary stability since January 1987 led traders to accept the official view that the system could now function without further realignments. Extraneous circumstances (the political difficulties of ratifying the Maastricht Treaty) then triggered a crisis (which culminated in the devaluation of the Italian lira that put paid to this belief). It revealed to all traders that what they privately believed all along was true—that realignments were still necessary.

3. This evidence is consistent with models emphasizing the domestic determinants of external balance as well as with more recent models that focus instead on the decisions of governments concerned with internal balance and constrained by the exchange rate in their choice of policy response.

4. In a similar exercise, Valdés (1996) analyzes the secondary market prices of sovereign debt, and shows that there exists a strong cross-country correlation of these prices even after controlling for macroeconomic fundamentals and "big news events" such as announcements of Brady Plan restructurings. This evidence of contagion in the markets for developing-country debt is much stronger than analogous evidence for the U.S. corporate bond market, where fundamentals explain essentially all of the observed correlation across issues, and than in a group of medium-sized OECD countries, where fundamentals again explain all of the observed correlation of credit ratings.

5. We refer to such actual changes in explicit exchange rate policy as "events" and think of them as overlapping in part with the currency crises that we are interested in.

6. And occasionally by the actual or threatened imposition of capital controls.

7. Frankel and Rose 1995 provides a recent survey.

8. Of course, idiosyncratic German shocks then acquire disproportionate importance. However, German unification is typically considered to be the only important such shock; and our sensitivity analysis indicates that our results do not stem from this event.

9. Following Girton and Roper, r is actually the ratio of reserves to narrow money (M1).

10. Just as we do not allow crises in successive quarters to count as independent observations, we also do not allow two successive periods of tranquility to count as independent observations. We do this by applying our exclusion window to periods of both crisis and tranquility.

11. However, missing data will preclude use of some of these observations; thus our panel is technically unbalanced.

12. The countries in our sample include (in order of IMF country number): the United States, United Kingdom, Austria, Belgium, Denmark, France, Italy, The Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Ireland, Portugal, Spain, and Australia, along with our center country, Germany.

13. One of the few indications of sensitivity stems from the inclusion of year-specific controls; this results in point-estimates of $\omega$ of around 4 percent and correspondingly marginally statistical evidence against the hypothesis Ho: $\omega = 0$. Because contagion would result in the clustering of speculative attacks over time that could be well

picked up by time-specific fixed effects, it is hard to interpret this result. Also, controlling for the IMF's real effective exchange rate (computed using relative normalized unit-value costs) reduces both the sample size, because the series is only available from 1975, and the magnitude of $\omega$ by around a half. The estimate of $\omega$ falls to around 4 percent and is of more marginal significance.

14. By way of contrast, Sachs, Tornell, and Velasco (1996) do not control for fundamentals when testing for contagion.

15. Documentation and references regarding these weights can be found in *International Financial Statistics*.

16. One could imagine adding additional focus variables. The presence of capital controls and the total stock of external debt would be interesting, especially in the case of developing countries. However, such variables tend to move slowly. Our seven focus variables turn out to be extremely collinear in any case.

17. This result does not depend on the conditioning set—specifically, on whether the traditional political and macroeconomic fundamentals are entered only contemporaneously or with moving-average lags as well. It is also insensitive to whether the macro weights are computed with variables standardized by country or time period.

18. For instance, the first eigen-value is substantially higher than the second (for both the country-specific and time-specific factors, the first eigen-value is almost 6, whereas the second less than $-0.2$). In addition, the first factor explains a high proportion of the data variance (close to 100 percent); the individual factor uniquenesses are low (never more than 30 percent). Finally, all the scoring coefficients are all positive, as expected.

19. Of course, there are two factors, one for each of the two standardizations (country- and time-specific).

## Chapter 7

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1. Camdessus 1995.

2. Ford 1962, 87.

3. Ferns 1960, 397.

4. This was especially true in Scotland, where the failure of the City Bank of Glasgow still discouraged residents from holding their deposits in local banks.

5. Bailey 1959, 272.

6. Contemporaries saw things the same way: in January 1888, H. G. Anderson of the London and River Plate emphasized the role played by "the extremely low rates of interest in London" in the continued flow of funds into Argentina. Joslin 1963, 121.

7. Wirth 1893, 227.

8. Two hundred and forty-eight, 154, and 45 million gold pesos, respectively.

9. Williams 1920, 94. The internal debt of the national government (in gold pesos) was relatively low and falling throughout the period.

10. International Monetary Fund 1995, 92.

11. Joslin 1963, 120.

12. Not only in Argentina were railway companies the first major enterprises to access foreign capital. The same was true in the United States. See, inter alia, Baskin 1988.

13. See, inter alia, Kuznets 1930, 1966.

14. In addition, railroadization may have been stimulated by a breakdown of oligopolistic collusion of the sort analyzed by Harley (1982) for the United States. A monopolist who controls the market for transportation services would construct his network at the moment that maximized his total profits. But a company with rivals might commence construction earlier in order to prevent the best routes from being preempted by others. Because the need to "build ahead of demand" reduces profits relative to those of the monopolist, competitors have an incentive to collude in an effort to restrain the temptation to build too early. Sooner or later, however, the temptation will be overwhelming and the oligopoly will break down, resulting in a scramble of construction activity. There is some evidence that just such a scramble broke out in Argentina in the second half of the 1880s, as provincial governments and private parties competed by constructing alternative lines from the interior to the coast. See Ferns 1960, 410.

15. For details on this practice, see Eichengreen 1996a.

16. MacPherson 1955, 180. Argentina not being under British control, a government guarantee did not confer the same security; hence, Argentina railway bonds still commanded a 6 or 7 percent interest rate.

17. Ferns 1960, 398; Lewis 1977, 407–408.

18. It is important to observe that, to some extent, this deficit was an endogenous response to the country's ongoing inflation and current depreciation, reflecting delays in collecting taxes and the relatively rapid response of expenditure obligations to inflation (the Tanzi-Olivieri effect). Vicente Lopez, finance minister in the second half of 1890, estimated that government revenues had been reduced by 50 percent in real terms due to inflation (Ferns 1960, 456).

19. Williams 1920, 118–119.

20. The growth of state and municipal debts was a consequence of the strategies of Argentina's own foreign bankers. The national government had borrowed heavily in the first half of the decade and experienced financial difficulties when revenues were slow to pick up. In 1885, it sent Carlos Pellegrini, a British-educated former minister of finance (and future president), to negotiate with the bankers. Dr. Pellegrini secured a loan of some £8 million in return for a promise that the national government would not borrow further without the bankers' approval. In addition, the subset of bankers underwriting the new loan were given a first mortgage on the revenues of the customs houses. But this agreement did not bind the provinces and municipalities, who could and did borrow at will. This response can be understood as a reflection of the still relatively decentralized nature of Argentine political arrangements, compared to other Latin American countries in which the central government virtually monopolized the

borrowing function. Marichal notes that 35 of the 39 loans taken out by municipal and provincial governments in the 1880s were Argentine. Ironically, it was often the same foreign financial houses—Baring Brothers prominent among them—that had been so insistent about restraints on national government borrowing who underwrote the issues of the provinces and municipalities. In the end it was the failure of one such issue, the Buenos Aires Water Supply and Drainage Loan of 1888, that brought Barings down. It has been suggested that Roca and Juárez Celman used the budget to buy political support. Marichal (1989, 140) asserts that graft and corruption were pervasive in the public sector. Wirth (1893, 219), in a contemporary account, refers to the fact that "corruption prevailed in government circles." Lauck (1907, 47) puts the same point more colorfully: "Argentina was honeycombed with corruption. A coterie of politicians and their henchmen had complete control of the national and provincial governments, and under the guise of politics carried on a scramble for loot." Similar statements of course again became fashionable following the Mexican debacle; the index to Oppenheimer 1996 contains 28 references to corruption.

21. Ferns 1960, 453.

22. The latter were all under the control of the Province of Buenos Aires.

23. Although the interest on cedulas was payable in paper, often they were sold at a substantial discount, so the effective interest rate incorporated a generous premium to compensate for currency depreciation and risk.

24. The land owner assumed the obligation to make an annual payment to the bank for interest and amortization, while the bank serviced the bonds.

25. Lauck 1907, 47.

26. Indeed, these information asymmetries can be thought of as the rationale for the creation of the mortgage banks, which were an instrument for monitoring borrowers on behalf of European lenders, applying first-hand knowledge of the value of their land, and pooling the risks of individual loans. The mortgage company–life insurance company connection played the same role in the United States. See Snowden 1995.

27. Wirth 1893, 219. Or, as John Proctor, quoted in Williams (1920, 79) put it, "Swamps and salt plains had as good a chance as a flourishing farm, provided the owner were in the political ring."

28. Leiderman and Thorne (1995) show that the decline in private saving is less pronounced when the official accounts are corrected for inflation, but their estimates of the shift in overall national savings are little different from the officials statistics because they also add in a correction for net lending by the development banks. They conclude that Mexico differed from other emerging markets in the 1990s in that capital inflows mainly financed consumption, not investment. They conclude that a fifth of all capital inflows was used to finance investment, whereas the rest financed increased consumption.

29. The Bank of Mexico has argued that the policy of financing should have been sustainable, absent the events of December, insofar as the loss of investor confidence caused by the Colosio assassination was temporary. Once it had passed and confidence returned, the prevailing level of interest rates should again have been consistent with balance-of-payments equilibrium. Sachs, Tornell, and Velasco (1995) dispute this view, arguing that the discrete decline in Mexican reserves in the second quarter dis-

guises a secular deterioration in the central bank's position that required a permanent adjustment to render the exchange rate band defensible.

30. Contemporaries referred to the problem of long gestation periods: that railway development, hampered by construction lags and a shortage of rolling stock, was slow to translate into increased commodity exports. See Ferns 1960, 402.

31. Gold convertibility was not restored until the early twentieth century.

32. Joslin 1963, 119.

33. It is revealing that the Bank of Cordoba, Celman's province, was among the worst offenders: it issued more than 33 million pesos of notes when its legal maximum was only 8 million.

34. The figures quoted are for the gold premium, which is not precisely the exchange rate against sterling insofar as that currency also fluctuated within the gold points.

35. Joslin 1963, 121. Wary European investors demanded that interest on its new 6 percent loan be paid in gold rather than be guaranteed by the revenues of the customs houses. Wirth 1893, 218.

36. Joslin 1966, 122.

37. The public outcry resembled that which would have occurred in Mexico in 1995 when spokemen for the markets suggested that the Zedillo government sell off Pemex to restore its credit.

38. In addition, the government announced the end to all further railway guarantees and imposed a 2 percent tax on the deposits of foreign banks. This last measure was hardly one that would have reassured foreign investors. But there are interesting parallels with the kinds of measures used by countries such as Chile and Brazil in the 1990s to limit their dependence on capital inflows.

39. Clapham (1944, 530–531) suggests that some "behind the scenes ... knew quite well" what was afoot, and reports that Barings' bills were coming in for discount relatively fast by Wednesday of the week. On the other hand, he reports that the government's own brokers were still uncertain of what was going on.

40. As argued by Eichengreen and Portes 1996.

## Chapter 8

Prepared for the conference celebrating the seventy-fifth anniversary of the Banco de Mexico, Mexico City, November 14–15, 2000. I am grateful to Andrew Crockett and Jose Viñals for comments, to Carlos Arteta for research assistance, and to Mindy Ruzicka for help with the graphics.

1. This refers to the "competitive-devaluation problem," which was of singular concern in Europe, owing to the association of currency devaluation with political strife in the 1930s.

2. The European Coal and Steel Community was the first achievement of "The Six." It predated the Treaty of Rome. In any case, the Common Agricultural Policy was essential for maintaining political support, notably in France, for the Common Market in whose construction the Coal and Steel Community was the first step. And, as Buiter,

Corsetti, and Pesenti (1998) argue, it is hard to imagine that the technical features of the CAP would have been designed as they were unless there had been a presumption that intra-European exchange rates would remain fixed. Even so, one can readily see how with the passage of time those technical features could themselves become an obstacle to exchange rate variability.

3. To be sure, NAFTA includes a number of non-trade-related provisions that extend beyond the border—those affecting environmental standards and practices, for example—but these are limited compared to the commitments entailed in the single market program.

4. The maturity of credits that could be obtained through the Very Short Term Financing Facility was extended, the conditions under which they could be accessed was liberalized, and provision was made for renewing maturing loans.

5. Where the Snake had included non-EC members, the EMS was exclusively an EC affair.

6. Bayoumi and Eichengreen (1994) document this point with estimates of the supply and demand shocks affecting the European economy in the 1970s and 1980s.

7. Italy, Denmark, and Ireland, among others, followed France's lead, turning to monetary and fiscal retrenchment.

8. The band for the lira was adjusted on January 8, 1990, but without changing the central parity and therefore posing no threat to the stability of expectations.

9. Because Chancellor Kohl had campaigned on a pledge not to levy additional taxes to defray the costs of unification, forecasting large budget deficits and their consequences was not rocket science.

10. And that these investments would deliver capital gains as interest rates came down in the future.

11. Thus, the Spanish peseta, like the Indonesian rupiah five years later, was pushed to the top of its band by these copious capital inflows before the bottom suddenly fell out.

12. It is revealing that, at the time of writing, sterling is some 15 percent higher against the DM than it was when it entered the ERM (and even higher against the synthetic euro). This is consistent with the emphasis in the text on the influence of the business cycle conjuncture on the level of the exchange rate, in the sense that Britain's relatively robust expansion in the second half of the 1990s is the obvious explanation for its currently high exchange rate.

13. Exchange rate stabilization and EMS participation was one of the four convergence criteria included in the Maastricht Treaty, although how strictly they would be interpreted was disputed. For understanding the crisis, it is important to recall that the consensus interpretation was stricter then than it tends to be today.

14. Despite intramarginal intervention. The Bank of Italy's reserves fell by $13\frac{1}{2}$ percent in the month of June.

15. Connolly 1995, 136.

16. New entrants to the EMS, following a precedent set by Italy, were initially permitted to operate wide bands of plus-or-minus 6 percent (rather than the conventional

$2\frac{1}{4}$ percent band), reflecting their continued problems of high inflation. Italy moved from the wide band to the narrow band on January 8, 1990, as noted above.

17. Technically, the adjustment was a 3.5 percent devaluation of the lira and a 3.5 percent revaluation of other ERM currencies. The Bundesbank also cut the discount rate by 50 basis points, but it was the Lombard rate that mattered for international transactions.

18. As Stephens (1996, 217) writes, "Officials believed an increase would have served only to heighten the tension between the domestic economy and the ERM. The financial markets would have recognized an increase as an act of desperation. In the words of one Bank official, 'There was a huge overkill even with base rates at 10 percent. Increasing rates would have been incredible.'" See also Lamont 1999, 200 and *passim*.

19. As Norman Lamont put it, when the increase was announced, "the pound did not move at all. From that moment, I knew the game was up. I later told a journalist I felt like a TV surgeon in *Casualty* watching a heart monitor and realizing that the patient was dead." Lamont 1999, 249.

20. Dyson and Featherstone 1999, 685.

21. BIS 1993, 188.

22. The Bundesbank cut repurchase and Lombard rates, but this was regarded as inadequate.

23. I deserve the blame for having coined this terminology, which seems to have produced as much confusion as clarity.

24. In a sense, this is what has led subsequent investigators to turn from case studies to "large n" studies that attempt to draw generalizations from many crises.

25. This characterization simplifies the situation, to be sure. In the case of the United Kingdom, another country whose subsequent difficulties have been ascribed to competitiveness problems, since 1988 the authorities had been resisting appreciation; in the two years preceding ERM entry, they did not intervene or use interest rates to target the exchange rate. Still, there is an element of truth in this characterization insofar as some of the principals in the discussion of alternative entry rates still saw inflation as more of a problem than competitiveness and therefore recommended a high rate.

26. The last three countries entered the period with the largest deficits of any member state other than Greece, not yet an ERM member, and Germany itself, where the deficit had already soared in 1990–91.

27. Giavazzi and Giovannini (1989), writing before the crisis, refer to the widely noted phenomenon of "dollar-Deutschmark polarization," in which the Deutschmark seemed to rise against other European currencies whenever the dollar fell. (See also Frankel 1986.) The popular interpretation was in terms of closer substitutability between dollars and Deutschmarks than assets denominated in other European currencies. For present purposes, it suffices that a weaker dollar should have intensified the competitive pressure on all of Europe, which would have created particular problems for countries where the exchange rate was already weak.

28. And, of course, it is precisely over the question of whether the current or capital account drove the EMS crisis on which the first- versus second-generation debate turns.

29. As constructed by the IMF. Buiter, Corsetti, and Pesenti (1998, 43) note a 1992 Bank of Italy report estimating that the loss of Italian competitiveness between 1987 and 1991 was limited to 5 percent. But this calculation was based on relative producer prices, which, as argued above, will be contaminated by a high weight on traded goods.

30. As noted in section 8.2.

31. Of course, in the seminal Krugman model, excess demand did not show up in overvaluation, because relative prices were given by the assumption of purchasing power parity. Extensions of the model (e.g., Willman 1988) relaxed this assumption and showed how the run-up to a speculative attack driven by excess demand would display growing real overvaluation along with the progressive depletion of reserves.

32. Unfortunately, large capital inflows like those produced by the convergence play can render this test less than telling.

33. Or, more precisely, bringing inflation and interest rates down to a point very close to those of Europe's low-inflation countries.

34. I return to this point below.

35. In addition to the Rose and Svensson (1994) and Campa and Chang (1996) references cited above, see Clarida, Galí, and Gertler 1997 for evidence.

36. Buiter, Corsetti, and Pesenti 1998, 41.

37. By a relatively small margin in 1990, but by roughly the same amount otherwise.

38. In addition, recall that the convergence of interest rates was another precondition laid down in the Maastricht Treaty for qualifying for monetary union.

39. Subsequently made famous, in its post-crisis reincarnation, by Long-Term Capital Management.

40. IMF 1993, 10.

41. Stephens 1996, 190.

42. It has been set out formally by Ozkan and Sutherland (1994), Jeanne (1997), and Eichengreen and Jeanne (2000).

43. The implication is that regions prepared to develop collective exchange rate arrangements and to operate them effectively (East Asia? Mercosur?) will be better able to resist future crises.

44. The idea that everyone else should have realigned against the Deutschmark is compelling if one believes that German unification, requiring a higher price of German goods, was the principal shock to the system.

45. For plausible parameter values, the disinflationary effects on Germany and the corresponding German interest rate cut will be greater when there are a large number of small devaluations than a small number of large devaluations.

46. Major 1999, 323.

47. Major 1999, 327, writes that the Italians encouraged other countries, including the United Kingdom, to accompany them in devaluing but that again it was French resistance that prevented them from going along.

48. As John Major reports having told Terry Burns in late August, "We have invested a lot in the ERM, . . . If we devalue the first time pressure emerges, our anti-inflation policy will lose all credibility." Major 1999, 319.

49. Stephens 1996, 210.

50. As Dyson and Featherstone (1999, 683) put it, it broke the cardinal rule of international negotiations, that "no one should be asked to deliver what they do not have the domestic power to commit themselves to." The British view (Major 1999, chapter 14; Lamont 1999, chapter 9) is that in placing pressure on German officials Lamont was simply voicing the preferences and concerns of other European governments. In his 1999–2000 article, the then chancellor observes that exchange rate policy, as distinct from monetary policy, was a matter for the federal government, not the Bundesbank, although it is not clear that a change in German monetary policy designed to sustain the exchange rate of a particular foreign currency is properly seen as falling under this heading.

51. Instead, Stephens (1996) and Frowen (1999–2000) say that Trichet communicated aspects of what he had learned from German officials to other European ministers in bilateral telephone conversations, which substituted for rather than instigating a meeting of the Monetary Committee.

52. One need not be a believer in early warning indicators for these exercises to be useful; for those for whom diversity rather than uniformity is the most impressive feature of the different crises, the forecast errors are useful precisely for highlighting what is different about each event.

53. Real appreciation is calculated as the deviation from trend over the course of the preceding 48 months.

54. Data from the BIS and World Bank put short-term international debt at 41 percent of reserves for our European countries in 1992 but at 96 percent for Bussiere and Mulder's emerging markets in 1997.

55. Although it did in 1993.

56. Because the coefficient on reserves in the forecasting model is very small, dropping this variable changes almost nothing; the change in ordering is heavily driven by the elimination of effects related to the presence of short-term debt.

57. Calvo and Reinhart (2000), using a different sample, estimate that growth typically falls by 2.0 percentage points between the year preceding a currency crisis and the year following in emerging markets, but by only 0.2 points in developed countries.

58. This may not feel right to readers impressed by the Asian crisis, in which the initial output losses were immense (depending on how it is dated, the swing in growth can be as large as 14 percent—from plus 7 preceding the crisis to negative 7 following). The comparison with the table 8.5 averages underscores how unusual this experience was. The EMS calculations in table 8.5 are for 1991–93 for all countries except Finland, where we compare 1990 with 1992. Note that the apparent mildness of the Mexican crisis reflects its v-shape and the difficulty of dating it. Table 8.5 takes 1995 as the year of that crisis, although strictly speaking it broke out in December 1994. If we take 1994 as year *t*, then the drop in the growth rate is a dramatic 10 percentage points.

59. Of course, Mexico, being an emerging market, should be expected to display a faster rate of growth, other things equal, until its levels of income and productivity converge to those of other OECD members.

60. Following its accession to the European Union.

61. To be sure, ERM members differed in the degree to which they utilized the exchange rate flexibility permitted by their plus-or-minus 15 percent bands. For example, whereas The Netherlands continued to hold the guilder very stable against the DM, Ireland utilized all the flexibility that the newly widened bands permitted. Spain adopted an explicit monetary policy operating strategy—inflation targeting—to stabilize expectations and the fluctuation of the exchange rate within the newly widened bands. (I will have more to say about inflation targeting below.) Although such qualifications are important, they do not undermine the general point that countries moved away from narrow bands and unilateral pegs in the wake of the 1992–1993 crisis.

62. These two cases were very different. Whereas Italy attached exceptional value to being accepted for EMU due to its incomplete monetary credibility and correspondingly high interest rates, for Finland EMU was attractive because of the country's proximity to Russia and its consequent desire to build a firmer bridge to the European Union.

63. A lengthier description of the United Kingdom's adoption of inflation targeting is in Mishkin and Posen 1997.

64. Departing from some models of inflation targeting, the authorities did not specify an explicit model of how monetary policy affects the economy. A more important departure from the standard model was that the Bank of England was not independent. The chancellor effectively made interest rate decisions, although in institutionalized consultation with the bank. As Mishkin and Posen (1997) put it, the bank became the chancellor's "institutional counterinflationary conscience" (p. 72).

65. The chancellor did not have to provide detailed explanations, however, for his reasons for going against the bank's recommendations, either through these minutes or independent channels, which was a limitation of the pre-1997 British system.

66. Good sources on its experience are Svensson 1995 and Bernanke et al. 1999.

67. Initially, the report was published three times annually. At first, the bank did not publish its own inflation forecast, although in late 1997, it began doing so in graphic form.

68. The opposition Social Democrats have consistently advocated more aggressive monetary expansion than the governing Liberal-Conservative coalition. Thus, when the Social Democrats formed a minority government following the September 1994 election, they appointed a new central bank board predisposed toward their agenda, something that did not enhance the credibility of Swedish inflation targeting.

69. They serve for the duration of the Parliament (of which most appointees are in practice members).

70. Although the board could dismiss him at any time.

71. The six members have staggered appointments, with one new appointment being made per year.

72. See Berg 2000.

## Chapter 9

Appendix C from Eichengreen 1999.

1. The classic reference, of course, is World Bank 1993.

2. Although some have gone so far as to cite Beijing's devaluation of the yuan in 1994 as setting the stage for the crisis, most observers agree not to give too much weight to this event: Chinese competition was but one of a number of factors intensifying the pressure on the crisis countries, and devaluation of the yuan was but one of a number of factors contributing to the intensification of Chinese competition. The depreciation of the yuan was largely offset by (and was itself designed to offset) the relatively rapid rise in yuan-denominated export prices. Analysis of these issues is in Fernald, Edison, and Loungani 1998. Radelet and Sachs (1998b) also emphasize surging Mexican exports of electronics, apparel, and automotive components to the United States following the North American Free Trade Agreement and the depreciation of the peso in 1995.

3. The other obvious indicator of Thailand's mounting problems, namely, the steady decline of the central bank's foreign reserves, is another example of wisdom after the fact, if only because the country did not release timely information about changes in the extent of its spot- and forward-market positions.

4. Radelet and Sachs (1998a) present and discuss these data. For example, spreads on emerging-market bonds only began to widen *following* the Thai devaluation (Cline and Barnes 1997).

5. This is documented in Eichengreen and Mathieson 1998 and Brown, Goetzmann, and Park 1998.

6. A representative opinion is Chase Manhattan Bank's research circular dated October 1, 1997 (Chase Manhattan Bank 1997, 8–9), whose analysts concluded that it was unlikely that any other country in that region "faces an imminent financial crisis" and who forecast growth rates for 1998 of 7 percent for Indonesia, 7 percent for Malaysia, and 6 percent for Thailand. Statistical studies support this distinction between Thailand and the other crisis countries: the leading econometric studies of crisis incidence have some success in predicting the Thai crisis, but not so the crisis in other Asian countries (see Berg and Pattillo 1998).

7. In addition, there was the rumor, later shown to be true, that the Bank of Korea had deposited a portion of its reserves with foreign branches of domestic banks, rendering those reserves unusable. Japanese banks were first to call in their short-term debts due to mounting problems in the Japanese financial system, such as the failure of Yamaichi Securities, the fourth largest securities firm in the country, and the bankruptcy of several regional and city banks. Kim and Rhee (1998) suggest that because Japanese banks were thought to be particularly well informed of the South Korean financial situation, their refusal to roll over their short-term credits precipitated similar actions on the part of other banks.

8. These problems were then compounded by a serious drought and by rumors of President Suharto's ill health.

9. This is the theoretical dilemma modeled by Chang and Velasco (1998).

10. Here, then, is where the factors emphasized in "third-generation" models of currency crises, such as Dooley 1997 and Krugman 1998, came into play.

11. Tornell 1999 emphasizes these parallels.

12. Other means of enhancing franchise value included interest rate ceilings on deposits and restraints in interbank competition in the loan market. In return, banks were subject to regulations requiring them to allocate certain portions of their loan portfolios to particular industrial sectors (Reisen 1998, 24).

13. With the exception of certain short-term trade-related credits.

14. The original intention had been to promote the development of Bangkok as an international financial center by financing "out-out" transactions in which Thai banks borrowed offshore and onlent only to offshore customers. Soon, however, the binding restrictions on domestic onlending were relaxed. Foreign banks were encouraged to abet this process by official intimations that the enthusiasm with which they helped to fund Thai banks' loans would affect their chances of eventually receiving a license permitting them to set up shop domestically.

15. Malaysia is a revealing comparison. In contrast to these other countries, its central bank sought to limit short-term foreign inflows through the banking system starting in 1994 by limiting banks' holdings of foreign funds, raising the cost of holding foreign deposits, and imposing ceilings on the net external liabilities of domestic banks. For details, see Glick and Moreno 1995. The foreign liabilities of deposit-money banks thus fell from a high of nearly 20 percent of GDP in 1993 to less than half that in 1996. Although Malaysia hardly escaped the crisis unscathed, the fact that the initial impact was milder than in Thailand is plausibly ascribed to these policies. Indonesia provides another case where the authorities imposed quantitative controls on offshore borrowing by banks in 1991 as well as tightening limits on their open foreign exchange positions and limiting their foreign exchange swap positions as a percentage of capital. In this case, however, these restrictions merely caused offshore borrowing to be rerouted from the banking system to the corporate sector.

16. In addition, some critics suggest that the U.S.- and IMF-led rescue of Mexico in 1995 was an important source of moral hazard, which, by allowing foreign investors to get out whole, encouraged them to rush back to emerging markets, including those of Asia. It is hard to know how much weight to attach to this explanation given the number of other forces also at work.

17. IMF 1998a describes the carry trade.

18. In addition, the strength of the yen over much of this period stimulated investment both by making East Asian exports more competitive relative to those of Japan and by encouraging Japanese investment in the region (Y. Park 1998, 6; BIS 1998, 118). The rapid rise of stock markets in the United States and many European countries, itself a concomitant of the low levels of interest rates, further encouraged investors in the advanced industrial countries to search for higher-yielding assets in middle-income Asia. Given their limited access to domestic securities markets, they funneled their cash through Asian banks.

19. See Krugman and Taylor 1978 for a theoretical exposition.

20. Those who emphasize the depressing effects of the high interest rates applied by Asian central banks (and required by the IMF as a condition for its assistance) and argue that these may have depressed rather than strengthened currencies presumably have in mind something along these lines (see, e.g., Radelet and Sachs 1998a; Furman and Stiglitz 1998).

21. As Alan Greenspan (1998, 4) put it, "The belief that local currencies could, virtually without risk of loss, be converted into dollars at any time was shattered. Investors, both domestic and foreign, endeavored en masse to convert dollars, as confidence in the ability of the local economy to earn dollars to meet their fixed obligations diminished. Local exchange rates fell against the dollar, including still further declines."

22. Thus, authors such as Sachs (1994) argue the need for an international bankruptcy court, or its equivalent, with the power to impose an automatic stay or standstill to halt the creditor grab race. Asia's experience suggests that the institutional lacuna giving rise to this socially counterproductive behavior was as much at the national as the international level.

23. An additional factor was the rebalancing of portfolios by commercial and investment banks and other institutional investors when the crisis struck. Losses on Thai investments encouraged them to sell off holdings in other Asian countries in order to rebalance their portfolios and raise cash. The loan clauses described above provided one mechanism for doing so.

24. Bacchetta and van Wincoop (1998) show how herding behavior that amplifies market volatility can result from incomplete information.

25. This is the explanation Yellen (1998) suggests.

26. And before regulators reclassified those assets as nonperforming.

27. A corollary is that the absence of an external deficit does not mean the absence of a crisis; past deficits, if financed recklessly, continue to confer that danger long after they have been eliminated.

28. Those few exceptions are smaller, more open economies with strong reasons for wishing to put monetary policy on autopilot. A currency board may be attractive to these exceptional few. But the number of countries for which this alternative is viable is likely to be small.

## Chapter 10

A different version of this chapter (as edited by Peter Passell) appeared in the *Milken Review*.

## Chapter 11

This paper was prepared for a special issue of *World Development* edited by Irma Adelman.

1. A comprehensive review of the evidence on this subject is Levine 1997.

2. The exposition here draws on Eichengreen and Mussa et al. 1998.

3. Devenow and Welch (1996) summarize the literature on models of rational herding.

4. The same phenomena arise in Bacchetta and Wincoop's (1998) model of international capital flows in the presence of incomplete information and learning. But where Calvo and Mendoza argue that capital market liberalization, to the extent that it occurs simultaneously in many countries, undermines individual incentives to gather

information and thereby permanently increases herding behavior, Bacchetta and Wincoop argue that incomplete information is a transitional problem associated with recent liberalization (that international investors will have the least information about recently liberalized markets) that should be overcome by the learning that takes place over time.

5. Eichengreen and Mathieson et al. (1998) find no evidence that hedge funds have an unusual tendency to herd together in currency markets. Our data on hedge funds' positions was, however, limited to five major currencies. To be sure, there are plenty of anecdotes to the contrary from smaller markets (see, e.g., Grenville 1999).

6. In contrast, Rossi (1999) does not report a correlation between capital account liberalization and banking crises. Credit booms are, however, a reliable leading indicator of banking crises (Caprio, Atiyas, and Hanson 1994), and domestic credit booms are often a side effect of capital account liberalization.

7. That studies of other countries that have employed similar policies reach analogous conclusions should be reassuring. See, for example, Cardenas and Barrera (1995) on Colombia. More generally, Calvo and Reinhart (1999) find in a 15-country panel, including Chile, that the presence of capital controls is significantly associated with a lower share of portfolio plus short-term capital flows as a percentage of total flows. That they do not find the same when they look at portfolio flows alone suggests that the impact on short-term flows is doing most of the work.

8. See Group of Twenty-Two 1998a,b,c.

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# Index

Page numbers in *italic type* indicate figures and tables.