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Volume Title: Financial Deregulation and Integration in East Asia, NBER-EASE Volume 5

Volume Author/Editor: Takatoshi Ito and Anne O. Krueger, Editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-38671-6

Volume URL: [http://www.nber.org/books/ito\\_96-1](http://www.nber.org/books/ito_96-1)

Conference Date: June 15, 1994

Publication Date: January 1996

Chapter Title: Credible Liberalizations and International Capital Flows: The ~~â€œ~~Overborrowing Syndrome~~â€~~

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Chapter URL: <http://www.nber.org/chapters/c8557>

Chapter pages in book: (p. 7 - 50)

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# 1            Credible Liberalizations and International Capital Flows: The “Overborrowing Syndrome”

Ronald I. McKinnon and Huw Pill

When undertaking reform and stabilization programs, countries are prone to excessive foreign borrowing that ultimately proves unsustainable. This paper outlines a model in which short-run deviations from sustainable behavior are caused by financial market failure. Because banks fail as efficient information conduits between depositors and borrowers, excessively optimistic expectations about the success of the reform are created among domestic residents, international investors, and the policy authorities. Initially, improved economic performance and large inflows of foreign capital justify such optimism. Only later do the sustainability conditions bind so that the economy collapses into a recession, financial crisis, and capital flight.

Recent events in Mexico have again highlighted the vulnerability to the “overborrowing syndrome” of economies undertaking liberalization programs (McKinnon 1993, chap. 10). Financial stabilization and real economic reform with NAFTA membership in prospect stimulated vast inflows of short-term capital—“hot money”—into Mexico in the late 1980s and early 1990s. Such inflows caused a dramatic collapse in domestic private saving (see table 1.1) and generated an ultimately unsustainable credit-driven consumption boom that finally collapsed into forced devaluation and financial crisis in December 1994. The implications of this episode for the real economy are not yet apparent. They are unlikely to be positive.

Unfortunately, this phenomenon is not unique. Examples abound across geographical and temporal dimensions. Memories of the Latin American debt crises of the early 1980s are still reasonably fresh, the most prominent cases occurring in the Southern Cone nations—Chile (see table 1.2), Argentina, and Uruguay. Moreover, the history of South America during the last two centuries is punctuated by episodes of excessive borrowing followed by financial crisis

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**Table 1.1** Savings and the Current Account in Mexico, 1989–93  
(% of GDP, except where stated)

	Average of Three Prior Years	Year Prior to Episode	Inflow Episode			
			Year 1	Year 2	Year 3	Year 4
Real GDP growth (%)	-0.3	1.2	3.3	4.4	3.6	2.6
Savings	21.1	21.6	21.5	22.4	21.8	21.9
Public sector	3.8	0.4	3.2	7.4	6.6	7.3
Private sector	15.1	17.8	15.5	11.2	10	7.7
Current account	-0.5	-2.2	-3	-3.2	-4.7	-7.1

Source: Schadler et al. (1993).

**Table 1.2** Chile's Overborrowing Experience, 1978–82 (% of GDP)

	1978	1979	1980	1981	1982
Investment	16.5	19.6	23.9	23.9	9.6
Consumption	72.4	71.1	70.5	76.2	76.1
Budget deficit	0.8	-1.7	-3.1	-1.6	2.4
Current account deficit	7.7	5.7	7.2	14.6	9.4
GDP growth (% per annum)	8.2	8.3	7.8	5.5	-14.1

Source: Dornbusch (1985).

and default. Writing in 1937, the Royal Institute of International Affairs concluded that “the history of investment in South America throughout the last century has been one of confidence followed by disillusionment, of borrowing cycles followed by widespread defaults” (Dornbusch 1985).

The Southern Cone experiences—especially the Chilean episode in 1978–82—have become textbook classics (Edwards and Edwards 1987; Bosworth, Dornbusch, and Labán 1994). Well-engineered supply-side fiscal and trade reforms undertaken after 1973 had, by 1978, generated enthusiastic expectations about lower inflation and increased future income. Facing enormous inflows of foreign financial capital during 1978–81, however, Chile's foreign exchange and banking systems failed to cope adequately with the problem of disinflating. By 1982–83, exchange overvaluation triggered widespread bankruptcy in heavily indebted industry and agriculture causing a severe downturn in national product. In addition to devaluing the currency under pressure from capital flight, the government was forced to reintervene in the banking system to payoff both foreign and domestic depositors.

Many other liberalizing economies have suffered similar episodes of boom-time “overborrowing”—with the domestic banking system being the principal intermediary between foreign lenders (depositors) and domestic borrowers—followed by financial crisis and bust. Uruguay and Argentina paralleled Chile in the late 1970s. Examples are not confined to Latin America. Turkey and Sri Lanka suffered in the early 1980s. In December 1993, the International Mone-

tary Fund (IMF) published *Recent Experiences with Surges in International Capital Flows* (Schadler et al. 1993). This paper outlined several more recent episodes of overborrowing, including Egypt beginning in 1991–92 and Thailand in 1988, as well as Chile (in 1990, following recovery from its earlier debacle), Colombia, and Mexico (for summary data of these episodes, see table 1.3). An updated list might include India, Malaysia, Estonia, and Argentina in the 1990s. Even subsequently successful East Asian “tigers” have not been immune to such problems. After successful structural and financial reforms in 1964–65, Korea overborrowed in the late 1960s, lost domestic monetary control, and rekindled inflation (McKinnon 1973). A second and ultimately successful stabilization program was required in the early 1980s to restore Korea’s financial stability.

Even mature industrialized economies are vulnerable. In Britain, the Thatcher government undertook apparently successful industrial restructuring and fiscal consolidation during the early 1980s. However, attempts to disinflate by exchange rate stabilization, beginning with Chancellor Lawson’s famous “shadowing of the Deutsche Mark,” touched off a credit-led consumption and property market boom in 1988–89 associated with large inflows of foreign capital through the British banking system. After a crash in asset values and a downturn in Britain’s economy in 1990–91, capital flight forced sterling devaluation in 1992—with Britain leaving the European Exchange Rate Mechanism. Similar cycles have been observed in Spain (another of the Schadler et al. [1993] examples), Sweden (Berg 1994), and the antipodes (Fischer and Reisen 1993; Lattimore 1994). Several authors analyzed the European cases in terms of the “Walters critique” (Walters 1986, 1990; Giavazzi and Spaventa 1990) by highlighting the problems of exchange rate management per se rather than by recognizing the magnitude of the international capital flows themselves as a problem—an omission corrected by Pill (1993). Australia and New

**Table 1.3** Recent Capital Flows in Selected Countries (billion dollars; % of GDP in parentheses)

Country (Year of Episode)	Average of Three Prior Years	Inflow Episode			
		Year 1	Year 2	Year 3	Year 4
Chile (1990)	1 (4.5)	3 (10.6)	1.1 (3.5)	3.1 (8.1)	–
Colombia (1991)	0.4 (0.9)	2 (4.8)	1.3 (2.7)	–	–
Mexico (1989)	–0.4 (–0.2)	4.9 (2.4)	11 (4.6)	20.8 (7.4)	24.7 (7.6)
Spain (1987)	–1.8 (–1.1)	10.9 (3.8)	9.2 (2.7)	14.6 (3.8)	14.5 (3.1)
Thailand (1988)	1.4 (3.3)	3.1 (5.2)	6.7 (9.7)	9.3 (11.4)	11.8 (12.6)

Source: Schadler et al. (1993).

Zealand suffered from overborrowing in the absence of explicit exchange rate pegs, suggesting the problem is broader than the existing exchange management literature has assumed.

This paper investigates the macroeconomic forces driving the overborrowing phenomenon, highlighting the interactions among successful real-side reform, flows of international financial capital, and possible market failure in the domestic banking and financial system as it is liberalized. Why have some countries embarking on otherwise apparently well-designed stabilization programs suffered from the overborrowing syndrome? How did the successful East Asian economies (Japan, Taiwan, and Singapore in the 1960s) avoid such problems? What lessons do such episodes have for liberalizing economies in East Asia and elsewhere? What policy implications come from a systematic analysis of the problem?

Most previous analyses of the overborrowing phenomenon have focused on the credibility of the reform program (Mussa 1986; Calvo 1987; Daveri 1991). A belief that the elimination of trade restrictions on consumer imports is merely temporary may provoke an unsustainable consumption spending spree, fueled by excessive borrowing, as domestic residents exploit the “window of opportunity” presented by the relaxation of controls. Such excessive borrowing will include borrowing from abroad if the capital account of the balance of payments is left open. This “lack of credibility” hypothesis *may* be consistent with the Chilean data from the late 1970s, which shows heavy spending on consumer durables combined with a sharp fall in private saving.

However, overborrowing has typically financed increased expenditure on nontraded goods; this would not be precluded by the reimposition of trade restrictions in the aftermath of a policy reversal. Moreover, in many cases, the industries most dramatically affected by the “boom-bust” cycle were construction and real estate—the quintessential nontradable sectors. Empirical work reported in a recent IMF study (Reinhart and Végh 1993) uses simulation methods to suggest that—for plausible parameter values—the magnitude of the capital inflows during overborrowing episodes is too great to be explained by this lack-of-credibility or “temporariness” hypothesis. Moreover, the most prominent explanations of the European Walters critique variant of the overborrowing phenomenon (Miller and Sutherland 1991; King 1990, 1994) have attributed a decisive role to excess, rather than insufficient, credibility—the complete opposite of the explanation used for developing nations.

In the light of such research and observation, this paper focuses on credible reform and stabilization programs. In many cases, when they were introduced the policies adopted by reformist governments appeared highly credible to individuals and firms in the countries in question. Observers seemed genuinely enthusiastic about the reforms’ chances of success, generating optimistic expectations of future income. In the extensive documentation on Chile in 1978–82, a number of prominent Chilean economists have highlighted the prevailing mood of “triumphalism” about the success of the reform program (e.g.,

Schmidt-Hebbel 1987). Political speeches from that period (although hardly objective) are laced with the same sentiments:

[Chile] in ten years will be a developed nation . . . where 70% of the population have colour TVs. (Labor Minister Jose Piñera, 1980; reported in Conley and Maloney 1995)

The economy is growing in such a way that in eleven years income per capita will double in contrast to past circumstances where this would only have been achieved after forty-six years. (Economy Minister Sergio de Castro, 1980; reported in Conley and Maloney 1995)

The reaction of the international capital markets and consequent rapid growth of capital inflows were themselves seen as further evidence of the success of the reforms. The way in which capital inflows feed off themselves in a self-sustaining cycle is central to our analysis of overborrowing. This feature is probably even more apparent in more recent cases, especially in Mexico, given the susceptibility of fund managers and other participants in the international capital markets to “emerging markets’ mania.”

Therefore, for analytical purposes, we start with the premise that real-side reform—such as trade liberalization, utility privatization, or domestic deregulation—is fully credible in the eyes of the private sector. Reforms raise the potential productivity of new investment above the levels attainable before the reform. To take advantage of these new opportunities to increase disposable income in the future, at least some economic participants must undertake discrete new investments that are large relative to their initial endowments. If the returns to such investment are certain in real terms, it is easy to design a financial system to intermediate funds between borrowers and lenders. In the absence of risk, domestic money and foreign exchange become a “veil”—the whole analysis can be collapsed into a simple two-period Fisherian model of intertemporal consumption and investment. The simple geometry of this framework, both when the capital account is open and when it is closed, is developed below. As intuition would lead one to expect, welfare is unambiguously raised when it is possible to borrow abroad at a fixed world interest rate. This relaxes credit constraints, allowing firms to undertake new investment and households to smooth consumption. Nevertheless, the effect of reform on domestic saving remains an interesting issue.

If the payoff to investing in new technology is uncertain, how financial intermediaries evaluate risk becomes important. Instead of a pure model of real borrowing and lending à la Fisher, the precise character of the monetary, credit, and foreign exchange regimes must eventually be specified. However, a simple extension of the Fisherian model, focusing on the nature of the domestic financial system, is proposed below and offers a limited approach to analyzing some of these problems.

One remarkable feature of the consumption booms associated with overborrowing episodes is the surprise their existence and magnitude aroused.

Conventional macroeconomic theory (as embodied, e.g., in large-scale macroeconomic models) failed to forecast—and subsequently has failed to explain—either the nature of the initial consumption boom or the depth and length of the subsequent recession (for a discussion of the British experience, see Church, Smith, and Wallis 1994). This failure has prompted considerable research into the role of financial systems in the macroeconomy (Gertler and Gilchrist 1992; Kashyap, Stein, and Wilcox 1993). A growing associated macroeconomic literature suggests that banks are “special” in some economically important sense (Bernanke and Blinder 1988). In developing nations (and, to a lesser extent, in industrialized economies), they dominate domestic borrowing and lending, especially to small firms and households. Moreover, they are often the major conduit for short-term (“hot”) money flows through the foreign exchanges.

As yet, this finance and macroeconomic research has had little impact on our understanding of the episodes discussed in this paper (for an exception, see Pill 1993). This paper uses a variant of the Fisherian framework (first introduced by McKinnon 1973). Because of a discontinuity in the production technology, the financial system and supply of credit play an important role in determining real economic outcomes. This allows us to address the role of the domestic financial system during overborrowing episodes.

Because the liabilities of commercial banks are monies or near monies, deposits—both foreign and domestic—may be guaranteed by the authorities in an attempt to preserve the integrity of the payments system. This will give private monetary institutions (commercial banks) a strong comparative advantage as financial intermediaries. The very fact of (often implicit) deposit insurance (which allows depositors to believe they will be bailed out if the reform goes awry) implies that lenders might excessively discount the lower tail of possible outcomes of the real-side reforms from the point of view of the economy as a whole. Unless otherwise restricted, domestic private saving could fall too far, and foreign indebtedness build up too much, in response to a real-side reform that increases expected future income *and its variance*.

### 1.1 Some Stylized Facts

Although we do not claim that these are universally associated with overborrowing problems, recent surveys of the macroeconomic consequences of large capital inflows on recipient countries (Schadler et al. 1993; Fischer and Reisen 1993) agree that the main distinguishing features of an overborrowing episode include:

- *Rapid growth of domestic credit*, largely financed out of capital inflows intermediated through the domestic banking system, leading to higher levels of domestic consumption
- *Widening of any current account deficit* on the balance of payments, as

greater availability of financing from abroad eases the external constraint

- *Weaker domestic monetary control* and rising or sustained *high domestic price inflation*, typically associated with problems in attempting to sterilize the capital inflows
- *Appreciation of the real exchange rate*, appropriately defined, with higher inflation concentrated in the nontradable goods sector; prices of domestic assets, especially real estate or house prices, typically increase
- A large proportion of the capital inflow in the form of *overseas deposits placed with the domestic banking system*, increasing pressure on the government to broaden the base of insured deposits
- *Greater vulnerability* to adverse shocks and increased likelihood that the stabilization program will be derailed and thrown into reverse
- *Culmination in a financial crisis, capital flight, and recession*, often forcing an uncontrolled, deep devaluation of the currency, with a resurgence of inflation

A recurrent theme of the Schadler et al. (1993) paper is the correlation of fiscal consolidation with the capital inflow surge (see table 1.4). One would generally expect independent implementation of such policies to reduce inflows of capital as the total public borrowing requirement falls and less public debt is sold abroad. Instead, fiscal consolidation apparently acts as a signal to international investors that the overall reform program is credible—as if the government was indeed getting the order of economic liberalization “right” (McKinnon 1982, 1993). As such, it is a stimulus to the capital inflows we discuss below. Pill (1993) discusses why fiscal consolidation may be a necessary precondition for large capital inflows to occur.

Note that under the temporariness hypothesis, it is hard to understand why an improvement in the public finances is a precondition for overborrowing. Often, one associates fiscal deficits with government borrowing abroad. Instead, fiscal consolidation would seem to signal the commitment of the policy authorities and thus add to the credibility of the reform program, rather than suggest that it will be abandoned in the future. This further justifies our focus on credible policy programs.

## 1.2 The Simple Fisherian Two-Period Model

The simple structural framework presented in this section extends the Fisherian two-period model of intertemporal investment and consumption introduced by McKinnon (1973), as refined by Krugman (1979). The central feature of this model is the existence of two potential production technologies—a “traditional” production process,  $f(\cdot)$ , which exhibits decreasing returns to scale over all possible levels of production, and a “modern” production technology,  $g(\cdot)$ , which has increasing returns over some range but requires a large initial



**Table 1.4** Fiscal Policy during a Capital Inflow Episode  
(government surplus as % of GDP)

Country (Year of Episode)	Average of Three Prior Years	Year Prior to Episode	Inflow Episode			
			Year 1	Year 2	Year 3	Year 4
Chile (1990)	2.8	5.3	3.8	2.3	3.2	–
Colombia (1991)	–1.5	–0.6	–0.2	–0.4	–	–
Egypt (1991)	–16	–17.2	–5	–	–	–
Mexico (1989)						
Operational balance	–1.4	–4.5	–1.7	2.6	2.3	3.3
Primary balance	4.4	6	8.1	7.8	5.5	5.6
Spain (1987)	–6.2	–6	–3.1	–3.3	–2.8	–4
Thailand (1988)	–4.2	–1.6	1.3	4.1	4.7	3.9

Source: Schadler et al. (1993).

fixed investment,  $F$ . The former mode of production has existed for a long time so that no major start-up investments are required. In contrast, adopting the postreform technology does require major investment or reequipment decisions. Although the new technology is potentially more productive, access to credit is required to overcome the indivisibility in the production process implied by the start-up cost. Credit plays an important role in the determination of real output by overcoming technological indivisibilities.

The economy consists of a large number ( $N$ ) of identical, risk-neutral firm-households. These are free to choose between adopting the new technology or retaining traditional manufacturing methods. They maximize utility—represented by a utility function  $U(c_1, c_2)$ —with respect to the available production techniques and an initial endowment ( $m$ ), taking prices (the real interest rate,  $r$ ) as given. We assume a single composite commodity good that is freely traded with the rest of the world. In this context, it is plausible to believe that the utility function of all firm-households is homothetic over consumption in each period. Because all firm-households are identical and have the same opportunity set, in equilibrium they must all achieve the same level of utility.

Initially, we assume a world of perfect certainty. In this world, the role of the financial system is passive—complications introduced by the detailed institutional structure of the financial mechanism can safely be ignored. Although credit plays an important role in the solution to the model by overcoming indivisibilities in investment, the way credit is intermediated is initially of little importance. Later, uncertainty is introduced into the model, and the structure of the financial system then plays a central role.

Exploiting the simple Fisherian two-period framework generates two significant practical advantages. First, the solution to the model can be illustrated by straightforward geometry, relegating the detailed algebraic solution to an appendix. Second, the optimization problem facing firm-households can be conveniently split into two parts: an investment decision, maximizing firm wealth (value) subject to technological constraints and the real interest rate,

and a consumption decision, maximizing utility for given wealth and the same real interest rate.

The government undertakes a reform of the real economy. Typically, a liberalization of the current account of the balance of payments, with the abolition of tariffs and other trade restrictions, is the starting point. Other potential reforms include privatization, deregulation, and domestic structural reforms, such as weakening of trade union powers through labor legislation. Measures of this type are common to all the liberalization and stabilization programs discussed in the introduction to the paper. These reforms are modeled analytically as follows. Prior to liberalization, all firm-households were constrained to use the traditional production technique,  $f(\cdot)$  in figure 1.1. The reform allows access to the “modern” technology described above,<sup>1</sup> as represented by  $g(\cdot)$  in figure 1.1.

Should this structural reform be undertaken in the presence of administrative controls on the cross-border movement of financial capital? If so, what form should these controls take? Drawing on earlier work (Pill 1993), we initially characterize two polar states for the economy: the *domestically liberalized economy* (DLE) and the *internationally liberalized economy* (ILE). In the former, inflows of international capital are not permitted and all domestic investment must be financed out of domestic saving. In the latter, domestic residents are free to borrow as they wish from a perfectly elastic pool of international capital at a constant world interest rate ( $r^*$ ).

The subsequent sections solve our simple intertemporal model in these two environments using a geometric approach. A formal algebraic derivation is presented in appendix A. A useful benchmark for comparison is the prereform equilibrium, which, following McKinnon (1973), we call the *financially repressed economy* (FRE). If all firm-households are confined to the same traditional technology, no capital market will exist. Because preferences and endowments are identical (by assumption), all households will make the same consumption and production decisions; if one wishes to borrow, they all would and there would be no supply of savings to lend. Thus households maximize utility with respect to the production opportunity set defined by the traditional technology, with production equal to consumption in each period. Both production and consumption occur at  $Q^{\text{FRE}} = C^{\text{FRE}}$  in figure 1.1.

### 1.3 Domestically Liberalized Economy

In order to exploit the new technological possibilities introduced by the reform process, however, suppose now that firm-households may borrow in the first period to cover the initial fixed investment while maintaining positive con-

1. This is consistent with the large endogenous growth literature (e.g., Romer 1990), which formally demonstrates Adam Smith’s proposition that “specialization is limited by the size of the market.” Once access to the large (possibly perfectly elastic) world market is attained, entrepreneurs can invest in modern techniques rather than the “small-scale” traditional modes of production.

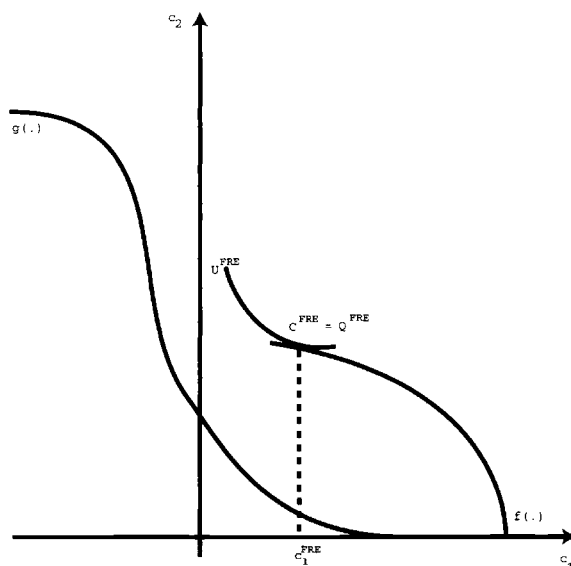


Fig. 1.1 Financially repressed economy

sumption. Financial intermediaries are able to raise funds from those domestic firms that continue to employ traditional production techniques and can thus extend credit to other firms that wish to make discrete investments in the modern, postreform technology.

Two conditions must be satisfied in equilibrium. First, because all firm-households are identical, they must achieve the same utility level (Krugman 1979). All households must have the same consumption opportunity set, as defined by their intertemporal budget constraint. The constraint is defined by a line tangent to the production function, with slope reflecting the real interest rate (see fig. 1.2). With firm-households confined to using one or other of the production technologies, the budget constraint must simultaneously be tangent to both production functions. Therefore, the slope of the constraint—and thus the equilibrium real interest rate,  $r^{\text{DLE}}$ —is entirely determined by technological factors: the gap in average productivity between the postreform investment technology and the traditional one.

With the real interest rate determined in this manner, firm-households continuing to use the traditional technology will choose to produce at point  $Q_T^{\text{DLE}}$ , where real income is maximized. They consume at point  $C^{\text{DLE}}$ . This implies consumption  $c_1^{\text{DLE}}$  out of production income  $x_T^{\text{DLE}}$ , the difference being saved as deposits with the banking system. In effect, the higher postreform interest rate induces these firm-households to invest less in the traditional technology in order to support lending in the capital market.

Firm-households exploiting the modern, postreform technology also con-

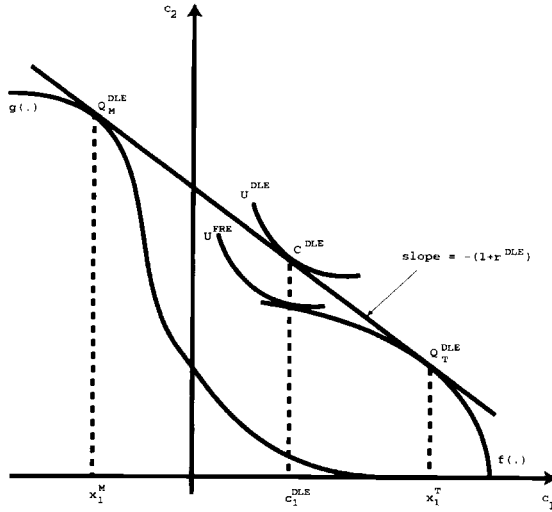


Fig. 1.2 Domestically liberalized economy

sume at  $C^{DLE}$ —the identical consumption profiles imply a common level of utility. However, their intertemporal income-maximizing production decision involves producing at  $Q_M^{DLE}$ , implying a potentially negative cash flow (endowment less consumption and real investment) in the first period ( $x_1^M$ ). Therefore, firm-households employing the modern technology must borrow  $c_1^{DLE} - x_1^M$  in the first period from the domestic banking system.

Second, the credit market must clear. As we have seen, the real interest rate is technologically determined and thus cannot vary to clear the market. Only changes in the proportion of firm-households that continue with the traditional technology (and thus save) and the proportion that adopt the modern technique (and thus borrow) can be the equilibrating mechanism. Therefore, the credit-market-clearing condition,  $N_M(c_1^{DLE} - x_1^M) = N_T(x_1^T - c_1^{DLE})$ , will determine how many firm-households adopt the modern technology ( $N_M$ ) and how many continue to use traditional techniques ( $N_T$ ).

Since income and substitution effects counteract each other, the relationship between first-period consumption in the DLE and that which would obtain in the absence of trade reform is unclear. In figure 1.2, first-period consumption in the DLE is arbitrarily drawn to be identical to that in the FRE; slight changes in the nature of technology or preferences could move the DLE consumption equilibrium in either direction. However, consumption in the second period will be much higher in the DLE because of the higher productivity of the new technology. With indivisibilities in the postreform technology, one cannot draw unambiguous conclusions about the behavior of current savings when liberalization occurs. This contrasts with the conclusion reached by Conley and Maloney (1995), who showed that, in the absence of technological indivisibilities,

reform would necessarily lower current domestic saving. Nevertheless, over the two periods, the reform produces an unambiguous improvement in welfare as the opportunity set expands in the DLE.

#### 1.4 Internationally Liberalized Economy

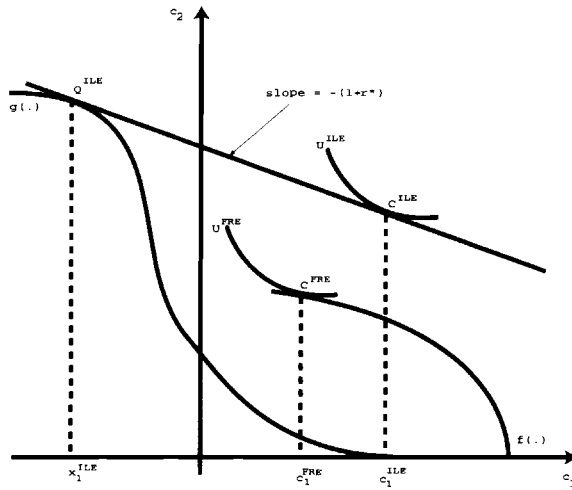
Once restrictions on the capital account of the balance of payments have been abolished, domestic residents are able to borrow freely from the perfectly elastic international capital market. In equilibrium, the domestic real interest rate must equal the exogenous world real interest rate ( $r^*$  in fig. 1.3). This is the meaningful definition of perfect capital market integration (Frankel 1992). Using foreign savings intermediated through the domestic financial system, *all* domestic firm-households now choose to borrow so as to adopt the modern production process, producing at  $Q^{ILE}$ , where intertemporal real income is maximized (see fig. 1.3). Not only does welfare improve relative to that obtainable prior to the initiation of the real-side reform, but it is unambiguously greater than that attainable in the DLE—where capital controls constrain the expansion of the consumption opportunity set even as trade is liberalized (this is an issue to which we return later; it is illustrated in fig. 1.6).

In the ILE, consumption occurs at  $C^{ILE}$ . Even starting with a very low or “repressed” implicit deposit rate in the prereform era at  $C^{FRE}$ , figure 1.3 shows that consumption in the first period,  $c_1^{ILE}$ , becomes higher because of the dominant income effect. Current saving falls relative to that in the prereform era.<sup>2</sup> Given the higher permanent income available to them following the successful implementation of structural real reform, domestic residents borrow from the perfectly elastic capital market in order to smooth their consumption. Moreover, current savings in the ILE are unambiguously lower than in the DLE equilibrium (again because substitution and income effects reinforce each other).

The counterpart of the capital inflow needed to finance domestic borrowing is a current account deficit,  $CA = -N(c_1^{ILE} - x_1^{ILE})$  in figure 1.3. The country consumes more than it has produced in the first period. Sustainability of the balance of payments in this certain world is guaranteed by the subsequent trade surplus in the second period,  $N(x_2^{ILE} - c_2^{ILE})$ —the investment in modern technology pays off in the second period, allowing future production to exceed consumption.

In a world of complete certainty, the advantage of liberalizing the capital account of the balance of payments prior to, or concurrently with, the implementation of a real-side reform is clear. A fall in domestic saving in response to a trade reform is likely to be intertemporally optimal. Households should

2. Even if, in the repressed state, the domestic interest rate had (accidentally) been at the international level, the income effect of economic reform would still dominate: current consumption would still increase.



**Fig. 1.3 Internationally liberalized economy**

consume more in the first period in order to smooth their intertemporal consumption path given a higher level of permanent income.

In contrast, in the DLE—where all investment is domestically financed—any incipient fall in saving drives up real interest rates and “crowds out” some new investment, while limiting current consumption. However, in the ILE, the fall in domestic saving is met by inflows of international capital that can maintain the new higher level of investment. Extensive borrowing from the rest of the world is the optimal solution—overborrowing cannot arise.

### 1.5 Introducing Uncertainty and an Explicit Financial System

In order to introduce the possibility of overborrowing, we now relax the assumption of perfect certainty. This immediately introduces an active role for the domestic financial system. We first describe how uncertainty is modeled within our Fisherian analytical framework and then describe the institutional nature of the financial system.

Uncertainty is introduced by making the productivity of the modern production technique a random variable (the modern technology production function becomes  $g'(\cdot) = (a + \varepsilon)g(\cdot)$ , where  $a$  and  $\varepsilon$  are orthogonal). The variability of  $a$  represents macroeconomic risk—the uncertainty about how successful the implementation of real-side reform will be. It is assumed that the number of firm-households is sufficiently large and their experience is sufficiently diverse that any firm-specific idiosyncratic risk  $\varepsilon$  can be eliminated by efficient risk management of the banks' asset portfolio. Firm-specific risk is ignored in what follows. The banking system faces only irreducible “market” or macroeconomic risk. The productivity of the traditional production process remains certain.

The domestic capital market is viewed as synonymous with indigenous deposit-taking commercial banks. The implications of relaxing this assumption are discussed below. Subsequently, we show that, in the presence of certain common market interventions by the authorities, the banks may enjoy a comparative advantage that allows them to dominate alternative financial intermediaries. The preeminent role of the banking system as a conduit for hot money flows—one of the stylized facts of overborrowing episodes noted above—is thus endogenous to our framework.

Uncertainty is resolved in two stages. At the beginning of the first period, a value  $\hat{a}$ —representing privileged prior knowledge about the productivity shock—is drawn from a probability distribution,  $H_1(\hat{a})$ . The outcome of this drawing is known to the banks, but all other economic actors in this economy—the government, the domestic firm-households, and overseas investors—only know the distribution function from which it is drawn. At the beginning of the second period, the value of  $a$ —the productivity shock itself—is realized. This information is common knowledge. The final realization of  $a$  is drawn from a distribution  $H_2(a)$  with mean  $\hat{a}$ .

This framework gives the banks an informational advantage. They have extra information about the likely final realization of  $a$  when consumption and investment decisions are being made. This informational advantage is a simple formalization of the notion that “banks are special,” an idea that is prominent in recent macroeconomic literature (Bernanke and Blinder 1988; Kashyap et al. 1993) and in earlier work in finance and development (Shaw 1973; McKinnon 1973). The other participants in this economy rely on the banking system to convey implicitly the relevant information about the magnitude of  $\hat{a}$ —the mean of the distribution—through the credit conditions and real interest rates they choose to offer to the market.

With a large number of atomistic firm-households and international investors, no individual has an incentive to incur the costs of assessing macroeconomic risks, since these costs would not be faced by competing firms. Competitors would gain a cost advantage. Moreover, the variance of market or macroeconomic risk may be small compared to the variance of firm-specific risk for any individual firm. Firm-households have a greater incentive to monitor idiosyncratic risk than do banks, which (given efficient portfolio management of their balance sheet) only face macroeconomic risk. The efficient solution requires the competitive banking system to undertake the assessment of macroeconomic risks and each individual firm-household to concentrate on firm-specific or local risks, inferring the macroeconomic information for their investment and consumption decisions from the resulting market credit conditions and interest rates.

The role of the banking system is central to this discussion. However, if banks are “well behaved”—in the sense that they act as efficient conduits of financial flows from savers to borrowers—the solutions to our simple analytical model are identical to those discussed in the case of certainty for both the

DLE and ILE (at least *ex ante*) in figures 1.2 and 1.3, respectively. In each case, the outcome will be efficient given the information available at the beginning of the first period (including the private information of the banking system). Moreover, the ILE outcome Pareto dominates the DLE outcome—*ex ante*, it remains preferable to implement the structural reform program without controls on international capital flows.<sup>3</sup> This is the sense in which a well-behaved financial system simply operates as a veil behind which efficient real economic decisions are being made.

Of course, *ex post* the outcome may not be efficient. Indeed, for some realizations, it is possible that the DLE outcome may Pareto dominate the ILE outcome. Domestic residents may have borrowed more than would have been desirable given the eventual realization of  $a$ . However, with the informational structure of the model as we have assumed, it is not possible to intervene to prevent these outcomes. The government would require better knowledge of the effects of the implementation of the structural reform program—and our model does not have this form. As Conley and Maloney (1995) demonstrate, to provide a rationale for government intervention and the maintenance of capital controls, the authorities must have risk preferences different from those of the risk-neutral domestic residents. While there are plausible political economy justifications of this structure, it does not sit easily with the assumption of identical firm-households (which permits use of representative agent analysis) and our implicit assumption that the government acts in the interests of its constituents. To say simply that the government is “more risk averse” masks what the underlying problems might be.

Accounting for downside risk that is intrinsic to the reform process offers a reasonable explanation of countries’ reluctance to simultaneously and fully liberalize all markets including the capital account. However, for this rationale to be fully convincing, it is necessary to explain why the private sector is unable to account for the riskiness of the reform program itself. We set about trying to explain why the private sector proves unable to solve this risk management problem. Our explanation centers on market failure in the financial system. Market failure interacts with the special informational role of the banking system to generate an environment of excessively optimistic private sector expectations. In contrast, the policy authorities make their economically important decisions before this environment is created and ought to be less susceptible to “bootstrap” effects that allow excessive optimism to feed on itself, leading to overborrowing. Unfortunately, short-term political considerations may foster triumphalist private sector expectations rather than restrain them. This offers a role for external monitors—international organizations such as the IMF—in pressuring governments to avoid excessive capital inflows.

3. A sufficient, but not necessary, condition for this result is our earlier assumption that all firm-households are risk neutral.



## 1.6 Deposit Insurance and Financial Market Failure

We have shown that, even in the presence of uncertainty, it is optimal to implement real structural reforms in the absence of administrative controls on the cross-border movement of international capital, provided the domestic banks are well behaved. However, market failure and poor risk management in banking systems are common phenomena, especially when the banking system is exposed to novel forms and magnitudes of risk by the ongoing process of domestic economic liberalization and financial innovation. The nature and magnitude of the capital inflows themselves might further aggravate the problem.

To understand how capital inflows affect the solvency of banks, let us briefly describe how they change the risks faced by the banking sector. When large inflows of foreign financial capital enter the newly liberalized domestic banking system, risk is likely to multiply rapidly. We can categorize the risks in the following manner:

- *Credit risk*—exposure to the failure of a borrower to repay a loan—will increase as bank lending rises. A sudden increase in the availability of loanable funds through capital inflows may encourage greater investment in risky prospects such as lending to real estate or securities market participants.
- *Foreign exchange exposure* is dramatically increased if the inflows are foreign currency denominated while the banks enjoy a comparative advantage (informational or otherwise) in domestic lending in local currency. Lack of experience and the absence of derivatives markets may make managing such risks more problematic in less-developed countries (LDCs) than in developed nations.
- *Real exchange rate risk* rises because the profitability of traded goods industries is lowered as more capital flows in.
- *Settlement risk* rises if the payments system is incapable of dealing with the magnitude or direction of cross-border settlements.
- *Liquidity risk* will rise if the size of the capital inflows is large relative to that of domestic securities markets. If banks attempt to invest the inflows in domestic markets (say real estate) they may simply bid up the price of housing, helping to create bubbles in real estate and equity prices and inducing destabilizing “herding” or “fad” behavior among market participants (Shiller 1991).
- Risks arise from the *supervisory and regulatory framework*: regulators face larger and different challenges in assessing the risks borne by the institutions they supervise when capital inflows are considerable and the risks described above multiply. For example, regulations may be inappropriate for the new policy regime: banks may not identify prob-

lem assets, thus making it impossible to measure the quality of their portfolios.

- All of the above effects can lead to greater *systemic risk*: the chances of contagion between different banks will rise as credit, liquidity, and settlement risks rise.

Here, we focus on the interaction between regulatory failure and the role of (possibly implicit) government-backed deposit insurance schemes. In order to preserve the integrity of the payments system, the monetary authorities may feel compelled to offer a public guarantee of banks' deposit liabilities. As has been well documented in the finance and development literature (reviewed in World Bank 1990), this is likely to introduce moral hazard into the banking system's behavior. This is but one of many potential examples of market failure.

When the government insures deposits against adverse macroeconomic outcomes, it alters how the banking system views the risks associated with making loans. Therefore, the banks' behavior changes as they exploit the authorities' guarantee—this is the essence of the moral hazard problem (McKinnon 1993, chap. 7). In our simple analytical framework, this process can be formalized as follows. The banks know the magnitude of  $\hat{a}$  and thus the distribution from which the ultimate realization of  $a$  will be drawn. However, because of deposit insurance, the banks' depositors are protected from outcomes in the lower tail of this distribution. Banks therefore base their lending and interest rate decisions on the value  $\hat{a}'$ , the mean of this truncated distribution, rather than  $\hat{a}$ , the mean of the true underlying distribution of  $a$ .

Necessarily,  $\hat{a}'$  is greater than  $\hat{a}$ . The banking system therefore behaves as if their private knowledge suggested better future economic performance following the liberalization process than is actually likely given the true realization of  $\hat{a}$  (these ideas are formalized in appendix B). The consequences of this market failure depend on the capital account regime.

In the DLE, the effect is to raise the domestic interest rate (see fig. 1.4). Using the same approach as outlined above, a well-behaved financial system would set a market real interest rate  $r^E$ , based on the expected productivity shock realization  $\hat{a}$ . Recall that real interest rates are entirely determined by technological factors in the DLE. If the banking system suffers from moral hazard induced by deposit insurance, they will base their behavior on a productivity shock  $\hat{a}'$  rather than  $\hat{a}$ . The implicit signal offered by credit conditions will be that the likely outcome of the liberalization process is more favorable. Therefore, more of the firm-households will wish to adopt the modern technology, in the belief that it will be highly productive. However, this will induce excess demand for credit that can only be met by raising the real interest rate until it is once again tangent to both the traditional technology schedule and that associated with modern technology under the realization  $\hat{a}'$ —that is, a higher real interest rate  $r^E$ . In equilibrium, the amount of borrowing undertaken

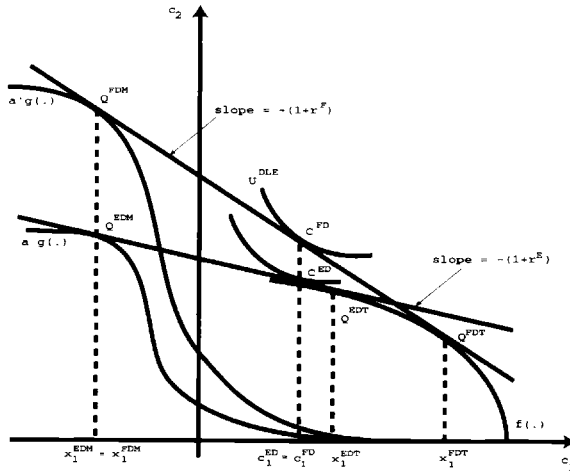


Fig. 1.4 Market failure in the DLE

may be higher or lower than if the financial system were well behaved. There is no guarantee that overborrowing will occur. While first-period surplus output beyond internal investment for those firm-households that continue to employ the traditional (denoted T) production technique ( $x_1^{FDT}$ , where F denotes market failure in the financial system and D denotes the DLE) will necessarily be higher than would be the case with an efficient (denoted E) banking system ( $x_1^{EDT}$ ), first-period consumption ( $c_1^{FD}$  and  $c_1^{ED}$  in the market failure and efficient cases, respectively) and investment in the modern (denoted M) technology (determined by  $x_1^{FDM}$  and  $x_1^{EDM}$  in the two cases) could be higher or lower. The effect on the savings rate and aggregate borrowing of market failure in the DLE is therefore ambiguous.<sup>4</sup> Financial market failure is reflected in higher financial yields; the effects on financial quantities—specifically credit aggregates—are uncertain.

In the ILE, the interest rate  $r^*$  is determined in the perfectly elastic international capital market. It cannot rise as in the DLE and therefore cannot be indicative of market failure in the financial system. Instead, moral hazard in the banking system manifests itself through excessive capital inflows (see fig. 1.5). The excessively optimistic reporting of prospective productivity gains by the banking system (i.e., the erroneous indication, implicitly signaled through credit conditions, that the expected productivity shock is  $\hat{a}'$  rather than  $\hat{a}$ ) encourages domestic residents to invest more heavily in the new technology than

4. In fig. 1.4, we draw the knife-edge case where  $x_1^{FDM} = x_1^{EDM}$  and  $c_1^{FD} = c_1^{ED}$ ; consumption and investment in the new technology are unchanged. Different assumptions about the relative magnitude of the offsetting income and substitution effects could result in higher or lower levels for either consumption or investment.

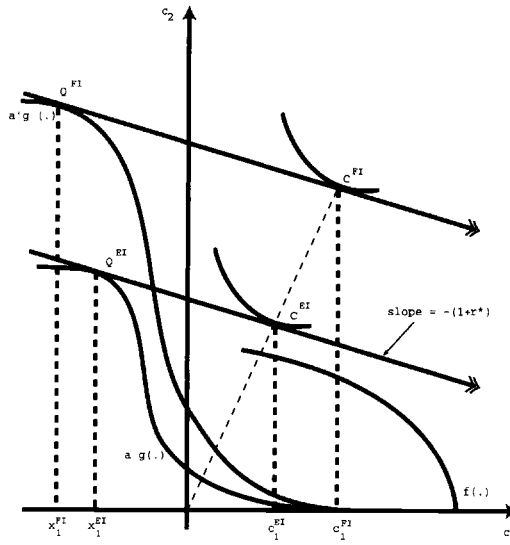


Fig. 1.5 Market failure in the ILE: the overborrowing syndrome

is appropriate for the actual expected productivity realization (at  $Q^{FI}$  rather than  $Q^{EI}$ , where I denotes the ILE). Moreover, domestic residents will overconsume in the first period (at  $c_1^{FI}$  instead of  $c_1^{EI}$ ) in anticipation of higher future incomes than are likely to emerge. Both overconsumption and overinvestment are financed in part by excessive borrowing from the rest of the world, beyond that which would maximize welfare ex ante in the absence of market failure. With financial failure, aggregate borrowing by the liberalizing economy  $N(c_1^{FI} - x_1^{FI})$  is unambiguously greater than the desired level of aggregate borrowing when the financial system is well behaved, namely,  $N(c_1^{EI} - x_1^{EI})$ . This is the essence of the overborrowing syndrome.

### 1.7 Rational Beliefs and Rational Expectations

Note that, in the first period, the behavior of the economy with a well-functioning capital market (figs. 1.2 and 1.3) is identical to that of an economy with a poorly functioning financial system and a lower realization of  $\hat{a}$  (known only to the banks) (figs. 1.4 and 1.5). Ex ante, for either the DLE or the ILE, these two situations are observationally equivalent. It is precisely this feature of the model that allows us to capture a phenomenon we believe is central to understanding overborrowing episodes.

The “deep” productivity parameters in this model are not directly observable ex ante. Participants in the economy have to base their decisions on imperfect information inferred from the behavior of the economy as a whole and specifically—given the special role of the banking system as a gatherer of, and

conduit for, information concerning macroeconomic risks—the state of domestic credit conditions. However, as mentioned above, there are two possible models of the economy that are consistent with the same values for all observables in the first period. If participants wrongly attribute the initial boom to a favorable realization of  $\hat{a}$  when in fact it is due to market failure in the financial system, overborrowing can arise. While such behavior turns out to have been inefficient ex post, there is nothing irrational about the private decisions being made ex ante. It is not irrational to be wrong if one could not detect one's error on the basis of observable information. The most plausible explanation of how this could arise comes from uncertainty about the authorities' information set. If the authorities have the same information set as the banks, they ought to be able to supervise and regulate the financial system so as to prevent market failure. The nonbank domestic private sector, overseas investors, and even other policymakers may trust that regulation of the banking system is sufficient to ensure a well-behaved financial system. When policy credibility—including the credibility of bank regulation—is high, overoptimism can emerge because nonbank private actors believe the financial system is well regulated and thus well behaved, when in practice it may not be (see the discussion of bank regulation in the next section).

The rational expectations paradigm cannot deal with a multiplicity of potential models that are indistinguishable ex ante. Central to the rational expectations approach to economic theorizing is the existence of a common structural model of the economy that all participants share. This structure is believed to be correct in an *objective* sense. Our framework does not correspond to this view. We find it useful to draw on the concept of “rational beliefs,” introduced by Kurz (1990). He proposed a wider notion that both encompasses and extends that of rational expectations. The rational beliefs approach permits individuals to hold different views about the structure of the economy, provided the models implicit in these views are not refutable by observed or observable data. This structure allows the economy to deviate from “sustainable” paths in the short run—which could last for an extended period—until observed data demonstrate that the structural model implying this ex post unsustainable behavior was incorrect. This approach has been applied to U.S. stock market data (Kurz 1993). We believe it is even more applicable in the current context.

The rational beliefs structure closely resembles our view of how overborrowing emerges. Ex ante, domestic firm-households believe the real economic reform program is credible and the financial system is well behaved; this is their Bayesian prior. Consequently, they will respond to the signals offered by the domestic financial system through real interest rates and credit conditions. Their confidence in the success of the reform program will be bolstered by the economic “boom” observed in the first period. Indeed, their prior beliefs are apparently confirmed by the performance of the economy (and the associated vast inflows of capital that occur in the ILE case). This is true whether or not the financial system is genuinely well behaved. It is precisely this initial im-

provement in economic performance that engenders the triumphalist assessment of the reform process that we identified in the introduction to this paper. Triumphalism itself breeds even greater confidence in the liberalization program—the process creates a self-sustaining momentum of its own.

Only when the true realization of the productivity shock is observed in the second period will the alternative models be distinguishable to the nonbank sectors. In some—unfortunately rare—cases, the triumphalist beliefs are borne out.<sup>5</sup> More frequently, they prove unfounded. It is financial market failure that has been driving domestic credit expansion rather than genuine improvements in structural economic performance. Ex post, domestic residents have overborrowed and participants in the international capital market have overlent. However, ex ante, there was nothing irrational about such decisions. They were justified on the basis of the model participants in the economy had in mind when the decisions were being made, a model that was consistent with and could not be falsified by observed data.

Our previous work (Pill 1993) using macroeconomic modeling techniques similar to those proposed in the British context by Muellbauer and Murphy (1990)—which would be dismissed by many as ad hoc theorizing devoid of microeconomic foundations—has been criticized for failing to take into account the sustainability conditions implied by forward-looking agents. Once we move to the rational beliefs approach outlined above, economic behavior is entirely consistent with sustainability and forward-looking formation of expectations *under the model of the economy the market participants themselves implicitly believe*. This model turns out to be incorrect, but this was not apparent ex ante when investment and consumption decisions were made because the model held by participants and the “true” (bank market failure) model were *observationally equivalent*.<sup>6</sup>

This framework therefore captures the intuition we discussed in the opening of this paper. Rather than being associated with lack of credibility of the reform program, overborrowing arises when domestic residents become excessively optimistic about the economy’s prospects following the implementation of reform. These optimistic expectations are generated by market failure of some form—in our case, that induced in the banking system by deposit insurance—but the existence of such failures is obscured until it is too late for their effects to be accounted for. Consumption and investment decisions have already been made, and overborrowing has occurred—this is likely to ultimately prove highly costly to correct.

5. This implicitly makes an assumption about the distribution  $H_2(\cdot)$ , namely, that it is symmetric and concentrated close to the mean. Of course, it is possible that ex ante excessive borrowing will turn out to be justified ex post by an unexpectedly favorable realization of the productivity shock.

6. Even if foreign depositors realized the potential for financial market failure and the likelihood that banks will misrepresent  $\hat{a}$ , they still have little incentive to impose market discipline on the banks by removing their deposits while they believe the deposit insurance scheme will bail them out.

Our earlier macroeconomic models (e.g., Pill 1993) ignore the long-run sustainability issues raised by intertemporal choices. This has been criticized as ad hoc. Once we move to a rational beliefs framework, such criticism rings hollow. The behavior described by our macroeconomic models need not ignore the transversality conditions imposed by intertemporal optimization problems. It is simply that the agents are using what ultimately turns out to be the wrong economic model. Their behavioral decisions may be consistent with long-run sustainability constraints in the context of the implicit economic model they believe. Unfortunately, this model proves to be a poor description of the true underlying economic structure because it does not encompass market failures in the banking system. Clearly, further work is required to marry the macroeconomic modeling more closely to the microfoundations offered by the rational beliefs framework.

## 1.8 Policy Responses to Overborrowing

What are the appropriate policy responses to overborrowing of this form? Before returning to the simple structural model outlined above, it is illuminating to draw some parallels with Keynes's policy prescriptions for the Depression. Central to Keynes's explanation of the Depression (Keynes 1936) was the self-sustaining nature of low private sector economic confidence and real activity. If the private sector's "animal spirits" were negative, economic activity was discouraged. But the lack of economic activity merely reinforced the negative sentiment. Keynes argued that a government-led economic stimulus could break the self-sustaining vicious circle of low confidence and low activity.

The overborrowing syndrome has similar features. The triumphalist animal spirits associated with the initiation of economic reform stimulate economic activity that, in turn, reinforces optimism about the liberalization program, which seems to be generating immediate tangible rewards. Rather than to stimulate real activity as in the Keynesian case, government intervention may be required to restrain positive animal spirits and the self-sustaining excesses of the initial boom phase of the reform program.

In describing the appropriate policy response to potential overborrowing, one should respect the informational constraints on the authorities imposed by the information structure of the model. Specifically, the government is unaware of the realization of  $\hat{a}$ , the privileged information obtained by the banking system. Uncertainty about whether the authorities know this privileged information is a cause of the potential for observationally equivalent equilibria described above.

The most straightforward policy response—and the first-best solution—would be to eliminate the market failure in the banking system altogether. As we saw above, the nonbank sectors could then rely on the financial system to offer correct signals about real macroeconomic shocks and an ex ante efficient outcome would result. If the government withdrew its guarantee of bank de-

posits, there would be no moral hazard for the banks to exploit. In principle, the banking system would then behave efficiently and give the correct information signals to the market as a whole. Unfortunately, the effects of such a policy are unlikely to be so positive. The authorities face a time consistency problem. *Ex ante*, it is clearly in their interest to disavow any responsibility for bank deposits in the hope of imposing the correct market discipline on the banking system. However, *ex post*—in the event of financial crisis—the government and central bank will be compelled to bail out at least the core of the financial system in order to protect the integrity of the payments and settlement system and maintain at least the semblance of international confidence. Banks are special, not because they are financial intermediaries, but because they are custodians of the monetary system. The banks will realize this at the outset and thus behave as if there is deposit insurance because of the authorities *de facto* or implicit deposit insurance scheme. The government's rejection of deposit insurance is unlikely to be credible.<sup>7</sup>

If deposit insurance (whether explicit or implicit) is *de facto* almost inevitable, one could attempt to limit its effects by creating of a small number of "narrow banks" to form the core of the payments system. These would be more heavily regulated and restricted than the generality of peripheral banks that, in principle, would be allowed to fail in the event of financial crisis since their collapse would not threaten the integrity of the settlement system.<sup>8</sup> However, it is probably more difficult to "ring fence" the payments system than this simple outline describes. Contagion and systemic risk are likely to breach the rather artificial distinction between core "narrow" banks and peripheral banks. It is likely the government would be faced with the same time consistency issue as described above.

One solution to the moral hazard problem would be to regulate the banks sufficiently closely that they could not exploit the consequent creation of moral hazard. In our framework, if the authorities have the necessary information, regulation will be perfect and overborrowing cannot arise. If the authorities lack the privileged information, their attempts at regulation may be misguided. It is precisely the confidence of the nonbank private sector in the efficiency of banking supervision and regulation that leads domestic firm-households to hold Bayesian priors that the financial system is well behaved. Of course, even when the authorities have imperfect knowledge of macroeconomic shocks, there is considerable scope for improvement in bank regulation, especially in

7. This phenomenon was demonstrated in the seminal Chilean example. Initially the authorities pursued a "free banking" policy, with no intervention in the financial or banking system and no explicit deposit insurance scheme. However, it is apparent that market failure in the banking sector was endemic by 1982 as banks exploited the moral hazard generated by the inevitable implicit deposit insurance.

8. This is a possible characterization of the U.K. system in which the "Big Four" retail, clearing banks (plus the main Scottish banks and possibly a couple of others) are simply "too big to fail." Although their designation as "narrow banks" is unofficial, they act in concert with the Bank of England to avoid large commercial risks.



LDCs, where existing systems are generally primitive. However, as suggested above, the very fact of large capital inflows is itself likely to undermine the regulatory system since it will increase the magnitude of intermediation to be assessed and introduce new forms of risk (such as exchange risk, risks arising from cross-national differences in legal systems, or cross-border settlement risk). Improvements in bank regulation are desirable but are unlikely to be a completely effective policy response to potential overborrowing.

Conley and Maloney (1995) have investigated whether the optimal policy response to potential overborrowing is to open the capital account of the balance of payments and allow international financial capital unfettered access to domestic financial institutions or to keep the capital account completely closed. This prejudices the issue of whether it is appropriate to consider only polar extremes—perfect capital mobility (the pure ILE) and complete absence of cross-border capital flows (the pure DLE). Where trade-offs exist, economics generally suggests interior solutions are optimal.

We have already shown that, should the banking system be well behaved, the market solution is efficient and there is no scope for policy intervention. The optimal policy is to allow unrestricted cross-border movement of capital; a polar solution is first-best. However, the authorities do not know *ex ante* whether the banking system is well behaved or suffers from market failure. Nevertheless, if they did, simply communicating the information to the private sector (both domestic residents and potential foreign investors) would solve the problem of itself. It is central to our rational beliefs framework that the two situations are indistinguishable *ex ante* both to the nonbank private sector and to the policy authorities.

This is a strict interpretation of the rational beliefs equilibrium. Using a weaker solution concept—which might be called a “pseudorational beliefs” equilibrium—one could envisage such an announcement being insufficient to correct the problem. Depositors, both domestic and foreign, would be protected by deposit insurance and would have no incentive to withdraw their savings from the banking system. Similarly, on the asset side of the banks’ balance sheet, adverse selection from the macroeconomic risk could imply continued excessive borrowing for high-risk projects (McKinnon 1993, chap. 7). However, the problem of adverse selection is beyond the scope of the simple model presented in this paper.

Remember that the authorities are forced to choose a capital account regime before any of the uncertainty in our model is resolved. That is, they cannot infer from the banks’ lending and interest rate decisions whether (given the government’s knowledge of  $H(\hat{a})$ ) it is more likely that there is market failure in the banking system or that there will be a good outcome for the probability shock. The banks’ choice of credit supply will depend on the choice of capital regime; one has already been chosen before any information can be inferred. Although the information available to the nonbank private sector and the policy authorities is identical at any point in time, the two groups make their economi-

cally important decisions in different information environments. The nonbank private sector makes its consumption and investment decisions taking the macroeconomic environment—most importantly, credit conditions—as given. It is precisely this timing that allows triumphalist sentiment about the reform program to be generated and the problems of overborrowing to emerge. There are spillovers or externalities between private sector agents—the optimism of one firm-household helps to generate macroeconomic conditions which foster optimism among others—that are mutually reinforcing.

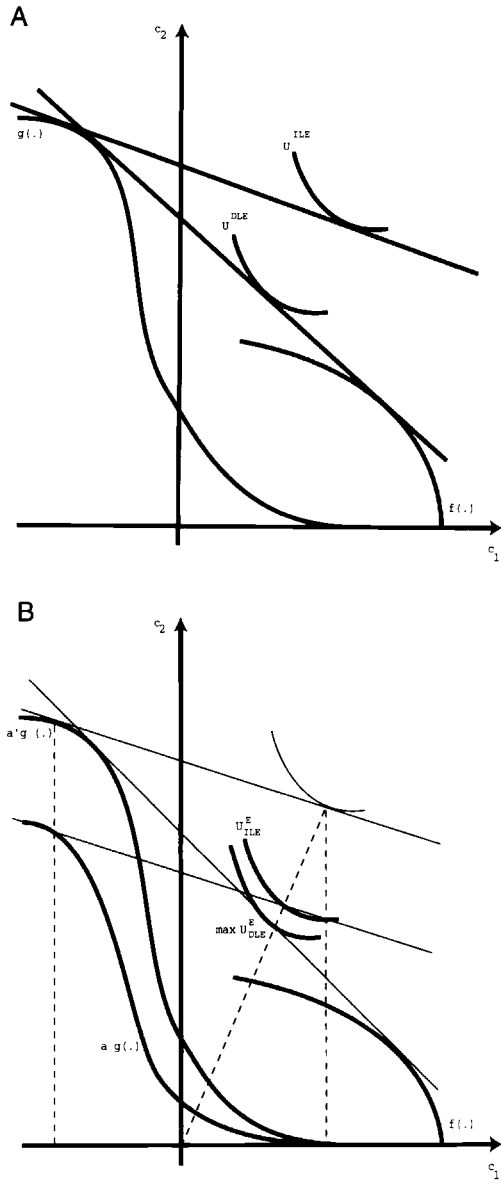
In contrast, the government's decision about policy regime is taken before macroeconomic conditions are observed; indeed, determination of the latter depends vitally on the former. Rather than taking macroeconomic conditions as given, the authorities ought to be aware of their ability to affect them. Moreover, the authorities should not prove susceptible to the spillover effects generated through optimistic expectations. As already noted, to the extent that they are absorbed in triumphalist euphoria, external monitors such as the IMF should step in to calm the excessive optimism and maintain macroeconomic stability.

The government's choice of welfare-maximizing capital account regime is therefore based on a productivity shock given by the expected value of  $\hat{a}$ , which we denote  $\bar{a}$ . Moreover, the authorities should entertain the possibility that market failure may occur in the financial system. Those countries that have suffered most extensively from overborrowing problems have either assumed away such problems (as in the Chilean "free banking" experiment during 1978–82) or have been complacent about the omniscience or ability of their bank regulators (as in the United Kingdom in the late 1980s).

McKinnon (1973, 1993) has argued that deposits held by foreign residents at domestic banks should be subject to the same level of reserve requirements as domestic deposits. Note that non-interest-bearing reserve requirements are an implicit tax on financial intermediation. In the absence of such requirements, there is a bias toward capital inflows that, as we have seen, can prove destabilizing.

In our framework, the international capital market is perfectly elastic. The public finance literature suggests that the burden of the tax—although nominally a reserve requirement on deposits—will fall entirely on borrowers, who are all domestic residents. Foreign depositors require a market rate of return, and therefore the reserve requirement tax on them must be zero. Moreover, a natural extension of Pigovian taxation theory would suggest that the implicit reserve requirement tax could be larger than that applied to domestic deposits to account for the macroeconomic externalities introduced by the instability caused by overborrowing.

Our model supports these conclusions. It may well be preferable to have no capital controls rather than to have completely exclusionary capital controls because, *ex ante*, the ILE solution is likely to Pareto dominate the DLE solution whether the financial system is well behaved or not (see figs. 1.6A and



**Fig. 1.6 (A) Welfare comparison in absence of market failure; (B) Welfare comparison with market failure**

1.6*B*). The former is straightforward to interpret; the latter requires more explanation (see appendix C). Problems arise because those firm-households that continue to use the traditional technology in the market failure DLE will attain a different welfare level from those that adopt the modern technology. This may prevent Pareto comparisons with the ILE when there is financial market failure. As figure 1.6*B* is drawn here, the expected utility of firm-households in the ILE exceeds the maximum attainable utility of any firm-household in the DLE. Therefore, ex ante, the ILE Pareto dominates the DLE. The potential for overborrowing to occur does not justify the imposition of controls completely excluding the inflow of foreign capital.

Nevertheless, ex ante, an interior solution with limited capital controls will Pareto dominate both polar outcomes. If one could impose different requirements on borrowing intended for investment purposes and on borrowing for consumption purposes, then the Pigovian tax reserve requirements could replicate the first-best outcome achieved in the absence of market failure (provided the tax revenue could be costlessly redistributed to all domestic firm-households in a nondistortionary way; i.e., lump-sum transfers are possible) (see fig. 1.7). As figure 1.7 is drawn here, a higher reserve requirement is needed on borrowing for consumption. This arises from the implicit assumptions about the nature of technology and preferences embodied in the way we have drawn the production function and indifference curves. The representation used here corresponds to our earlier discussion of the stylized facts of overborrowing episodes. These facts suggested that the problem manifests itself largely through excessive consumption rather than excessive investment. While this does not necessarily imply a higher reserve requirement on consumer borrowing,<sup>9</sup> intuition would suggest such an outcome is likely.

By imposing an implicit tax on foreign deposits, in the form of a reserve requirement, the effective real interest rate for domestic borrowers is raised; the budget constraints have slope  $tt$  for investment and  $t't'$  for consumption. In the market failure model, this will reduce both first-period investment and first-period consumption toward their optimal levels (from  $x_1^{FI}$  toward  $x_1^{EI}$  and from  $c_1^{FI}$  toward  $c_1^{EI}$ , respectively). Such a policy will reduce the extent of overborrowing and improve ex ante welfare for all firm-households. As noted above, with differential reserve requirements for investment and consumption borrowing and lump-sum transfers, an ex ante first-best solution can be obtained, even in the presence of financial market failure. Unfortunately, achieving this result imposes very strong information requirements on the government that are difficult to attain.

Obviously, in the well-behaved banking sector model, such reserve require-

9. Since the world real interest rate is exogenous in our model, it is income, rather than substitution, effects that will determine the relative magnitude of overborrowing for consumption and investment purposes. In contrast, the magnitude of the optimal reserve requirement will be determined solely by substitution effects because, with lump-sum transfers, expected real income is unchanged.

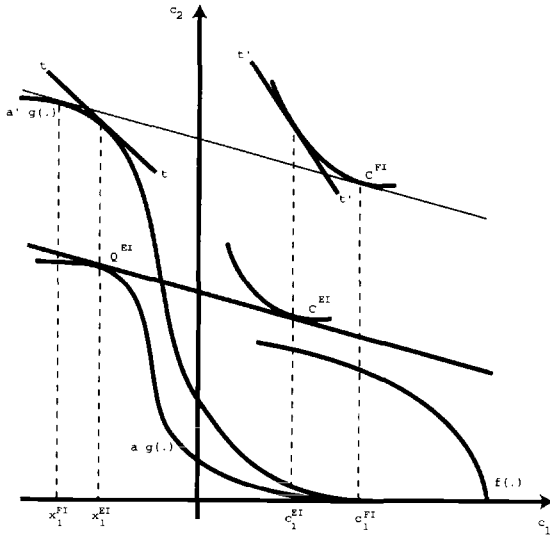


Fig. 1.7 Policy responses to overborrowing

ments introduce an inefficient distortion. However, since the government internalizes the potentially large macroeconomic costs of overborrowing and subsequent financial crisis in a way that private individual firm-households do not, the policy authorities may view the imposition of such controls as welfare improving ex ante. Even for relatively small probabilities that the financial market failure model is objectively true, the potential costs of financial crisis following an overborrowing episode are large enough to justify a small efficiency loss should the financial system turn out to be well behaved.

The public finance literature generally assumes a second-best world, in which lump-sum transfers cannot be made and the redistribution of tax revenue is costly in terms of efficiency. Moreover, it would be difficult to enforce differential reserve requirements for consumption and investment lending. There would be incentives for the private sector to organize between the two markets for borrowing and to extract supernormal rents. In a plausible, practical setting, only much blunter policy tools are available. A single reserve requirement (except in pathological cases) will not be able to precisely replicate the first-best solution, although the outcome will still Pareto dominate the polar extremes.<sup>10</sup> If the marginal rate of intertemporal substitution is greater than the marginal rate of intertemporal transformation over the relevant ranges, then additional controls on consumption borrowing, beyond the reserve requirement tax on investment borrowing, may be justified.

10. Strictly, it will always dominate the perfect capital mobility pole that, in turn, almost always dominates the zero capital mobility pole.

## 1.9 Conclusions: Policy Implications

How should policymakers respond to the possibility of overborrowing in the course of an otherwise successful liberalization program? Improved banking regulation with higher capital and reserve requirements could help. However, such measures are unlikely to prove fully effective, given the banking industry's inherently asymmetric information structure. The authorities may wish to impose other financial controls to limit the potential for damage should overborrowing arise. Controls on cross-border movements of financial capital are one appropriate tool. This summary of policy options draws on the experience of East Asian countries that have successfully liberalized.

- *Restrain short-term capital flows*, particularly those intermediated through the domestic banking system (as in Japan in the 1950s and 1960s). The preferred policy instrument is probably reserve requirements rather than direct administrative controls. These level the playing field between domestic and foreign sources of funds and are harder to evade. Marginal reserve requirements could be increased if capital controls become unduly large.
- *Be more liberal with "direct" investment*, perhaps in the form of joint ventures with domestic partners. Direct investment brings new technology into the economy and by-passes the banking system—thus avoiding the market failure problems discussed above.
- *Limit organized consumer borrowing*—say on bank credit cards—and *restrict access to mortgage finance* (as in Japan and Taiwan through the 1970s). Such measures should help to prevent the runaway excess demand for consumer durables and nontraded services that may reignite domestic price inflation.
- *Consolidate compulsory social security contributions into a Singapore-style provident fund*. A fully funded compulsory saving program—geared to preventing the dramatic falls in private saving seen during overborrowing episodes—should be considered earlier rather than later in the liberalization process.

After its overborrowing debacle in the late 1970s through 1981, all of these measures were subsequently introduced into Chile during the 1980s. During Chile's successful recovery in the 1990s, these measures have helped to sustain domestic saving and prevent exchange rate overvaluation when pressure from capital inflows—now largely incipient—again become very great.

The example of several successful East Asian economies in avoiding the overborrowing problem during their liberalization programs in the 1960s and 1970s suggests the policy conclusions of our analysis are appropriate in the context of stabilization and liberalization policies currently being introduced in Latin America, India, Egypt, and elsewhere.

## Appendix A

To algebraically solve for the DLE outcomes, we can exploit two of the main advantages of the Fisherian two-period framework, namely, that the real interest rate is purely technologically determined and that investment and consumption decisions are separable. In order to find the equilibrium real interest rate, we solve for firm investment decisions as a function of the interest rate.

Firms maximize the present value of their net worth (a measure of firm value or wealth) taking the real interest rate as given. For those firms adopting the modern technology,

$$(A1) \quad \max_i W = \left[ \frac{g(i)}{1+r} \right] - (i - m),$$

where  $W$  is wealth,  $i$  is investment inclusive of fixed costs, and  $m$  is the initial endowment. The resulting first-order condition, where  $i_M$  is optimal investment in the modern technique, is

$$(A2) \quad g(i_M) = 1 + r.$$

Equating the marginal rate of transformation to the gross real interest rate, we can solve this implicit function for investment as a function of the interest rate, substitute it back into the production function for modern technology, and differentiate to find the marginal rate of transformation as a function of the interest rate:

$$(A3) \quad \text{MRT}_M(r) = g'(i_M(r)).$$

Repeating this analysis for the traditional technology results in an expression for the marginal rate of transformation in the original production process. The equilibrium condition requires the marginal rate of transformation to be equated across production techniques. We therefore have an equation that can be solved for the equilibrium DLE real interest rate:

$$(A4) \quad \text{MRT}_M(r) = \text{MRT}_T(r) \Rightarrow r_{\text{DLE}}.$$

Substituting the equilibrium real interest rate and the implied level of investment in the original maximized expression, we find wealth. Consumption decisions are now made, maximizing utility for given wealth and real interest rate. The problem gives the equilibrium levels of consumption,  $c_1$  and  $c_2$  (which are common to all households regardless of which production techniques they use):

$$(A5) \quad \max_{c_1, c_2} U(c_1, c_2) \quad \text{subject to} \quad c_1 + \frac{c_2}{1+r} \leq W.$$

These consumption and investment levels define the equilibrium level of borrowing (by the firms that adopt modern technology) and financial saving

(by those which retain the original production technique). Market clearing in the credit market is described by the following expression, which also pins down the proportion of firm-households that choose either the traditional technique (T) or the modern technique (M):

$$(A6) \quad N_M[(i_M + c_1) - m] = N_T[m - (c_1 + i_T)],$$

$$N = N_T + N_M.$$

In the ILE, the real interest rate is determined by the perfectly elastic international capital market. As we have seen, with the world real rate lower than the DLE equilibrium rate, all domestic residents adopt the modern technology. The solution procedure is then straightforward: simply substitute the world rate,  $r^*$ , into the expressions for investment (A3), wealth (A1), and consumption (A5) for the modern production technique firms derived above.

## Appendix B

In this appendix, we present a simple formal model of deposit-insurance-induced market failure in the banking system. For the purposes of the exposition in the main text, all we require is that banks discount outcomes in the lower tail of the probability distribution. This would appear to be an implication of any plausible formalization of moral hazard caused by government guarantees of the banks' deposit liabilities.

However, to pursue a more formal analysis, we aim to endogenize the results of the market failure. Specifically, we attempt to encompass how changes induced in bank behavior by the existence of deposit insurance alter the choices made by the nonbank private sector. In principle, this can affect the welfare ranking of potential capital account regimes.

The point is essentially as follows. Deposit insurance encourages banks to ease credit conditions. The domestic nonbank private sector reacts to such easing by increasing the amount it borrows to invest and consume. The higher gearing this implies makes bankruptcy more likely, and thus increases the potential worth of the deposit insurance scheme to the banking system.

As this discussion suggests, we have a simultaneous system that has to be solved to find the relevant market failure distortion. In the main text, we assumed that the market failure results in banks' using a realization of the distribution for the probability shock  $\hat{a}'$ , when the true realization is  $\hat{a}$ . These two are related as follows:  $\hat{a}'$  is the expected value of  $a'$ , where  $a'$  is defined as:

$$(B1) \quad a' = a \quad \text{if } a \in (\bar{a}, \infty)$$

$$a' = \bar{a} \quad \text{if } a \in (-\infty, \bar{a}),$$



and  $\bar{a}$  is the true realization of  $a$  at which the average private sector firm (i.e., the firm with idiosyncratic shock  $\varepsilon = 0$ ) will go bankrupt.

Whether a firm-household goes bankrupt depends on the amount of borrowing it does in the first period. This, in turn, is related to the signals offered by the banking system about the success of the reform program through the market credit conditions. The private sector—if it believes the banking system is well behaved—will choose to invest according to the schedules derived in appendix A. The argument presented here applies only to the ILE; this is the simpler case, because real interest rates are exogenously determined. Similar intuition applies to the DLE, but the derivation is harder because one has to account for the effect of market failure on the equilibrium interest rate, which also affects consumption, investment, and borrowing decisions.

We showed in appendix A that in the ILE, investment will be determined by equating the marginal rate of transformation to the real interest rate. We now augment this expression to include the expected value of the stochastic productivity shock, where this expectation is flawed because of the market failure (denoted by F) in the banking system.

$$(B2) \quad \hat{a}' g'(i) = 1 + r^* \Rightarrow i_{MF} = i_{MF}(\hat{a}').$$

This investment decision will imply an expected level of wealth, which itself is an argument of the consumption function derived from utility maximization. This implies that borrowing,  $b$ , is a function of  $\hat{a}'$  for two reasons: first, it increases the borrowing undertaken for investment since the returns available seem greater, and second, it raises consumption borrowing since higher returns imply higher wealth:

$$(B3) \quad b(\hat{a}') = m - [i(\hat{a}') + c_1(\hat{a}')].$$

The firm household will go bankrupt if, after paying off its creditors out of its period-two output, there is no residual for consumption. Therefore,  $\bar{a}$  is defined as follows:

$$(B4) \quad \bar{a}g(i(\hat{a}')) - (1 + r^*)b(\hat{a}') = 0.$$

This gives  $\bar{a}$  as a function of  $\hat{a}'$  and therefore allows us to find the simultaneous solution of equations (B4) and (B2).

## Appendix C

This appendix briefly describes how to interpret figure 1.6B, which offers an ex ante welfare comparison of the DLE and ILE when there is market failure in the financial system. Figure 1.6A has already clearly demonstrated that, in the absence of such market failure, the ILE is Pareto superior to the DLE.

Therefore, if the ILE also welfare dominates the DLE when market failure exists, then policymakers should undertake their liberalization and real reform programs even if appropriate controls on capital inflows cannot be secured.

As discussed in the main text, if banks are subject to market failure they will set credit conditions such that the nonbank private sector assumes the expected productivity shock will be  $\hat{a}'$ , rather than its true magnitude  $\hat{a}$ . As shown in figure 1.4, in the DLE this implies consumption at  $C^{\text{FD}}$  and production either at  $Q^{\text{FDT}}$  (for the firm-households continuing to use the traditional technology) or at  $Q^{\text{FDM}}$  (for those adopting the modern technology). Similarly, figure 1.5 shows consumption at  $C^{\text{FI}}$  and production at  $Q^{\text{FI}}$  (for *all* firm-households) in the ILE.

What implications does this have for welfare analysis? As external observers, we know that the true magnitude of the expected productivity shock is  $\hat{a}$ ; therefore, we should base our ex ante analysis on this productivity level.

Consider first the DLE. A complication arises here because there are two groups of firm-households (one continuing to use the traditional technology, the other exploiting the postreform production process) that achieve different levels of utility. Although (as we showed in the main text) there is no presumption that consumption or investment in the modern technology will be too high or too low with financial market failure in the DLE, because the equilibrium real interest rate is higher than would be the case if the banking system were efficient, borrowers will have to pay more interest and are thus worse off. In contrast, depositors with the banking system—that is, those firm-households continuing to employ the traditional technology—enjoy higher interest payments, guaranteed by the deposit insurance scheme. They will actually be better off than if there were no market failure. In figure 1.6*B*, we simply draw the utility level achieved by the depositors; this is the maximum utility attainable by a firm-household in the DLE market failure equilibrium ( $\max U_{\text{DLE}}^{\text{E}}$ ).

Now consider the ILE. First-period consumption and investment decisions by the nonbank private sector are based on the expected productivity shock  $\hat{a}'$ . These are irreversible when the realization of the true value of  $a$  is apparent. For the actual magnitude of the expected productivity shock  $\hat{a}$ , the intertemporal budget constraint will be represented by the lower line. This has slope  $-(1 + r^*)$  and goes through the “true” expected production function at  $x_1^{\text{FI}}$  (note that this is *not* a point of tangency since firms are maximizing with respect to the *anticipated* productivity shock  $\hat{a}'$  rather than the “true” expected productivity shock  $\hat{a}$ ). With consumption in the first period already determined at  $c_1^{\text{FI}}$ , this implies an expected welfare level  $U_{\text{ILE}}^{\text{E}}$  (again, the indifference curve is *not* tangent to the budget constraint because consumption decisions are being made in anticipation of the better productivity shock rather than the true expected productivity shock).

Figure 1.6*B* has  $U_{\text{ILE}}^{\text{E}} > \max U_{\text{DLE}}^{\text{E}}$ . The expected utility in the market failure ILE is greater than the maximum attainable utility in the market failure DLE.

With our simplifying assumption of risk neutrality, this is sufficient to establish that the ILE Pareto dominates the DLE in the presence of financial market failure as well as when the banking system is efficient. (Obviously, such an assumption is not necessary. Modest levels of risk aversion would not materially affect the result.) In this case, the ILE welfare dominates the DLE unambiguously. If the authorities are forced to adopt a polar capital account regime, one with no impediments to the cross-border movement of international capital is preferable.

This result depends on how the diagram is drawn; one could envisage cases (with different preferences, technologies, or world real interest rates) in which  $U_{ILE}^E < \max U_{DLE}^E$ . Clearly, this is insufficient to reverse the policy implication. Even if the depositors in the DLE (those firm-households continuing to employ the traditional technology) are better off than would be the case in the ILE, there remain those firm-households that have adopted the modern, postreform production process. The latter group are necessarily worse off in the market failure DLE than they would be in the market failure ILE. In such a case, the two capital account regimes are simply not Pareto rankable.

Simply because there is potential market failure in the financial system, one cannot conclude that it is preferable to implement the liberalization and reform program while excluding foreign capital. The benefits arising from consumption smoothing may dominate the costs of overborrowing. However, as shown in the main text, partial capital controls can help mitigate the latter problem while not ruling out exploitation of the benefits of the former.

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## Comment Francisco de Asis Nadal De Simone

McKinnon and Pill's paper presents a model that tries to capture what is referred to as the "overborrowing" syndrome that follows macroeconomic stabilization and real-side reform. This syndrome comprises an inflow of "excessive" foreign capital that produces an excess of domestic demand, inflation in nontradables, loss of monetary control, and, finally, the likely reversal of the reform process.

If reforms are credible, if there is certainty and perfect information, and if contracts can be enforced easily, the structure of the financial system is neutral even without capital account restrictions. Overborrowing does not arise. If those assumptions do not hold, however, the overborrowing syndrome appears because the financial system is no longer neutral: banks are "special." Banks are unique because of institutional features, such as deposit insurance schemes, that induce market participants to take relatively higher risks. This fact together with the credit rationing that results from less than perfect information are the sources of excessive capital inflows. As those capital inflows endanger the reform process, some restrictions on credit expansion must be put in place and some capital controls must remain.

The paper, therefore, produces a conceptual framework for analyzing the overborrowing syndrome in the context of a small open economy that has undertaken a disinflation program using the exchange rate as nominal anchor, together with a successful liberalization of current account transactions. Cases both without and with free capital mobility are considered. However, it is the combination of disinflation with free capital flows that most interests us because this is the policy mix that leads to overborrowing.

The paper focuses on credible reform and stabilization programs. I shall deal with four issues: (1) empirical regularities observed in disinflation programs, (2) reasons why the explanation of the capital inflows cannot be dissociated from the credibility issue, (3) reasons why banks, if truly "special," deserve a more explicit modeling than undertaken in the paper, and (4) features that a model trying to explain the boom-bust or the bust-boom cycle should have.

### Empirical Regularities

Countries using either exchange-rate-based (EB) anchors or money-based (MB) anchors have experienced a slow convergence of the inflation rate to the

devaluation rate, or to the rate of growth of the relevant money aggregate. As a result, they have experienced an appreciation of the real exchange rate—in many cases, quite substantial.

However, the choice of the nominal anchor seems to matter for the path of economic activity. EB programs have been observed to produce an initial rise in consumption and in real activity followed by a contraction; the reverse is true of MB programs. Most important for our concern here, however, is the behavior of the external accounts and the real interest rate.

Under EB programs, the current account has always deteriorated as suggested in the paper. The real interest rate fell in the “tablita” program of the late 1970s in Argentina, in the Austral plan in Argentina (1985), in the Cruzado plan in Brazil (1986), and in the Israeli plan (1985), all programs based on an exchange rate anchor. The interest rate has risen, however, in the heterodox programs of the mid-1980s.

In MB programs, the current account has not shown a clear pattern and, if anything, has seemed to show some short-run improvement. The interest rate has tended to rise sharply. This was the case in Chile in 1975 and in Argentina and Brazil in 1990, for example.

### **Credibility of the Reform and Stabilization Programs**

The paper discards too quickly, I believe, the role of credibility. I was surprised to see that Reinhart and Végh’s quantitative analysis is mentioned to support the view that credibility is not enough to explain the facts mentioned above. In that paper, however, less than full credibility is assumed. The same assumption is made in a more recent paper by Calvo and Végh (1992), where the IMF study is also quoted in support of the view that in the cases mentioned we are dealing with less than fully credible reforms. I think that McKinnon and Pill’s paper belongs more to that framework than the authors admit. This results in tension between the text, the model, and the empirical regularities.

1. The disinflation and reform programs mentioned in the paper are less than fully credible as the persistence of inflation shows. This has been attributed in the literature to backward indexation or to nonsynchronized price setting. At a policy level, it has motivated the use of some heterodox policies such as price and wage controls. Interestingly enough, the result has been that heterodox and orthodox programs have shared similar characteristics, suggesting that these measures cannot solve the fundamental problem of lack of credibility.

If the foreign inflation rate is zero as assumed in the model, the domestic rate of inflation must converge to zero as well. The fact that it does not is more consistent with a less than fully credible reform and stabilization program.

Note that the success of the fiscal reform seems to be unrelated to the dynamics discussed. Thus, a successful fiscal reform, although necessary, is clearly not sufficient. What is necessary is to convince market participants that the overall program is both economically and politically sustainable.

2. Another factor that makes me think that it would be better to view the EB program as less than fully credible is the fall in the real exchange rate. If the

program were fully credible, we should instead expect inflation to fall immediately to its new equilibrium, consistent with the new steady state, given by the lower rate of devaluation. The real exchange rate would not change or would rise.

In a truly dynamic model where the equilibrium real exchange rate is modeled explicitly and agents have rational expectations, it could be shown that credible liberalization will lead economic agents to expect a higher equilibrium real exchange rate. Thus, the expected rate of return on foreign asset holdings will also be higher tomorrow, and agents will spend less today. This will produce an excess supply of nontraded goods that will be removed via a reduction of their price, a depreciation of the real exchange rate. This will depend on the share of nontraded goods in domestic expenditure, the relative price elasticity of the excess demand for traded goods, the influence of the difference between the rate of time preference and the real interest rate on the desired excess of domestic spending over domestic income. If the liberalization is not credible, domestic spending will increase today in anticipation of the reversal of the liberalization measures, a fact consistent with most Latin American countries experience with trade liberalization. The real exchange rate will appreciate making further adjustment more difficult.

3. I think that the fact that a large proportion of capital inflows is in the form of overseas deposits placed with the domestic banking sector is not related solely to implicit deposit insurance. It is instead most likely another aspect of the short-term view adopted by foreign capital and therefore an argument in favor of thinking that the market does not view reforms as sustainable. The purpose of the capital inflow is to profit from the expected real exchange rate appreciation. This is another consequence of the noncredibility of the program.

4. Moreover, it is argued in the paper that the market perceives the increase in income following the successful real-side reform as permanent. In a truly intertemporal framework—using some version of the permanent-income hypothesis of consumption, for example—permanent increases in income are not likely to affect the current account. This is not what the stylized facts show. Temporary changes in income or anticipated future changes in permanent income can be associated with changes in savings and in the current account.

A related matter is that overborrowing is the result of domestic financial market inefficiencies. This sort of Ponzi scheme is most likely to be associated with transient changes in economic policy.

5. In the model, once excess demand is generated via the inflow of foreign capital, it should be followed by inflation in the nontradable sector together with a current account deficit. This is consistent with a less than fully credible EB program. If the public expects a higher rate of devaluation to be resumed in the future (it is now zero), the fall in the nominal lending interest rate is perceived as temporary. As this reduces the cost of present consumption with respect to future consumption, there is excess demand: output expands, and

there is a current account deficit. The overheated economy keeps the rate of inflation above that of devaluation, and the real exchange rate appreciates. Over time, the real exchange rate appreciation reduces excess aggregate demand for home goods, and output declines.

Policymakers have noticed that the increase in liquidity is dangerous. For this reason, some programs have also implemented higher reserve requirements, a higher discount rate, or tightened controls on short-term capital flows. These measures largely explain the sharp increase in real interest rates, as in Israel in 1985.

### **Financial Market Imperfections and “Special” Banks**

First a naive comment: in most countries of the world some form of deposit insurance exists, and it is difficult to see why it should play such a crucial role when a stabilization program is undertaken, or, in other words, why it should not play a more pervasive role in international capital markets. Now let me comment on the imperfections suggested in the text of the paper but not fully incorporated in the model.

As hinted already, the belief that deposit insurance may actually be responsible for the kind of boom-bust or bust-boom cycle studied here seems somewhat exaggerated. Many industrialized nations provide some form of deposit insurance, with some exceptions. The Australian central bank has the authority to take over a troubled institution, although there is no formal deposit scheme. In Luxembourg, small-depositor insurance does not appear to be guaranteed. In New Zealand, it is expressly prohibited. In Canada, Switzerland, and the United Kingdom, insurance is provided by the banking authorities. In Japan and Belgium, banks and the authorities operate insurance facilities jointly. In France, Italy, Germany, and Sweden, it is the banking industry that administers deposit insurance. Within the European Union, the 1986 Banking Directive recommended that deposit insurance schemes cover all credit institutions.

Given the extent of deposit insurance, namely in countries over all the spectrum of capital mobility, it seems somewhat exaggerated to single out this institution as the factor responsible for overborrowing.

Moreover, the model is truly more representative of a less developed country: no primary securities, equity concentrated in families, no bond market, and so on. It takes a great leap of faith to use the case of the pound sterling's departure from the Exchange Rate Mechanism for empirical support. In the model, the fiscal deficit is money financed, and the stabilization plan is aimed at eliminating this inflation. The model really better fits a Latin American country and a less than fully credible EB program.

Another market imperfection suggested is asymmetric information. This results in credit rationing in the model: firms and people are financially constrained in production (working capital) and demand (liquidity). From the famous article by Stiglitz and Weiss (1981) on credit rationing, it is obvious that monetary policy affects investment through credit availability and not through



the interest rate because the interest rate not only conveys information on relative scarcities but also on different qualities of borrowers. If for a given interest rate a risk-neutral borrower is indifferent between two projects, an increase in the interest rate will make him prefer the riskier project, the project with the higher probability of bankruptcy. As the expected return to the bank in that case is lower, credit rationing occurs. It is not clear from the model why banks should increase loans without taking into account the effects of this increase on the expected return to the loans. The model really needs much more structure here so as to take into account how banks use the interest rates they charge to sort potential borrowers and affect the actions of borrowers. There are interest rates in this case that equate supply and demand, but they are not equilibrium ones.

If credit rationing occurs instead because of interest rate ceilings on lending institutions, then interest rates are below the equilibrium levels. Notice that in this case of credit rationing the interest rate that equates supply and demand is most likely to be an equilibrium interest rate. The distinction between these cases seems to me very important. Again the model really needs to much more explicitly identify the source of the financial market inefficiency.

Finally, the real deposit rate rises in the internationally liberalized economy because the elimination of the fiscal deficit reduces the need to extract financing from the banking system. The abolition of reserve requirements eliminates the wedge between deposit and lending rates and thus allows deposit rates to rise even when the lending rate is falling. This policy shock should also be made explicit in the model. Presumably, in a dynamic discussion these effects should be made explicit. Otherwise, there is tension in the model as the increase in net foreign official reserves via the capital inflow becomes exogenous to the model (although it is endogenous in the discussion).

Banks are special. However, the behavior of the banking industry, especially its demand for reserves, is not modeled explicitly in the uncertainty environment suggested in the paper.

### **Some Necessary Features of a Dynamic Model of Reform and Stabilization**

*The equilibrium real exchange rate.* In a fully credible stabilization and reform program, the equilibrium real exchange rate is not likely to remain constant: both commercial policy and capital controls affect its equilibrium level. Similarly, because many successful fiscal reforms require a change in the composition of government expenditures—not only a change in their share in GDP—they will also affect the equilibrium real exchange rate.

Trade liberalization makes available new investment opportunities and allows not only a move along the production possibility frontier but also access to a new technology. This is another source of change of the equilibrium real exchange rate.

*Banks' supply of funds.* In the model, the exchange rate peg is believed to hold into the indefinite future. The authorities are said to be forced to control their policy instrument, the narrow money supply, so as to keep the domestic nominal interest rate consistent with uncovered interest parity. Notice that the money supply measure should not be considered a policy instrument because, in a truly fixed exchange rate system such as the one assumed in the paper, the stock of the money supply is endogenously determined by the balance of payments. The central bank passively purchases and sells foreign exchange at the pegged rate. If the foreign currency is purchased from banks, as is assumed here, those banks will find themselves with enlarged holdings of domestic monetary reserves, which will induce an expansion of the country's money stock. This capital inflow should be modeled which will require more structure to explain banks' supply of funds.

*Expectations.* The issue of how expectations are modeled also seems important. If some backward price indexing exists, or if rigidities such as nonsynchronized price setting are highlighted, then there is likely to be a group of agents who have extrapolative and destabilizing expectations as they forecast for shorter periods. Those forecasting for longer planning horizons tend to have stabilizing expectations instead. This has been shown to matter for the dynamics of the system, for example, in a simulation of the effects of financial liberalization of the Italian economy by Gandolfo and Padoan (1990).

In McKinnon and Pill's paper, adequate modeling of expectations could show that less than perfect credibility results from agents' anticipating that capital account liberalization without domestic financial market reforms is bound to lead the economy into an explosive path.

## Conclusions

I agree that capital market imperfections, asymmetric information, and the like, are present in most if not all of the countries that undertook stabilization programs. The fact that the boom-bust cycle is related to both a capital account surplus and a current account deficit seems to me, however, to point to causes other than those suggested in the paper. A most fundamental force must explain these phenomena. I suggest that most stabilization programs seem to run into a basic sustainability syndrome motivated by dynamic inconsistency.

Credibility of the reform process is essential, in particular for the well functioning of domestic financial markets. However, credibility takes time to build. Credibility requires two elements. First, the *overall* program must be feasible, not just the fiscal adjustment. Second, policy commitments must not be subject to a time inconsistency problem. Simple and not excessively state-contingent rules are to be preferred to discretion. Tying the hands of policymakers guarantees that a better equilibrium ensues. This can be done by introducing a series of constraints on discretion in policy making. First, a signal that an irreversible

change in regime is going to take place raises the political cost of policy reversals and thereby promotes credibility. This is an internal political constraint. Second, effective checks on the various branches of the policy-making apparatus, such as creating an independent central bank or introducing the legal prohibition of deficit monetization, increase the credibility of reform. These are internal legal constraints. External legal constraints such as the prohibition on quotas or increases in bound tariffs in WTO also raise the credibility of the reform. Finally, external economic constraints such as adopting an economic program supported by a multilateral agency also provide credibility to the reform. It is suspected, however, that none of these measures, even not all of them adopted simultaneously, are likely to be a perfect substitute for the actual path followed by the reform process.

Trade liberalization demonopolizes the economy and improves the allocation of resources by better price signaling. However, adjustment requires the use of credit. Without access to the credit market, even sound projects will not be undertaken, and sound firms may go out of the market. Thus current account convertibility requires a functioning financial system. It is clear that the quality of money and capital markets influences the benefits that can be obtained from real-sector reform. Trade liberalization also requires some capital inflows to finance the adjustment costs as well. However, capital inflows are not a substitute for fiscal reform as they appreciate the exchange rate and offset the depreciation of the equilibrium real exchange rate that is likely to result from trade liberalization. But a successful fiscal reform is just the beginning of a lengthy process aiming at a lasting change of market participant expectations.

In the literature about the sequencing of reforms it has already been suggested that domestic financial market reform must be undertaken before any liberalization of the capital account is attempted. McKinnon has also argued this in the past. From this point of view, the paper does not add much new.

After living for 25 years in a country which is a textbook case of unsound macroeconomic policy and failed stabilization programs, I remain unconvinced by the “overborrowing syndrome” hypothesis.

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## Comment Chong-Hyun Nam

McKinnon and Pill have written an excellent paper that is full of insights and provides very useful messages to policymakers in both developing and developed nations. The paper is especially interesting to me because Korea is currently involved in liberalizing its capital account, and the possibility of excessive capital inflow has recently become an acute issue.

The highlight of McKinnon and Pill's paper is the demonstration of why and how some economic reform programs can lead to excessive capital inflows when the capital account is open. For that, the paper provides models as well as some factual evidence. The paper also examines the effects of a country's trade reform on its investment and saving patterns, using a Fisherian type of model. Finally, the paper suggests some policy prescriptions to mitigate potential damage due to overborrowing.

I have two major comments on the paper: one is on the relevancy to reality of the Fisherian type of model, and the other concerns the practicality of the policy prescriptions suggested. Both comments will be made in the light of Korean experiences.

First, using a Fisherian two-period model, the paper shows that some real-side reforms, such as trade reform, can raise income and consumption in both periods when the capital market is open, and more important, it shows that domestic private saving could fall sharply as a consequence. Indeed, the Mexican experience seems to confirm this argument. As shown in table 1.1, the private saving rate in Mexico declined sharply from 15.5 to 7.7 percent in the three-year period following an economic reform plan put into action in 1989. This drop was accompanied by a sharp rise in foreign capital inflow which took place during the same period as shown in table 1.3.

It seems, however, that the Korean experience provides a contrasting case. The Korean economy, for instance, underwent a rapid liberalization period during the 1980s on almost all fronts, real as well as financial. Following a view generally held by economists on sequencing of economic liberalization, Korea undertook trade reform first and pursued it much more quickly and more extensively than financial reform. In particular, a very conservative step-by-step approach was taken toward the liberalization of the capital account of the balance of payments. Nonetheless, steady and significant progress was made in opening up the capital account during the 1980s.

An important consequence of all of these liberalization efforts undertaken in Korea may be found in a rapid rise in both income and the domestic saving rate: between 1981 and 1991, real income grew at an annual rate of nearly 10 percent, and the domestic saving rate rose to greater than 36 percent from less than 22 percent.

An interesting question then is, Why is Korea's saving pattern so different

from Mexico's? McKinnon and Pill may argue that Korea's capital account had been less open than Mexico's. That may have some truth in it. But I have a couple of other hunches. One is that the domestic saving rate may depend much more on income level and its growth rate than on the domestic real interest rate. In fact, many econometricians, including Nam (1988), seem to support this view, at least when the Korean economy is concerned. My other hunch has to do with the role of the real exchange rate, in that an overvalued currency can encourage consumption of imported goods and may lead to less domestic savings. I do not know much about the Mexican experience with real exchange rates, but I do know that Korea has been rather successful in maintaining a stable real exchange rate over time at a realistic level (Nam 1995). So I wonder what different results McKinnon and Pill's model would produce if modifications were made so that saving or consumption is a function of real income rather than of real interest rate.

Now let me turn to the policy recommendation part of the paper. I fully share McKinnon and Pill's view that the potential damage due to overborrowing can be real when economic reform plans are implemented with the capital account open or the capital account being opened up simultaneously. In that case, therefore, some kind of safeguards or precautionary measures may be needed.

For that purpose, McKinnon and Pill suggest a list of *do's* and *don't's*, such as restricting consumer access to credits, restraining short-term capital flow itself, and setting up a system something like Singapore's provident fund. I think these measures may be of help in mitigating the potential damage, but I wonder whether these measures are workable. I also wonder whether such compulsory measures as suggested above can be consistent with the concept of economic liberalization. It is quite conceivable that these measures may also produce undesirable side effects.

In any case, I think it would be better to take a gradual approach to opening up the capital account, controlling the speed and scope. But I am not sure how much "gradualness" would be optimal. I recall that Robert Mundell (1992) recently came to Korea and expressed his views on the Korean case. He suggested that Korea, with a saving rate already over 35 percent, can afford to forget entirely about relying on foreign capital for its economic development. This is certainly an another extreme view.

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