

International Overborrowing: A Decomposition of Credit and Currency Risks

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Summary. — The severity of the financial crises enveloping the “tiger” economies of Southeast Asia in 1997 came as a surprise to many observers. This paper uses a simple Fisherian model of the “overborrowing syndrome” to compare the Asian crises of 1997 with earlier overborrowing episodes in Mexico and Chile. While important similarities exist, the crises in Southeast Asia have been exacerbated by the unhedged foreign exchange positions of Asian banks. These open currency positions not only imposed significant additional losses on the banks following devaluation, they also magnified the scale of overborrowing during the cycle’s initial boom phase. Failure to limit the exposure of banks to foreign exchange risk therefore increased the magnitude of the boom–bust overborrowing cycle both *ex ante* and *ex post*. The paper highlights the importance of effective regulation and supervision of capital markets, with a focus on limiting the speculative currency positions of banks, especially those that form the core of the domestic payments system and therefore enjoy a (possibly implicit) public guarantee. Improving the institutional infrastructure of financial supervision is the only effective way of mitigating the macroeconomic costs of overborrowing. © 1998 Elsevier Science Ltd. All rights reserved

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1. INTRODUCTION

The summer of 1997 marked a watershed for economic performance in Southeast Asia. Prior to the currency crises of July through September, robust growth in the “tiger” economies of Thailand, Malaysia and Indonesia was the norm. These countries appeared invulnerable to the vagaries of the international capital markets—their macroeconomic policies were applauded by the international financial community and foreign capital flooded into the region on a vast scale. But the Thai authorities’ suspension of trading in finance company shares on the Bangkok stock exchange in April 1997 focused attention on the scale and extent of incipient crises in these countries’ domestic financial systems. One by one, Southeast Asian currencies came under speculative attack by the international capital market. With open capital accounts, the monetary authorities could only defend their currency by raising short-term interest rates, a policy that merely served to weaken further already fragile domestic financial systems. Forced to choose between devaluation

and the integrity of domestic financial and payments systems, the authorities chose the former. By November, Southeast Asian currencies were floating against the dollar at rates up to 50% below their pegged levels at the start of the year. But the policy dilemma proved to be a Hobson’s Choice: the direct revaluation effects of currency depreciation on bank balance sheets (where banks were large net dollar debtors) caused a financial and payments crisis nevertheless.

After several years respite, it appeared that Southeast Asia had eventually succumbed to the “Mexican disease”. If Mexico were any guide, the macroeconomic implications of these financial crises were likely to be severe, at least in the short term. During the 1994–95 Mexican crisis, an apparently well designed program of macroeconomic stabilization and structural economic reform had collapsed into financial crisis, precipitating a deep recession and surge in inflation. Real GDP fell more than 6% in 1995, while inflation exceeded 50% (Carstens and Gil-Diaz, 1996). Moreover, the Mexican experience was far from unique. Extensive economic liberalization

in Chile during the late 1970s prompted rapid growth, only to culminate in the 1982 "Southern Cone" crisis, with significant costs in terms of growth and inflation (McKinnon, 1982; Diaz-Alejandro, 1985). Even industrialized economies were not immune. Britain's consumption boom of the late 1980s was sparked by the Thatcher administration's structural economic reforms, but collapsed into devaluation and deep recession in the early 1990s. Scandinavia and the Antipodes have suffered similar "boom-bust" cycles in the last 15 years. Southeast Asia may be on the verge of a similar fate.

In our previous work (McKinnon, 1993; McKinnon and Pill, 1996, 1998), we have offered an explanation of these macroeconomic phenomena, conveniently labeled the "overborrowing syndrome" (McKinnon and Pill, 1997). This simple framework focuses on the interactions between structural economic reform, expectations regarding its success, and institutional and market failures in the financial system. In many cases, the complex interrelationships between these factors have resulted in Mexican-style catastrophes, although their magnitude has varied both across countries and across time. Thus far, we have largely focused on real explanations of overborrowing, abstracting from the nominal issues raised by the institutional details of the foreign exchanges and credit creation. However, in at least one respect—namely the currency in which domestic bank borrowing and lending is denominated—these institutional details matter, especially in the Southeast Asian context. Therefore, in this paper, we extend our analysis to encompass the possibility that financial intermediaries may take speculative open positions in foreign exchange. Such positions can magnify the scale of overborrowing, increase the vulnerability of the financial system to a Mexican-style crisis, and exacerbate the deleterious effects of the resulting devaluation on financial and macroeconomic stability.

2. ECONOMIC REFORM AND CREDIT EXPANSION

Initially, we believed that solving the overborrowing problem was merely a matter of "getting the exchange rate right." If severe under- or overvaluation of the currency could be avoided, and anticipated exchange rate movements remained aligned with interest rate differentials, it seemed that a rapidly liberalizing economy could absorb capital efficiently. Overborrowing was a result of exchange rate mismanagement.

These monetary and exchange rate issues have spawned a huge literature, which is conveniently systemized by Agénor and Montiel (1996). Several important papers (Dornbusch and Werner, 1994; Dornbusch, Goldfajn and Valdes, 1996) have used this literature to explain the Mexican crisis, focusing on the role of real overvaluation of the peso. No doubt papers in this vein will soon address the Asian crises.

Of course, we agree that proper management of the exchange rate during economic liberalization is of the utmost importance. In this paper, however, we argue that the *real* consequences of economic stabilization, liberalization and reform also have central explanatory roles. To focus analysis at this deeper level, we initially abstract from the complications introduced by money and the foreign exchanges. Following Conley and Maloney (1995), we use a simple Fisherian framework, where borrowing and lending decisions are made in real, rather than nominal terms. The *real* process of financial intermediation is at the center of our model. Only when the implications of these real factors have been explored do we introduce the additional complications of the monetary system, albeit in a simple form.

Our previous analyses of overborrowing have emphasized the role of the domestic financial system in controlling the pace and direction of credit expansion, financed by inflows of capital from overseas. While an expansion of credit can be beneficial for economic development, too rapid an expansion may result in excessive loosening of overall credit conditions (Gavin and Hausmann, 1996). Moreover, experience of financial crises throughout the world has shown that certain types of lending—particularly real estate finance, consumer credit, loans to bank insiders or affiliates, and loans financing speculative activity in equity and currency markets—have been more problematic than others. In countries where the banking system is sound and efficient, rapid credit expansion generated by capital inflows is less likely to create additional risk to financial and macroeconomic stability. Either banks are able to internalize the macroeconomic effects of credit growth on their borrowers' ability to pay, or they are forced to do so by the regulatory authority. In contrast, in countries where credit institutions are not well regulated and market failures exist in the financial system, capital inflows create opportunities for banks to expand lending for misguided or speculative purposes, exposing the economy to greater systemic financial risk and macroeconomic instability.

Kaminsky and Reinhart (1996) have shown that banking crises and currency crises are often closely linked, with the former, on average, preceding the latter. In retrospect, it is clear that the vulnerability of a weakened banking sector was an important constraint on the Mexican authorities' response to a deteriorating balance of payments situation in 1994. Similarly, in 1997, revelations about the dire state of Thai finance companies were the catalyst for currency crises in Southeast Asia. Information about the banking sector may therefore offer important signals about the likelihood of a wider macroeconomic crisis. In this paper, we offer a simple structural explanation for these observed interrelationships and correlations between banking and balance-of-payments crises. Moreover, we contend that effective policy prescriptions, aimed at mitigating the financial and macroeconomic volatility associated with overborrowing, should address institutional development in the financial and banking sectors directly, rather than relying on conventional macroeconomic tools such as monetary, fiscal and exchange rate policies.

3. AN INTERTEMPORAL MODEL OF REAL-SIDE LIBERALIZATION, INVESTMENT AND SAVING¹

We first develop our simple model in purely real terms, ignoring the currency denomination of assets and liabilities in the financial system. These complications—central to an understanding of the dynamics of the currency crisis in Southeast Asia—are introduced in the subsequent section.

Consider an economy consisting of a large number (N) of atomistic, risk neutral firm-households placed in a simple Fisherian two-period setting. These firm-households produce and consume a single, composite commodity good that is freely tradable with the rest of the world. Each household receives an endowment (m_1, m_2) of the good.² Households choose a consumption plan (c_1, c_2) to maximise utility $U(\cdot)$, taking the real interest rate (r) and technology as given. Preferences described by this utility function are homothetic overconsumption in the two periods.

Initially, firms are confined to a traditional production technique $F(\cdot)$ that exhibits decreasing returns to scale over all levels of investment. Structural economic reform permits the introduction of modern technology $\alpha G(\cdot)$, which has increasing returns over some range, but requires an initial fixed start-up investment, K .

The success of the structural reform is uncertain *ex ante*. The productivity of the modern

technology (α) is therefore a random variable. Initially, we focus on modeling this economy-wide real shock as a major potential increase in overall future productivity. The move from extensive tariff and quota protection to free trade, complemented by the general deregulation and privatization of domestic industry and liberalization of the domestic financial system, is a leading example. Such reforms generate enormous excitement and optimism, encouraging people to expect that their national output and household incomes will be much higher in the future. Nevertheless, it is highly uncertain how much aggregate output and income will actually increase. The payoff from liberalization depends on how well the macroeconomy responds to the newly liberalized regime. In this section, we attempt to model precisely this real-side shock and the related uncertainty it introduces into macroeconomic outcomes, hoping to relate both to the behavior of the financial sector.

Suppose that the macroeconomic productivity shock α is drawn from a probability distribution, $Q(\alpha)$. The realization of α occurs in two stages. At the beginning of the first period, a drawing is made from probability distribution $q_1(\hat{\alpha})$. The outcome of this drawing is known only to the banks—they have privileged knowledge about the state of the macroeconomy that is not directly available to the non-bank private sector. Banks are "special," in part, because they have certain informational advantages, here related to the country's macroeconomic prospects.

Only during the second period is the value of α itself realized. This is drawn from a distribution $q_2(\alpha|\hat{\alpha})$, with expected value $\hat{\alpha}$. The realization is common knowledge. In setting credit conditions—the price and availability of bank lending—banks offer an implicit signal to the non-bank private sector of their privileged information regarding the realization of $\hat{\alpha}$. Domestic firm-households, perhaps naively, rely on these implicit signals from the "expert" banking system to assess the success of macroeconomic reform.

Because of the technical indivisibility introduced by fixed start-up costs, only firms that have access to credit will be able to exploit the modern technology (McKinnon, 1973, chapter 2). Credit expansion will therefore affect the real economy through two interrelated channels. Easy credit conditions are a signal of successful structural reform and therefore should stimulate real economic activity indirectly, as expectations of permanent income are revised upward. Moreover, credit expansion enables firms to exploit the more productive modern technology, increasing real activity directly. A well-behaved

financial system will ensure consistency between the signaling and direct effects. Market failure in the banking system, however, introduces the possibility that contradictions between these two channels may emerge. These contradictions form the basis of our explanation of the overborrowing syndrome.

4. DEPOSIT INSURANCE AND MARKET FAILURE

Banks are "special" not only because they have certain informational advantages on the lending side, but also because bank liabilities are central to the domestic payments system, a vital component of a modern economy. In consequence, bank deposits are generally believed to enjoy a central bank guarantee, even in the absence of an explicit deposit insurance scheme. This is an example of the time consistency problem (Kydland and Prescott, 1977). However strongly the monetary authorities claim they will not bail-out the financial system in the event of financial crisis, the claim is not credible. Should a crisis occur, the authorities will always choose to facilitate the bail-out, if necessary raising funds through the inflation tax, rather than see the payments system destroyed.

Market failure in the financial system may arise from this, possibly implicit, guarantee of bank deposits.³ It will introduce *moral hazard* into the banking system's behavior. Bank depositors are protected from the consequences of poor outcomes of the macroeconomic shock. Banks' loan decisions will be affected with, as we have seen, implications for the real economy (Cho, 1986). Where banking supervision is effective, regulators will ensure that banks do not exploit the potential for moral hazard and credit conditions will accurately reflect the privileged information about macroeconomic developments enjoyed by the banking sector. Where regulators are unable to control the moral hazard problem, however, the signal implicit in credit conditions will be distorted in a direction that may lead to overborrowing and increase financial and macroeconomic instability.

In our simple framework, this process is formalized as follows. Prior to lending decisions being finalized at the start of period one, banks know the realization of $\hat{\alpha}$.—and thus the distribution $q_2(\cdot)$ from which the final drawing of α will be taken. Deposit insurance protects banks from outcomes in the lower tail of this distribution—realizations of α worse than $\hat{\alpha}$, the shock that causes general private sector default.⁴ They will set credit conditions using a risk assessment

based on the truncated distribution (with mean $\hat{\alpha}'$), rather than the true underlying distribution (with mean $\hat{\alpha}$). Clearly, $\hat{\alpha}'$ is unambiguously greater than $\hat{\alpha}$.

5. SOLUTIONS FOR THE INTERTEMPORAL MODEL

Having described the endowments, technology, preferences and information conditions, we solve this model in three policy environments: the *financially repressed economy* (FRE), where usury laws and other restrictions on the financial system prevent the emergence of a private capital market; the *domestically liberalized economy* (DLE), where a competitive domestic financial system exists but this is isolated from the international capital market; and, the *internationally liberalized economy* (ILE), where the capital account of the balance of payments is open and the domestic financial system is fully integrated with the perfectly elastic international capital market. In solving the model, we use two distinct solution concepts: a *first-best* (FB) solution, where the financial system is well-behaved (in the sense described above, namely that credit conditions offer the correct implicit signals about macroeconomic developments); and, a *rational beliefs* (RB) equilibrium, where the non-bank private sector believes the implicit signals offered by credit conditions (despite the existence of market failure in the financial system) because of *ex ante* observational equivalence with the first-best equilibrium. As discussed below, the rational beliefs equilibria capture the notion of "euphoria" surrounding economic reform and performance that we view as the major behavioral explanation of overborrowing.

(a) *The financially repressed economy*

No private capital market exists in the FRE. Consequently, firm-households cannot borrow. It is impossible to overcome the technological indivisibility in modern techniques. Production is confined to the traditional technology. Firm-households optimize at point A in Figure 1. Consumption equals production in each period. There is no financial saving. In the absence of any financial system, the distinctions between the two solution concepts—which revolve around the extent of financial market failure and perceptions of it—are not relevant. The FRE merely offers a useful benchmark case for comparison with the outcomes for more liberalized financial systems.

(b) *The domestically liberalized economy*

In the DLE, a domestic private capital market emerges. Banks can raise deposits from those households that continue to exploit traditional technology. These deposits are lent to other firms, allowing them to overcome the technological indivisibility in the modern technique. Two conditions must be satisfied in equilibrium. First, because households are identical, each must achieve the same level of utility (Krugman, 1979). Their opportunity sets must be the same. Since firms are optimizing, the intertemporal budget constraint must be simultaneously tangent to both production possibility schedules, $f(\cdot)$ and $g(\cdot)$.⁵ The real interest rate (r_{DLE})⁶ is therefore determined solely by technological factors. Second, the capital market must clear.

Optimizing firms will produce at the points of tangency in Figure 2: point A, generating cash flow x_1^M from the modern technology; and, point B, generating cash flow x_1^T from the traditional technology. All households consume c_1^{DLE} in the first period. Consequently, aggregate bank deposits by those firm-households that continue to use traditional techniques— $N_T(x_1^T - c_1^{DLE})$ —must equal aggregate borrowing by investors in modern technology— $N_M(c_1^{DLE} - x_1^M)$.⁷

Figure 2 represents the first-best (FB) equilibrium, where the financial system accurately reflects its privileged knowledge of \hat{a} when setting credit conditions. There is no financial market failure. Although welfare is unambiguously greater than in the FRE, total saving ($m_1 - c_{1FB}^{DLE}$) may be higher or lower, since income and substitution effects are off-setting.

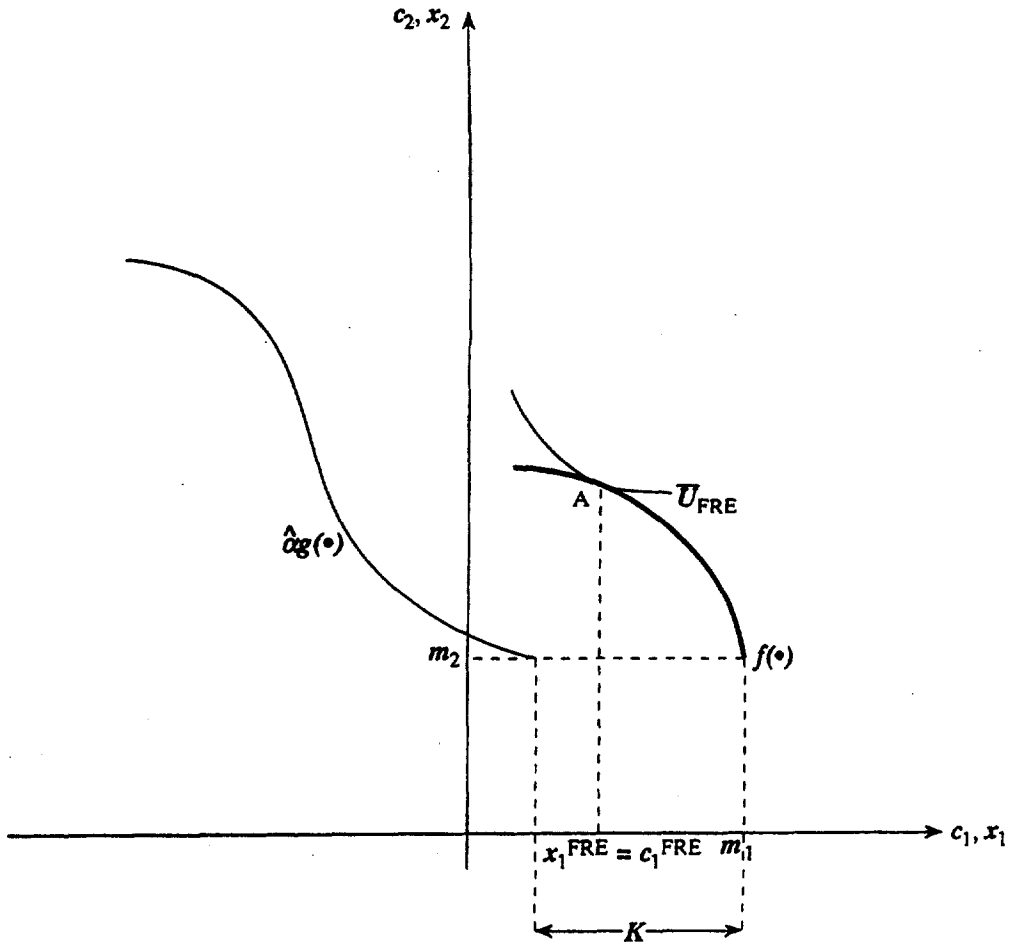


Figure 1. *Equilibrium in the financially repressed economy.*

In the rational beliefs (RB) equilibrium, banks exploit the potential for moral hazard implied by the implicit guarantee of bank deposits. Using the truncated distribution for the macroeconomic shock, they set credit conditions based on an expected value $\hat{\alpha}'$, which is unambiguously greater than $\hat{\alpha}$ (as shown in Figure 3). Non-banks, perhaps naively, continue to believe the financial system is well-behaved. *Ex ante*, they are unable to distinguish between outcomes due to financial market failure and those associated with a well-behaved financial system but a higher realization of the macroeconomic shock. The behavior of the non-bank private sector is consistent with rationality—and the forward-looking expectations and sustainability conditions that it implies in the intertemporal context—under the implicit economic model they believe, one in which the financial system is well behaved and the macroeconomic shock is favorable. Since

this model cannot be refuted given available data, it is admissible and consistent with a wider and more plausible notion of rationality than that associated with conventional rational expectations equilibria. This is the essence of the rational beliefs approach (Kurz, 1994; Kurz, 1997).

The RB equilibrium has a higher real interest rate, $r_{RB}^{DLE} > r_{FB}^{DLE}$. Borrowing by individual firm-households may rise or fall, however, relative to the first-best outcome since income and substitution effects offset one another. Similarly, the effects on aggregate borrowing are ambiguous. In the DLE, a RB equilibrium does not necessarily imply overborrowing. Financial market failure is reflected in financial prices—specifically, an excessive real interest rate—rather than financial quantities.

Considerable overborrowing is unlikely to emerge in the DLE, since market failure forces

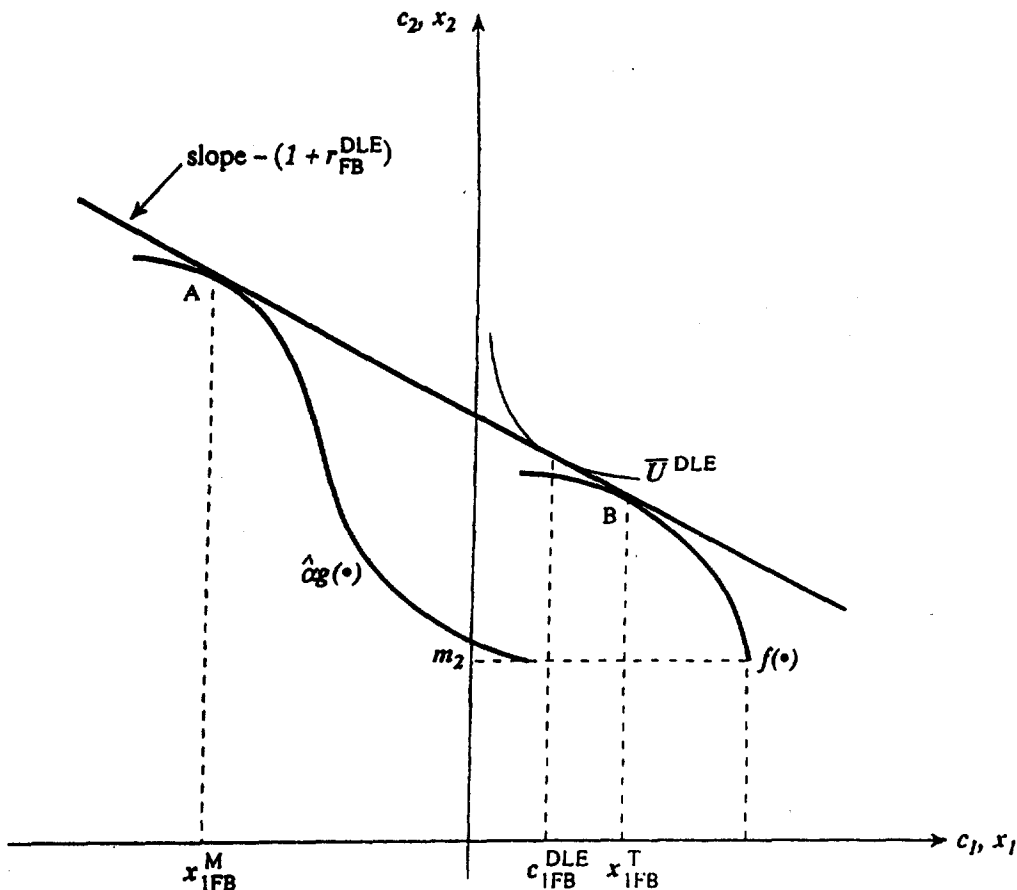


Figure 2. First-best solution in the domestically liberalized economy.

interest rates higher, raising the costs of excessive borrowing. Moreover, financial crisis in the DLE will merely result in a reallocation of resources within the economy, rather than requiring transfers abroad. While producing allocative and productive inefficiencies that would be better avoided, financial market failure in the DLE is unlikely to result in a Mexican-style catastrophe at the macro level.

(c) *The internationally liberalized economy*

Once domestic residents are able to borrow freely from the international capital market, the equilibrium real interest rate must equal the exogenous world rate, r^* —if there is no currency risk. Real interest rate equalization is a stringent definition of capital market integration (Frankel, 1992). In assuming real rates are equalized, we

implicitly require that both uncovered interest parity and purchasing power parity conditions hold. A large empirical literature rejects these conditions—they are consequently relaxed in the next section, where we introduce important institutional and empirical features of the international capital market that made significant contributions to overborrowing in Southeast Asia. Nevertheless, we initially maintain the assumption of real interest parity since, as emphasized in the introduction, this paper aims to distinguish the “real” causes of overborrowing from those introduced by currency risk.

Using foreign savings intermediated through the domestic banking system, every firm-household will choose to borrow at the exogenous world rate and exploit the modern production process. Investment and consumption decisions in the first-best equilibrium are shown in Figure 4. Comparing the FB solutions, welfare in

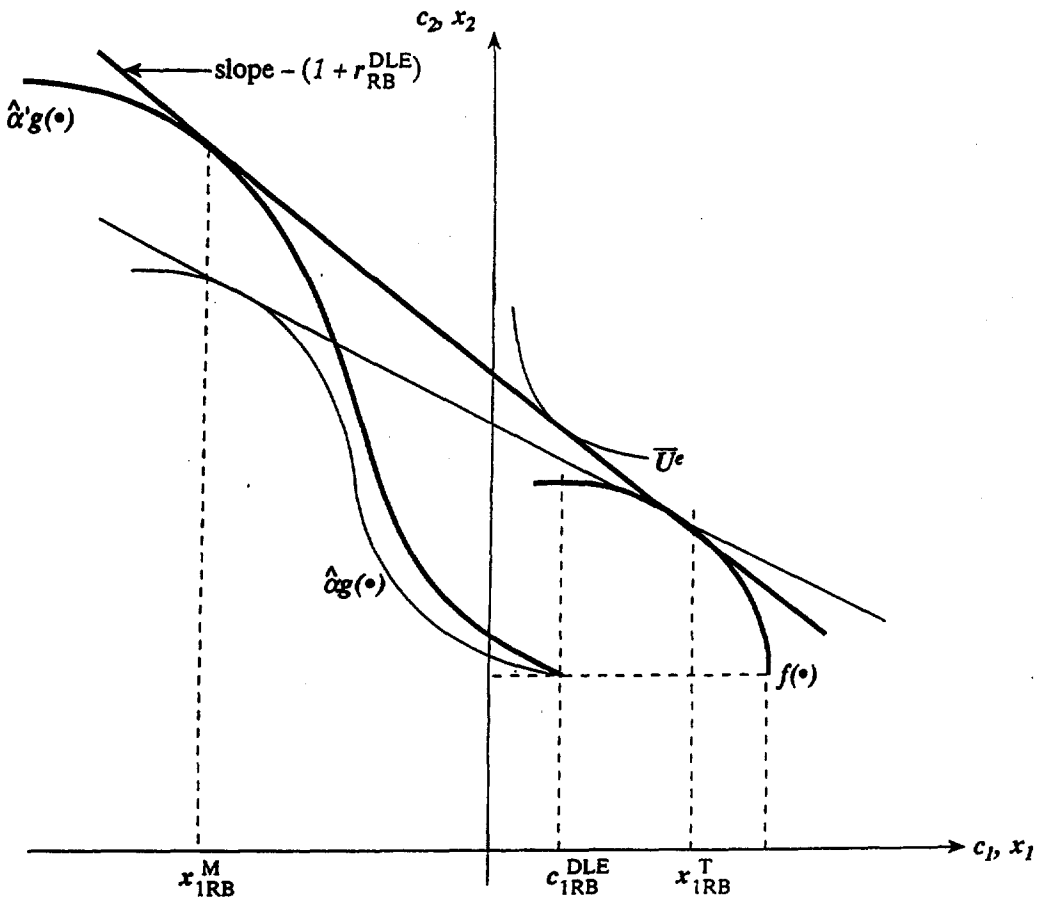


Figure 3. Rational beliefs equilibrium in the domestically liberalized economy.

the ILE is greater than in the DLE. If the financial system is well-behaved, it is unambiguously preferable to undertake structural economic reform with an open capital account.

Suppose prudential regulation of banks is inadequate and fails to prevent the emergence of moral hazard in the banking sector when the real-side liberalization—with its attendant uncertainties—is implemented. With the real interest rate set exogenously in international markets, it can no longer rise in response to market failure in the financial system, as was the case in the DLE. Instead, moral hazard in the banking system becomes manifest through excessive capital inflows (as shown in the rational beliefs equilibrium, Figure 5). Relative to the FB solution, in a rational beliefs equilibrium, the overly optimistic macroeconomic signal implicit in credit conditions (based on the truncated conditional distribution of macroeconomic

shocks with mean $\hat{\alpha}'$, rather than the true distribution with mean $\hat{\alpha}$) prompts domestic residents to overinvest (at x_{IRB}^{ILE} in the first period, rather than x_{IFB}^{ILE}) and overconsume (at c_{IRB}^{ILE} rather than c_{IFB}^{ILE}). The relative magnitude of overinvestment and overconsumption is largely determined by technology and preferences. Both overinvestment (V) and overconsumption (W) are financed by excessive borrowing from the rest of the world, beyond that which would occur in the absence of financial market failure. This is the essence of the overborrowing syndrome.

Ex ante, domestic firm-households believe economic reform is credible and the financial system is well-behaved. This confidence in the success of the reform program is bolstered by the economic boom—high levels of consumption and investment—observed in the first period. Overborrowing occurs when the non-bank private sector becomes *euphoric* or *triumphalist*

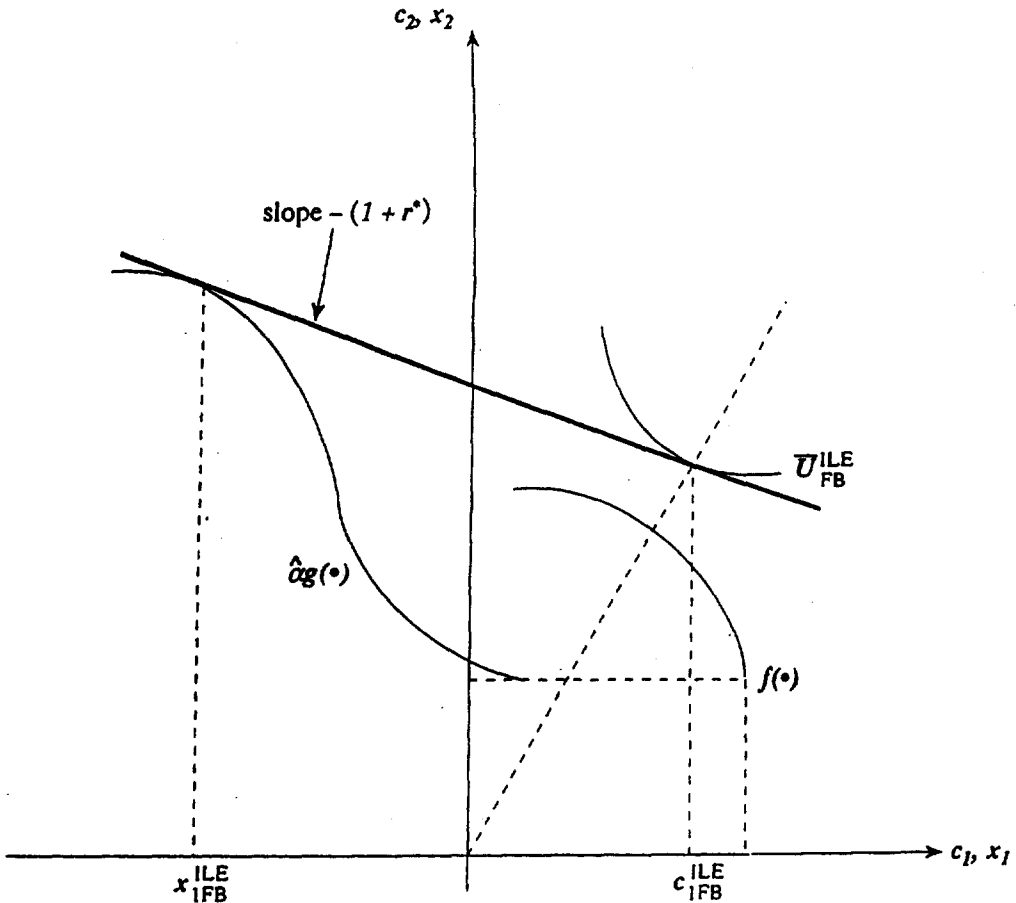


Figure 4. First-best solution in the internationally liberalized economy.

about the success of reform because of the overly optimistic implicit signal about macroeconomic developments contained in loose credit conditions. Triumphalism breeds even greater confidence in the liberalization process, creating a self-sustaining momentum of its own. The rational beliefs equilibrium in the ILE therefore corresponds to the period of *euphoria* presented by Kindleberger (1989). Overoptimism promotes an economic boom that justifies the optimism, albeit ephemerally.

6. INTRODUCING CURRENCY RISK

Thus far, we have assumed that real interest rate parity holds—domestic residents can borrow at the world real interest rate, which is ex-

ogenously determined in international capital markets. There is a considerable body of empirical evidence that suggests however that such an assumption is inappropriate. Risk premia exist in the interest rates of developing countries. Even in the absence of explicit administrative controls, goods and capital markets are imperfectly integrated. In this section, we relax the assumption of real interest parity and entertain the possibility that currency risk may also play a role in generating overborrowing. We suggest that this channel has been especially important in Southeast Asia.

Following the work of Frankel (1992), we introduce a number of interest rate identities. Financial market arbitrage will ensure that covered interest parity (CIP) holds continually when the cross-border capital movements are

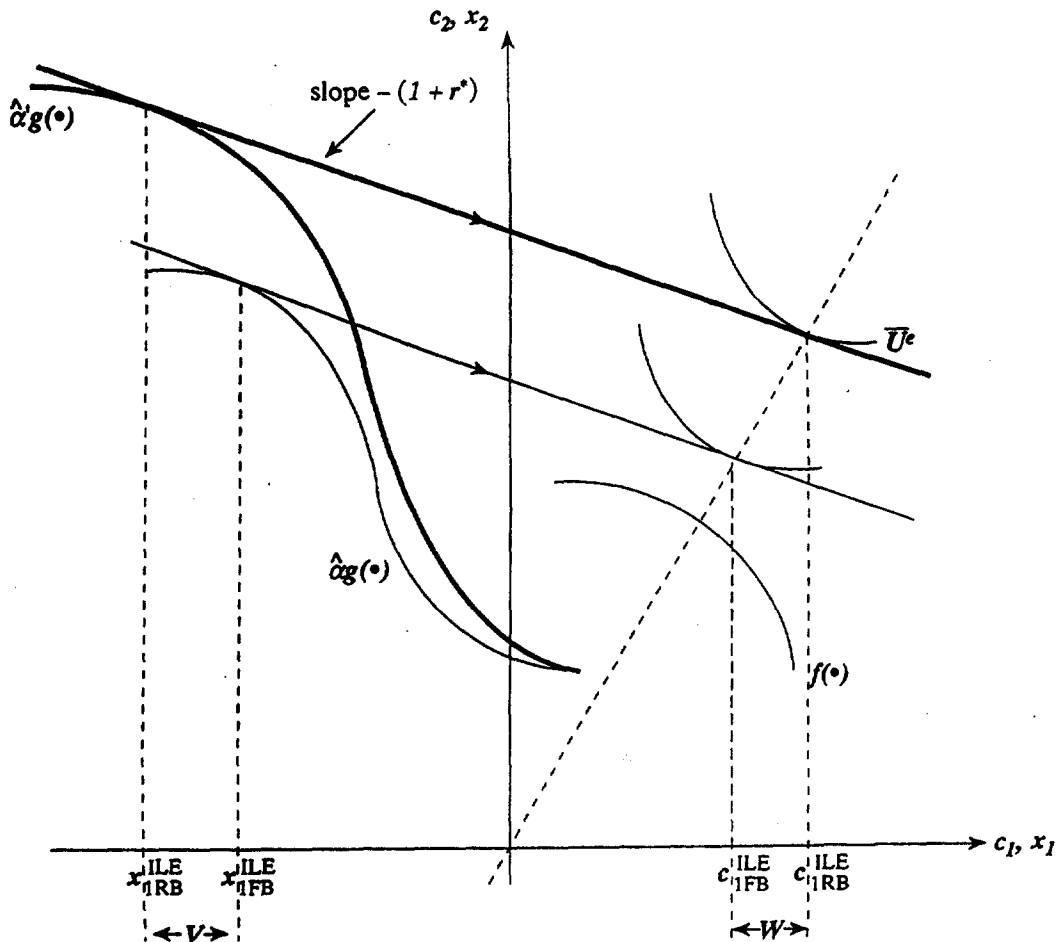


Figure 5. Rational beliefs equilibrium in the internationally liberalized economy: the overborrowing syndrome.

unhindered by administrative controls.⁸ Therefore:

$$i = i^* + f \quad (1)$$

where

i = the domestic nominal interest rate.

i^* = the dollar interest rate in the international capital market.

f = the forward premium on domestic currency.

Uncovered foreign exchange positions are not constrained, however, by financial market arbitrage. The open position remains at risk from unanticipated changes in the exchange rate. Therefore, the uncovered interest rate parity (UIP) condition includes an additional risk premium term, ρ .

$$i = i^* + \Delta s^E + \rho \quad (2)$$

where

s = spot exchange rate against the dollar.

Δx = percentage change in x .

x^E = expected value of x .

Using the Fisher identity, one can construct the relationship between domestic and foreign real interest rates:

$$r + \Delta p^E = r^* + \Delta p^{*E} + \Delta s^E + \rho \quad (3)$$

where

p = domestic price level.

p^* = foreign price level.

Therefore, deviations from real interest parity consist of two components: deviations from (relative) purchasing power parity and a real risk premium.

$$r - r^* = (\Delta p^{*E} + \Delta s^E - \Delta p^E) + \rho \quad (4)$$

In this paper, we will continue to assume that purchasing power parity holds, since economies vulnerable to overborrowing are typically very open, and their tradable goods prices are determined on world markets. But, we now introduce the possibility that uncovered interest parity will fail: real interest rates are no longer equalized because of the existence of a real risk premium.

Domestic banks may now borrow offshore in two ways: they can borrow in dollars at the prevailing world nominal interest rate i^* , or they can borrow in domestic currency at the rate i . In either case, we assume that their lending to the domestic private sector is denominated in domestic currency.

If the banks choose—or are forced by the regulatory authorities—to cover the currency risk exposure that dollar denominated external borrowing implies, then the currency in which

external bank borrowing is denominated is irrelevant for the real outcomes described in our simple Fisherian framework. The cost of hedging the exchange risk in the forward market will ensure that the interest rate charged by banks to the private sector on domestic currency denominated lending is the same, regardless of whether that lending is financed by dollar or domestic currency denominated external borrowing. This is an implication of the covered interest parity condition. In this case, the currency risk is eliminated, and overborrowing in our model is an entirely real phenomenon, as described in section 5.

If domestic banks are able, however, to take open foreign exchange positions by not covering the currency risk implicit in dollar denominated external borrowing, the implications for our model can be profound. This is a likely outcome where foreign dollar lenders to domestic banks believe they will be “bailed out” in the event of a crisis. This bail out could be financed by the domestic government or from official international “rescue packages” similar to those organized by the International Monetary Fund (IMF) for Southeast Asia in 1995–97. Where such international bail-outs are considered likely, the definition of “deposit insurance” outlined in section 4 needs to be broadened to encompass them.

Outcomes are affected through two interrelated channels. Banks are able to offer credit to the private sector at “artificially low” interest rates. Equation (2) demonstrates that, even if banks cover the expected change in the nominal exchange rate (Δs^E), the cost of funds for dollar denominated external borrowing ($i^* + \Delta s^E$) will be lower than that for domestic currency denominated borrowing (i). The cost implicit in the real risk premium (ρ) has been avoided. Equivalently, using expression (4), even if relative purchasing power parity continues to hold, the real interest rate for dollar external borrowing (r^*) will be lower than that for domestic currency external borrowing ($r = r^* + \rho$). Since the risk premium captures a real downside risk—the excessive volatility in the return to saving or investing in domestic currency—using unhedged dollar external borrowing to avoid the premium will result in a lower domestic real borrowing rate than would obtain under the first-best outcome. As shown in Figure 6, if the domestic real interest rate faced by private borrowers is too low (at r^* rather than $r = r^* + \rho$), then overborrowing will result. The artificially low real rate encourages optimizing firms to increase investment, and optimizing households to bring

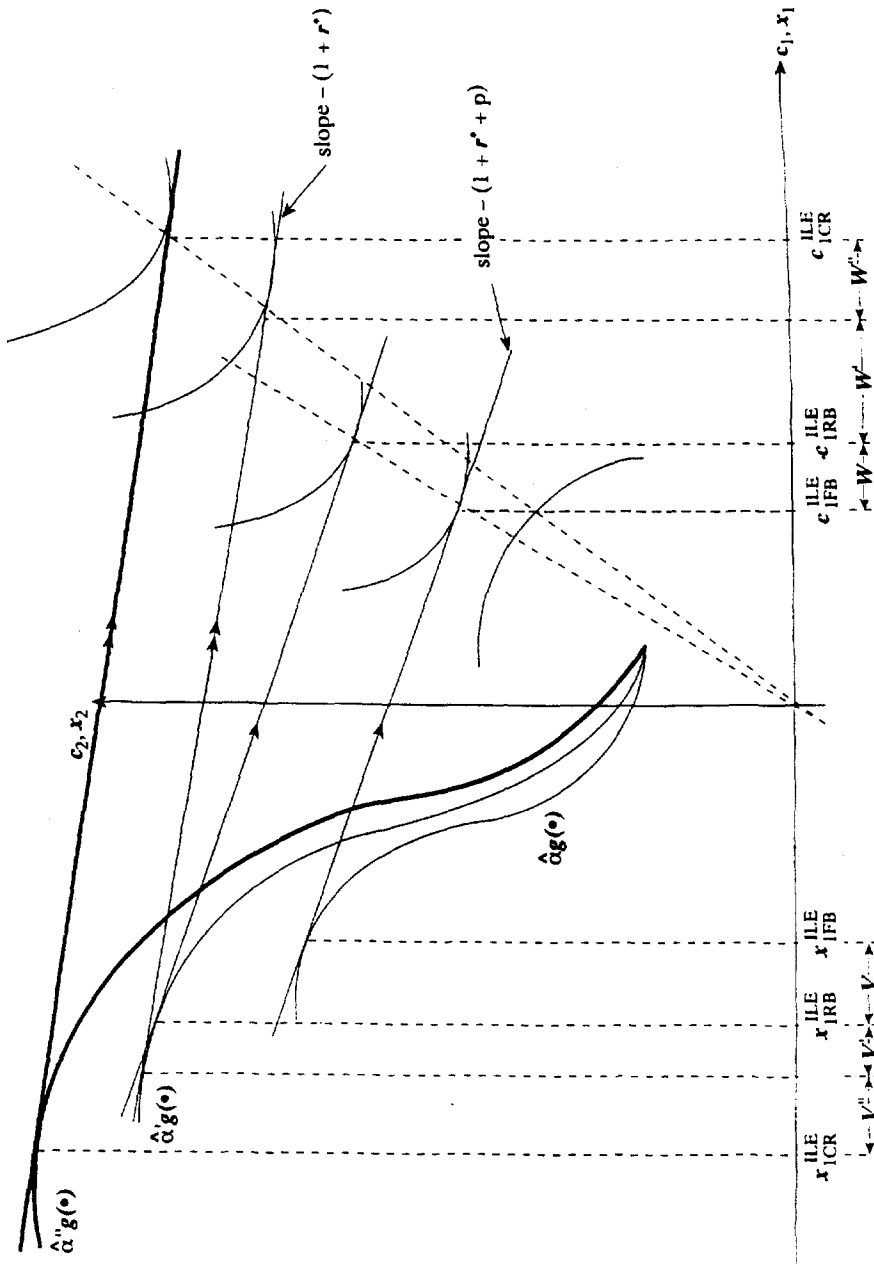


Figure 6. Overborrowing with unhedged bank foreign exchange positions.

forward consumption, in the first period of the Fisherian model. Relative to the ILE rational beliefs outcome described in section 3, there is additional overinvestment (V' in Figure 6) and additional overconsumption (W'). Unhedged dollar denominated external borrowing by domestic banks to finance domestic credit expansion will add to overborrowing in a liberalizing, open economy.

In addition to creating an "artificially low" domestic real interest rate, uncovered foreign exchange positions taken by banks also introduce new risks into the model. The risk premium in the uncovered interest parity condition appears precisely because of the riskiness of open currency positions. Specifically, should the domestic currency depreciate unexpectedly, then unhedged banks will suffer a capital loss. The value of their assets (domestic currency denominated loans) will fall relative to the value of their liabilities (dollar denominated external borrowing). A large enough devaluation will cause bankruptcy.

In section 4, while developing our simple Fisherian model of overborrowing, we described how (possibly implicit) deposit insurance will create moral hazard in the banking system. Because banks know they will be bailed out to protect depositors, they will finance excessively risky projects. Moreover, with a government guarantee of their deposits, banks will have an incentive to absorb the currency risks described above, rather than impose them on either their domestic borrowers (through lending to the private sector in dollars) or foreign depositors (through accepting only domestic currency deposits). The institutional nature of the financial system results in banks accepting the currency risk, since they can immediately, if perhaps implicitly, pass the risk on, either directly to the government through public guarantees of deposits or possibly to international agencies and foreign governments through IMF-sponsored financial bail-outs.

Furthermore, if—as intuition would suggest—currency risks are positively correlated with the real macroeconomic risk (α) discussed in section 3, then this distribution of currency risk will result in yet more overborrowing. When the banks have uncovered foreign exchange positions, they face not only the real credit risk—defaults by their domestic borrowers when an adverse macroeconomic shock occurs, as described in section 5—but also currency risk, as described above. Where currency and macroeconomic risk are positively correlated, the probability of bank failure for any realization of

α will be increased: banks suffer the additional capital loss from the currency mismatch on their balance sheet, as well as the default losses captured by our purely real model. Therefore, banks with unhedged currency positions are more likely to fail, precipitating a general financial crisis.

When a bank fails, it is rescued by government-financed deposit insurance. As in section 4, banks therefore truncate the probability distribution of α . Since bank failure is more likely at any value of α when currency risk is unhedged, this truncation—the realization of the macroeconomic shock where banks just fail—will be at a higher value of α . The truncated distribution of macroeconomic shocks relevant for the lending decisions of insured banks will be more skewed toward good outcomes when these banks face currency risk. The expected value of the macroeconomic shock on which they base their lending decisions when they have open currency positions ($\hat{\alpha}''$) is greater than the expected value when they face credit risk alone ($\hat{\alpha}'$). Consequently, credit conditions will be easier—banks will want to lend more—when they face currency risk than would otherwise be the case.

Provided that the domestic private sector relies on the signals implicit in credit conditions to formulate its assessment of macroeconomic prospects—as is implicit in the rational beliefs equilibrium concept outlined in section 5—then these easy credit conditions will translate into greater borrowing, consumption and investment. As shown in Figure 6, basing lending decisions on $\hat{\alpha}''$ —as is the case when banks have uncovered currency positions—will create further overconsumption (W''), overinvestment (V''). When insured banks can speculate on exchange rate movements, as well as on macroeconomic outcomes, overborrowing in the ILE will be even greater.

7. DISCUSSION

In sections 5 and 6, we distinguish two explanations of overborrowing. The first (described in section 5) focuses on real credit risks—defaults by private sector borrowers caused by adverse macroeconomic outcomes. The second (outlined in section 6) centers on banks' exposure to unhedged currency risk, as they borrow abroad in foreign currency. There are common elements to these explanations. At root, both are caused by institutional failures in the financial system, specifically the failure of the authorities to super-

vise and regulate banks appropriately in the face of moral hazard created by (possibly implicit) deposit insurance. Moreover, a “monetary veil” exists so that private borrowers are—perhaps naively—prepared to rely on the implicit signals in credit conditions to make their assessment of macroeconomic prospects, buoyed by the euphoria that is associated with apparently successful structural economic reform and growth.⁹ The explanations, however, are distinguishable. Can we decompose recent overborrowing episodes into these two components?

We have argued previously (McKinnon and Pill, 1996) that overborrowing in Mexico during the early 1990s (and Chile in the late 1970s) was largely caused by real phenomena. For example, in Mexico the banks faced relatively little currency risk at the time of the December 1994 crisis because the authorities—by converting the public debt from peso denominated Cetes into dollar denominated tesobonos—had assumed much of the exchange rate risk directly. Although currency risk may have added to the extent of overborrowing during the initial “boom” phase during 1991–92 through the channels described above, the banks were insulated to some extent from the direct effects of devaluation. The domestic financial crisis was largely a result of debt default—real credit risk—rather than currency losses.¹⁰ Mexican and Chilean largely borrowed to finance consumption loans during their post-liberalization boom phases: default risk was the central problem, while currency risk was less acute.

In contrast, at the time of the Southeast Asian currency crises in 1997, the banks faced considerable exchange risk. Thai banks and finance companies had vast unhedged foreign exchange exposure through borrowing offshore in dollars to finance their aggressive domestic credit expansion. Although the Indonesian authorities had imposed limits on banks’ open currency positions, these were either poorly enforced or had been evaded through the expedient of offshore affiliates, outside the control of the regulators. Consequently, the devaluation—caused by the default of overborrowed domestic households and firms, as in section 5—itself imposed additional losses on the banks. Although the extent of real credit risk was probably less than in Mexico during 1994–95, these currency losses exacerbated the resulting financial crisis considerably. Southeast Asian countries were caught in a vicious downward spiral. A crisis in the domestic financial system undermined the confidence of foreign investors (and wealthy domestic savers), who withdrew

their capital to offshore “safe havens”. This capital flight precipitated a speculative attack on the currency, forcing a devaluation that only served to magnify the banks’ currency losses and thereby exacerbate the financial crisis that had started the cycle. In consequence, Asian exchange rate and banking crises achieved a momentum of their own, resulting in a severity and length that surprised many observers.

Although the scale and composition of overborrowing may have appeared less dangerous in Southeast Asia during 1995–97 than had been the case in Mexico prior to its crisis, the additional currency risks faced by the banking system (as described in section 6) made these countries much more vulnerable to financial and currency crises than many observers foresaw.¹¹ While the mechanics of the overborrowing syndrome were in many ways similar, exposure to currency risk magnified the impact of the financial crises in Southeast Asia, beyond those implied by the pure credit risk model, that we have applied previously to Mexico and Chile. A thorough understanding of the overborrowing episodes in Thailand, Malaysia and Indonesia must therefore include this additional element.

8. POLICY CONCLUSIONS

Our model of the overborrowing syndrome has a number of important policy implications. It highlights the role financial supervision and regulation play in the achievement of a successful development strategy. Clearly, the model suggests that a policy of complete *laissez faire* with regard to the financial system is extremely misguided. The experiences described above provide compelling evidence to this effect. Perversely, a deregulated financial system may be more in need of effective supervision than one that is subject to extensive administrative controls and government intervention. Since the problem of overborrowing is rooted in an institutional failure to manage the moral hazard problem introduced into the financial system by deposit insurance (and supported by IMF-sponsored foreign bail-outs in the event of crisis), a first-best solution would be to improve the institutional infrastructure of regulation and supervision. Attempts to liberalize the financial system in the absence of effective—appropriately staffed, funded and respected—regulatory bodies are likely to end in financial crisis. The “Washington consensus” in favor of structural reform and financial liberalization has tended to

underemphasize the need to invest in this institutional infrastructure prior to the introduction of such reforms. This paper suggests this failing requires urgent attention.

While it is hard to disagree with the general conclusion that financial regulation should be made more effective, this paper offers some more specific goals. It shows that the risks and costs of overborrowing are magnified considerably when banks are able to take open foreign exchange positions. Offshore borrowing in foreign currency to fund domestic currency denominated credit expansion is the typical vehicle for this currency speculation.¹² Bank regulators must limit the scope for financial intermediaries to face foreign exchange risk. Such currency speculation is an inappropriate activity for institutions that enjoy an implicit government guarantee because of their integral place in the domestic financial and payments systems. Obviously, such limitations must be enforced *de facto*, rather than merely imposed *de jure*. Lack of enforcement, or evasion of controls on foreign exchange exposure, are problems common to many Southeast Asian countries.

Second-best regulatory remedies may also be required. If the authorities are unsure of their ability to monitor the quantity, quality and currency denomination of bank assets and liabilities, direct and indirect measures to restrain inflows of foreign financial capital (especially foreign currency denominated flows) may be necessary to control moral hazard in the banking system from deposit insurance or other *ex post* bail out provisions. In very open Southeast Asian economies, direct controls on inflows of foreign financial capital may be difficult to implement and have undesirable side effects, such as the promotion of corruption. Often indirect methods will suffice. Reserve requirements (implicit taxes on intermediation) imposed on the banks' foreign borrowing, in conjunction with the very tight rules governing net foreign exchange exposure of banks and other financial institutions advocated above, can reduce risk taking directly while also having the incidental effect of restricting capital inflows.

In an era where the size and liquidity of the international capital markets create the potential for "self-fulfilling" speculative attacks (Obstfeld, 1994; Obstfeld, 1995), currency crises offer little guide to a country's economic fundamentals. The superficially similar fate of Mexico and Thailand, Malaysia and Indonesia at the hands of international currency speculators may therefore mask more than it reveals. Moreover, while there may be no "fundamental" cause of self-fulfilling

speculative attack, the attack itself—if successful—may have financial implications that cause or exacerbate a wider crisis.

In this paper, we have argued that there are important common elements to the Mexican and Asian financial and macroeconomic crises that offer compelling lessons for other countries. Following Kindleberger (1989) and Minsky (1977, 1982), we suggest that financial systems in developing, capitalist economies facing uncertainty appear to be inherently unstable, as surges of euphoria and despair alternate in international and domestic capital markets. Institutional failures—especially, but not exclusively, in the regulation of moral hazard created by public insurance of bank deposits—transmit and magnify the effect of these volatile "animal spirits" on the real economy. Countries may not be able to insulate themselves entirely from the vagaries of market confidence, other than at the expense of complete isolation from international markets and stagnation from overregulated domestic markets. Nevertheless, investment in a sound and effective institutional infrastructure, especially in the financial sector, can play an important role in mitigating their destabilizing effects.

While important similarities exist, the decomposition of overborrowing into that generated by real credit risk and that arising from currency risk appears to differ between Mexico and Southeast Asia. The failure of regulators to limit the foreign exchange exposure of Asian banks added to the accumulation of overborrowing prior to the 1997 crises. This magnified the impact of poorly controlled, directed and monitored domestic credit expansion. Moreover, with the onset of the crisis, the losses resulting from banks' unhedged foreign exchange positions rapidly deepened the existing financial crisis. Rather than helping to cure the problem through monetary easing as in Mexico, devaluation exacerbated the underlying cause of the crisis, namely the fragility and vulnerability of the domestic financial sector. In retrospect, the countries of Southeast Asia may have been better served by more aggressive defense of their currency pegs—presumably aided by earlier and greater support from the international financial community. Although this would have exacerbated some of the problems of real credit risk—most apparent in those intermediaries exposed to speculative property loans (a common problem across Thailand, Malaysia and Indonesia)—these could have been addressed directly (and would have needed to have been solved, at considerable public expense, regardless) without the addi-

tional foreign exchange losses being imposed on the financial system more widely. Devaluation, and the associated capital losses as dollar liabilities were revalued in domestic currency terms,

became an additional burden on an already weakened financial system. This offered an additional strong channel for the overborrowing crisis to propagate itself in Southeast Asia.

NOTES

1. Following McKinnon (1973), Krugman (1979) and McKinnon and Pill (1996), the solution presented in this paper is graphical.

2. Here and throughout the paper, subscript numerals 1 and 2 refer to period 1 and period 2 of the Fisherian model.

3. Since this failure arises from the inability of the authorities to manage the moral hazard problem associated with their (albeit possibly implicit) intervention, it perhaps should be called "institutional failure" rather than market failure. We are grateful to Francisco Gil-Díaz of the Banco de México for this point.

4. In the event of widespread default by private debtors, the government will impose a tax (for example, the inflation tax) on the unearned second period income of domestic residents to pay-off bank depositors.

5. The lower case annotation for technology (f and g) represents the production possibility frontiers corresponding to the two production functions (F and G respectively).

6. In a simple Fisherian two-period model, the slope of the intertemporal budget constraint is equal to $-(1+r)$, where r is the real interest rate.

7. N_T and N_M are the number of firm-households employing the traditional and modern production techniques respectively.

8. Strictly, there must be no possibility that capital controls of some form be reimposed in the future; i.e.,

the commitment to free international capital movement must be perfectly credible. If this were not the case, then a country risk premium would exist, raising the domestic interest rate above that implied by the CIP condition.

9. Alternatively, one might assume that the cost of the government financed bail-out will be spread uniformly over the whole population. Therefore, no individual has an incentive to refrain from excessive borrowing, even if they understand the true macroeconomic risks. They will still be coerced by government into financing the bail-out of the financial system, but they would have foregone the benefits—in terms of higher first period consumption—associated with the initial "boom" phase. We have labeled this alternative explanation of private behavior during overborrowing the "pseudo-rational beliefs equilibrium" (McKinnon and Pill, 1998).

10. Indeed, Mexican banks would have made large profits on devaluation if they had been engaging in highly geared speculation against the peso as described by Garber (1998).

11. *Mea culpa* (McKinnon and Pill, 1998).

12. Garber (1998) describes how banks can use financial derivative instruments to take highly geared foreign exchange positions. This appears to be an important phenomenon close to, and during, the crisis period. But our focus is the larger macroeconomic context where currency mismatch of balance sheet items is the dominant factor.

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