

IMF Working Paper

Sustaining Fixed Exchange Rates: A Model with Debt and Institutions

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Abstract

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Fixed exchange rate regimes have come into disrepute, as their defense has become all but impossible. Yet, while a determined attack on a currency cannot be prevented or, ultimately, withstood, policies can reduce the vulnerability of a country to such attacks.

The paper develops an analytical framework of costs and benefits of a fixed exchange rate, based on the ability of a developing country to meet its external obligations while achieving a maximum rate of long-term output growth. The focus is on how structural policies and institutions influence the degree of dependence of a country on a fixed exchange rate regime.

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I. INTRODUCTION

The recent breakdowns of fixed or quasi-fixed exchange rate regimes in Asia, Russia, and Brazil have reconfirmed the important role played by current account deficits and debt in the sustainability of a pegged exchange rate in developing countries. In addition, the crucial importance of sound banking institutions and government policies has been highlighted. Other factors have also played a role, to a different degree in different countries: the government deficit, political considerations, and external circumstances, such as the appreciation of the U.S. dollar, to which the currencies attacked were either fully or partly pegged.

Fixed exchange rates are chosen chiefly for three reasons. First, in the short term, they provide a nominal anchor for the currency, thereby reducing inflationary expectations. In a longer-term view, they make access to international capital markets easier by providing more stability and predictability in foreign exchange markets. Trade relations constitute the third reason for fixing the exchange rate. Small, open economies that trade heavily with one or a few bigger partners do not have much scope for an independent monetary policy, and a stable exchange rate carries the advantage of reducing transaction costs.²

The present paper provides a framework in which the costs and benefits of a fixed exchange rate are based on a country's ability to meet its external obligations while achieving a maximum rate of output growth. The assumption is one of a small, open economy with few or no restrictions on capital account transactions. In addition, it is assumed that macroeconomic policies are broadly consistent with the exchange rate target (i.e., there are no excessive fiscal deficits, and monetary policy has as its sole objective the maintenance of the nominal exchange rate or a pre-announced crawl).

The driving force in determining the cost of abandoning or maintaining the peg is the accumulation of foreign debt, and the quality of a country's financial intermediation sector plays a crucial role in determining the sustainability of a peg over time. Foreign debt accumulation is a function of total investment, savings, and foreign direct investment. The larger the stock of foreign debt, the more worthwhile it is for the authorities to maintain the peg. This is a "negative" motivation, stemming from the potential losses that arise from higher costs of foreign debt service in domestic currency in the case of devaluation. Maintaining a peg also can entail costs, however, in the form of higher interest rates, which lower investment. With a given interest rate necessary to maintain the peg, that is, to sustain sufficient capital inflows (or stem too large capital outflows), the higher the capital productivity, the lower are these costs. Capital productivity, in turn, depends, for any given stock of capital, on the institutional setting under which the economy operates. Together, these relationships determine the costs of maintaining and abandoning a fixed exchange rate.

² Of course, the introduction of a fixed exchange rate also entails adjustment costs to the new regime. These costs are, however, sunk costs once the regime has been established and are not modeled in this paper.

The main conclusions derived are that the institutional setting of the economy is crucial in sustaining a peg, that the capital account needs to be liberalized cautiously, and that foreign direct investment should be encouraged to limit indebtedness and, thereby, the exchange rate risks for the domestic economy.

II. THE MODEL

The model presented here serves to highlight an important determinant of sustainability of a fixed exchange rate in the case of a developing country: the quality of institutions in general, and of the financial intermediation sector in particular. Together with the evolution of foreign indebtedness, institutions, or structural policies, influence the costs of maintaining and of abandoning a fixed exchange rate.

Two aspects are taken here to model the importance of these factors to the exchange rate regime: the structure of the capital account, and the quality of banking supervision. Both have a profound influence on the benefits and costs of a fixed exchange rate. It is assumed that the exchange rate has been pegged in order to provide a generally more stable environment for international trade and capital flows, and because a fixed (or, for that matter, crawling) exchange rate reduces transaction costs. The link between institutions and costs and benefits of the fixed exchange rate runs via foreign indebtedness and productivity of investments.

Foreign indebtedness is directly linked to the potential losses from abandoning the peg. A given stock of foreign debt, which must be serviced in foreign currency, is smaller in terms of domestic currency if the exchange rate under the fixed exchange rate regime is more appreciated than the rate that would prevail in a setting where monetary policy pursues other objectives than maintaining the external value of the currency. Therefore, the larger the stock of foreign indebtedness, the more valuable the peg becomes for the authorities. This setup excludes the possibility of a peg's being abandoned because of **upward** pressure on the exchange rate. This case is not considered since such a situation is at least in the short term a manageable one, and no serious financial problem should occur when or if the exchange rate is revalued or the peg abandoned and the domestic currency subsequently appreciates (Eichengreen, Masson, and others 1998).

The costs of pegging are driven by the productivity of investment: the interest rate required to maintain the peg at a given rate is determined by the world interest rate and a country-specific risk premium. Given this interest rate, the lower the returns on investment are, the higher are the costs of pegging since investment and, thus, output growth are lower than with a lower interest rate. These links determine the loss function that the government faces, and, hence, if or when the peg is abandoned.

The assumption is that, in a small, open, developing economy, the government's objective is the maximization of economic growth: the credibility of policies or of a commitment to an exchange rate peg is of no value per se, but only serves to underpin economic growth.

A. The Loss Function

The government's objective is to maximize growth over the business cycle; this implies that it wants to keep interest payments to foreigners—stemming from private as well as public debt—at an optimal level determined by intertemporal utility maximization. The higher the returns on investment made with the capital on loan, the easier it is to repay the debt. However, the burden of debt service depends also on the exchange rate: it is assumed that foreign debt is entirely denominated in foreign currency, which makes interest payments in terms of domestic currency more expensive after a devaluation.

The government therefore minimizes the losses to output growth by choosing the least-cost path of either devaluing (or floating), and thereby incurring higher debt-service costs, or defending the exchange rate, and thus slowing growth with high interest rates. An additional motivation for the government to avoid too high interest rates is the state of the financial intermediation sector. If banks are weak, too high interest rates may undermine the stability of the financial sector, which exacerbates the cost of defending the peg.

B. The Financial Intermediation Sector

The economy is modeled as consisting of two sectors, a production sector Y and a financial sector F . The purpose of the latter is to intermediate between capital holders and capital users. The financial sector performs a range of key services to firms: it mobilizes savings and allocates capital, and in so doing manages risk, evaluates projects, and monitors managers (King and Levine, 1993a). Banks then—if well run and supervised—allocate capital to projects where expected returns are highest. The services performed by the financial sector at the macroeconomic level become an input to the real economy:

$$F = [(1 - \phi_K)K]^\delta [(1 - \phi_L)AL]^{(1-\delta)} \quad (1)$$

$$Y = (\phi_K K)^\alpha (\phi_L AL)^\beta F^\gamma \quad (2)$$

where $(1 - \phi_K)$ and $(1 - \phi_L)$, respectively, are the shares of capital (K) and effective labor (AL) allocated to the financial sector.³ α , β , γ , and δ are parameters, with $\alpha + \beta < 1$, and α , β , γ , and $\delta > 0$. The returns to capital and effective labor, taken together, are smaller than

³ It can be shown that, in competitive equilibrium, $\phi_K^* = \frac{\alpha}{\delta\gamma + \alpha}$ and $\phi_L^* = \frac{\beta}{(1-\delta)\gamma + \beta}$.

These values are independent of whether returns to scale are increasing, constant, or decreasing, and they are optimal in the sense that, if they obtain, the output of the real sector Y is maximized.

unity in the production sector, reflecting the modeling of the financial intermediation sector as an input to this sector. The introduction of the parameter γ serves to mimic the capital allocation function of the financial sector. With γ determining the contribution of the financial sector to output and influencing returns to scale in the economy, a high value of γ implies well-run and well-supervised banks that finance sound projects, thereby rendering returns to capital in the economy higher than a weak banking sector could. The equation assumes that returns to scale are increasing in such an economy if the value of γ is high enough. A more developed banking system can reap scale economies in its functions of risk evaluation and monitoring of projects, leading to faster growth if the financial system is more developed.⁴ In King and Levine (1993b), economies of scale in the financial system lead to a higher rate of research and thus faster technical progress, but the reasoning can be extended to the economy in general. Lower intermediation costs and better spreading of risk render the introduction of technologies where there are fixed (or sunk) costs less expensive.

After substituting equation (1) into (2), returns to capital (i.e., its marginal product) can be expressed as

$$\frac{dY}{dK} = (\alpha + \delta\gamma)\phi_K^\alpha \phi_L^\beta (1 - \phi_K)^{\delta\gamma} (1 - \phi_L)^{(1-\delta)\gamma} K^{\alpha+\delta\gamma-1} (AL)^{\beta+(1-\delta)\gamma} \quad (3)$$

The returns are thus positively dependent on γ . By improving the allocation of capital, a better financial intermediation sector raises the growth rate of the economy and fosters development by allowing entrepreneurs “to force the economic system into new channels” (Schumpeter, 1911, p. 106). With the banking system pricing capital and risk, it serves as a coordinator of economic and, in some models, research activity (King and Levine, 1993b).

C. The Link between the Capital Stock and Debt

The external constraint of a small, open, developing economy is given by the usual balance of payments identity. The capital account, the current account, and changes in reserves must balance out by definition. The capital account (KA) is here simplified to consist of two components only: foreign direct investment (FDI) and increases in foreign debt (\dot{D}):⁵

$$KA_t = FDI_t + \dot{D}_t \quad (4)$$

⁴ Although, in the model outlined the output of the financial sector F is not subject to scale economies, the variable γ does capture this feature as well.

⁵ This excludes financing a current account deficit by drawing down foreign reserves.

where the subscript t denotes time. Depreciation of capital is assumed to be zero, and therefore the increase in the capital stock (\dot{K}) is equal to investment (I), which is, in turn, the same as the sum of total savings (S) and the capital account:

$$\dot{K}_t = I_t = S_t + FDI_t + \dot{D}_t \quad (5)$$

Therefore, for any given increase in the capital stock, the higher savings and foreign direct investment are, the smaller is the increase in the debt burden.

The capital stock of the economy is, with zero depreciation, the sum of investments made in prior periods:

$$K_T = \sum_{t=0}^T I_t, \quad (6)$$

whereas the stock of foreign debt is, by parallel reasoning and solving equation (5) for debt,

$$D_T = \sum_{t=0}^T (I_t - S_t - FDI_t). \quad (7)$$

Using equation (6), this translates into

$$D_T = K_T - \sum_{t=0}^T (S_t + FDI_t). \quad (8)$$

Thus, the debt level is proportional to the capital stock if investment, savings, and foreign direct investment grow at the same rate, which is assumed.

D. Plugging the Model Together

The next step to construct the framework is to establish relations between the capital stock and returns on investment; between returns on investment and the costs of keeping the peg; and between the capital stock (and, given FDI and savings, the debt burden) and losses resulting from abandoning the peg. Together, these relations provide a framework within which the net benefits of a fixed exchange rate can be determined, given the government's utility function.

The capital stock and returns on investment

The capital stock—and thereby, implicitly, the debt level as established in equation (8)—and returns on investment are linked in accordance with neoclassical theory. An increasing

capital stock triggers falling returns to capital (given technology and the labor force). Although New Growth theory has created models where long-run marginal returns to capital are taken as constant (Grossman and Helpman, 1991), the experience of developing countries, in particular the East Asian economies, was that a large part of output growth could be accounted for by increasing factor inputs, and returns on capital were indeed diminishing (Kim and Lau, 1994; and Young, 1994).

However, an important additional factor determining returns on investments is the quality of the financial sector that intermediates between creditors and entrepreneurs. A third factor influencing returns on investment is openness to foreign trade, the measure for which is

$$\Theta = \frac{X + M}{Y}, \quad (9)$$

where X is exports, M imports, and Y output.

Foreign trade influences capital productivity through two main channels. First, with a more open trade regime, the allocation of factors of production is more efficient, as domestic relative prices are—owing to competitive pressure—more closely in line with world relative prices (World Bank, 1993). This increases the pressure on domestic producers to employ factors of production more efficiently, thereby raising productivity. The second channel is represented by knowledge spillovers and transfers of technology; as the economy is—through trade—more open to foreign influences, it can easier obtain information on new techniques and is, owing to competition, more likely to employ them. Again, more technological possibilities raise capital productivity.

Returns on investments (ROI) are then a function of K , γ , and Θ :

$$ROI = f(K, \gamma, \Theta). \quad (10)$$

A higher γ is associated with a better allocation of financial resources at all levels of capital stock and shifts the curve upward in the K - ROI space. Likewise, Θ , the variable for openness, influences ROI positively (as a shift parameter), since a more open trade regime allows the economy to reap the potential factor allocation benefits (in addition to those stemming from the quality of the financial sector) and knowledge spillover benefits of foreign trade at any level of the capital stock.

Returns on investment and the cost of pegging

Returns on investment have an impact on the cost of fixing the exchange rate. In order to maintain the peg, a real interest rate \bar{r}_t (defined as the nominal interest rate minus the

inflation rate) is needed that may be higher than under a floating exchange rate.⁶ With a given interest rate, the higher the returns on investment (i.e., capital productivity), the higher productive investment will be and the higher the economy's growth rate.⁷ The relation between the cost of pegging, C_P , and ROI thus becomes

$$C_P = f(ROI, \bar{r}_t - r_t) \quad (11)$$

where \bar{r}_t is the real interest rate necessary to maintain the peg and r_t the real interest rate under a float. The larger $(\bar{r}_t - r_t)$ is, the higher is the cost of the peg at any level of returns on investment, thus shifting the curve upward in the $ROI-C_P$ space.

The capital stock and the losses arising from abandoning the peg

The benefits—and thus the potential loss upon abandonment—of a fixed exchange rate are twofold. First, the foreign debt burden denominated in domestic currency is less volatile, which increases the overall stability of the economy and may reduce the costs of adjustment to temporary shocks. Second, the level of foreign debt denominated in domestic currency is lower under a fixed exchange rate if, with the peg abandoned, the domestic currency were to depreciate. Thus, with exchange rates fixed, the debt-servicing costs for both the government and the private sector are lower than under a float, or with a devalued currency.

The higher the debt-service payments by the government are, the lower must be expenditure on other items if a given overall expenditure stance is to be maintained. A similar reasoning applies to the private sector. In order to pursue its goal of growth maximization, the government thus wants to keep these payments to foreigners, whether from private or public sources, as low as possible, given the level of debt.⁸ With rising foreign indebtedness, the peg becomes more valuable for the government.

In order to translate the relation between the debt level and the loss from abandoning the peg into one between the capital stock and potential loss, the relation between debt and the capital stock of Section (II.C) is needed (equation 8). The higher the savings and foreign direct investment are, the lower is the level of debt at any given stock of capital. This implies that,

⁶ This \bar{r}_t applies to domestic and foreign debt contracted in period t . Interest on foreign debt is assumed to be fixed so that payments on foreign debt contracted in $t-n$ carries an interest rate of \bar{r}_{t-n} .

⁷ If investment is to include a broader form of investment such as in human capital and research and development, ROI can be viewed as a measure of total factor productivity.

⁸ Of course, the currency must not be so overvalued that exports falter and the capability of the economy to earn foreign exchange is threatened.

at the same level of capital, the higher S and FDI , the smaller are the losses from abandoning the peg.

Both savings and foreign direct investment are a function of policies. Domestic savings depend on a host of government policies, ranging from the government's own budgetary stance to the degree of financial repression, all of which influence real interest rates. Similarly, foreign direct investment is influenced by laws regulating such investment, bureaucratic procedures, and infrastructure. Both policy sets are summarized here in one variable σ , a higher value of which indicates more foreign direct investment and higher savings for a given increase in the capital stock. The potential loss (L_P) from abandoning the fixed exchange rate is then

$$L_P = f(K, \sigma) \quad (12)$$

where σ is a slope parameter: the larger σ , the slower the accumulation of debt for a given rate of capital accumulation, and the flatter the curve in the K - L_P space.⁹

The relations among the capital stock, returns on investment, and costs and benefits can be depicted in a four-quadrant diagram (see next page). Whether, as the capital stock grows, the costs of maintaining outweigh those of abandoning the exchange rate depends on three main factors.

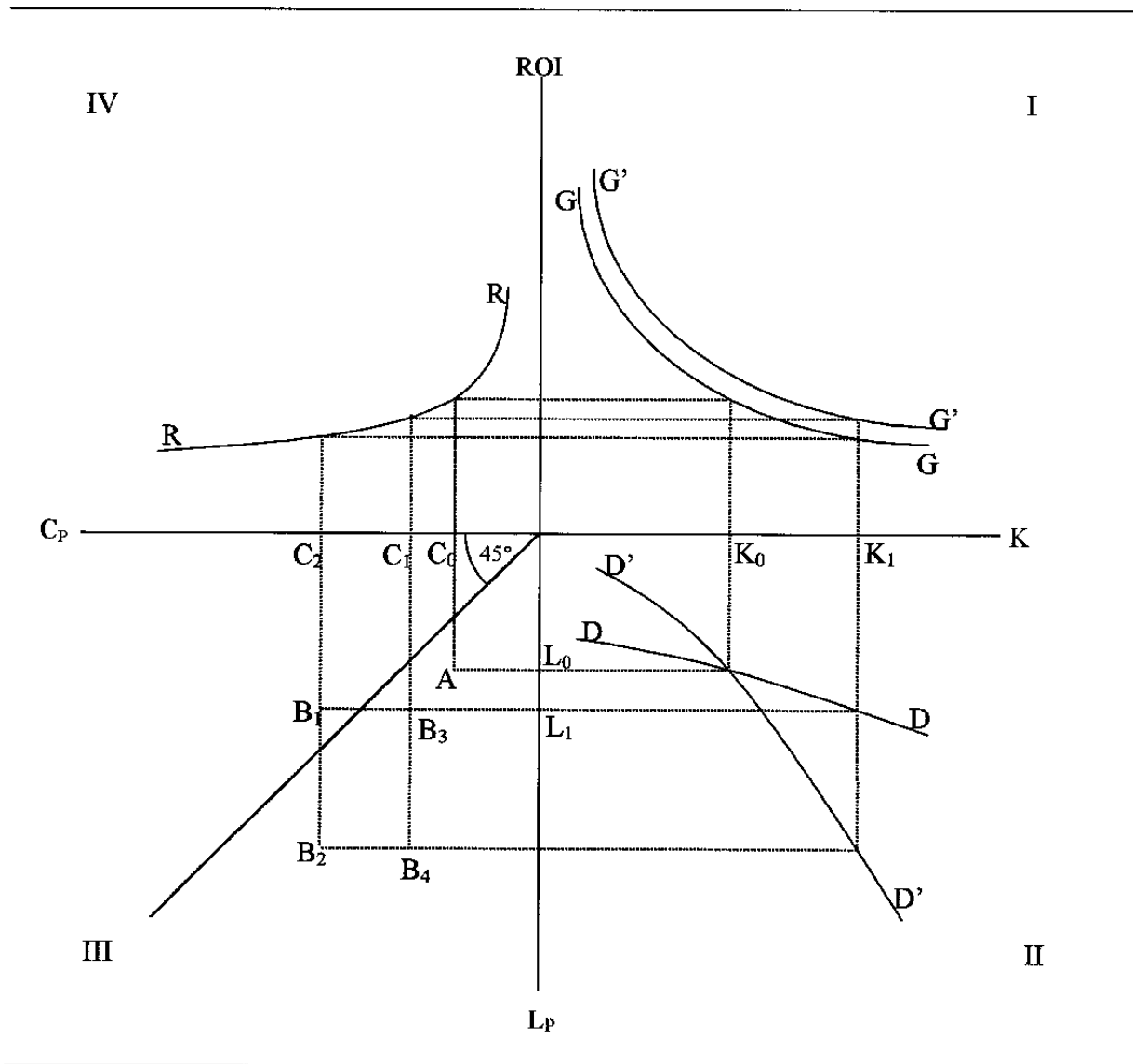
First, the policy parameter σ influences the financing of investments through domestic savings, foreign direct investment, and debt accumulation, and thereby determines the slope of the curve in the second quadrant. Second, the quality of the financial sector, γ , (which shifts the G - G curve in the first quadrant) and openness to trade, Θ , drive returns on investment and thus, directly, the growth rate. Third, the real interest rate differential necessary to maintain the peg is an indicator of the riskiness of holding assets denominated in domestic currency and influences the position of the R - R curve.

Starting with a capital stock K_0 , a relatively flat D - D curve (which indicates high savings and foreign direct investment), and the G - G curve, which shows the relation between the capital stock and productivity, the economy is initially at point A , where the potential losses from abandoning the peg outweigh the cost of maintaining it. With the capital stock rising to K_1 , the economy reaches a potential-loss level of L_1 , and a cost level of C_2 , and the economy

⁹ Strictly speaking, the parameter for efficiency of the financial sector, γ , should also influence the slope of the potential loss curve, since the overall productivity of the economy—and, therefore, also, to an extent, foreign direct investment—is in part determined by the quality of financial intermediation. However, regimes governing foreign direct investment are captured by the parameter σ , which is also influenced by factors that have nothing to do with the efficiency of the financial intermediation sector. Therefore, σ comprises γ , as well as other factors.

moves to point B_1 , where pegging is no longer worthwhile. If, however, for some reason there are lower savings or lower foreign direct investment (and the $D'-D'$ curve is relevant), the economy moves to point B_2 , remaining to the east of the 45° line. If the government manages to increase the productivity parameter γ (or increases openness) while the capital stock is growing, thereby shifting the $G-G$ curve upwards to $G'-G'$, the end point, depending whether the $D-D$ or the $D'-D'$ curve is relevant, is either point B_3 or B_4 . There, the peg is still worth maintaining, at costs C_1 , which are lower than C_2 . In addition, the higher foreign debt level at B_4 to an extent increases the credibility of the peg vis-à-vis point B_3 , as this high debt level imposes a greater 'threat' on the authorities not to devalue.

Figure 1



Therefore, the further to the southeast in the third quadrant the economy is, the more credible is the peg, as the costs of abandoning are higher and costs of maintaining are relatively low. Conversely, the more to the northwest the economy is, the less credible the peg, until at the 45° line it is abandoned. In addition, the more the economy moves to the southwest, the worse are the choices the authorities face, as the costs of pegging, as well as the costs of abandoning, increase. The economy becomes more vulnerable as the costs of either course of action rise.

Institutional improvement and trade liberalization as the economy grows are therefore crucial for the sustainability of the peg, since these actions increase returns on investment and thereby lower the cost of maintaining the fixed exchange rate. As a corollary, a policy designed to raise domestic savings and attract foreign direct investment decreases the dependency on the peg and leaves the government more policy leeway. This may, of course, still lead to the decision that a pegged exchange rate is best, in particular if the economy is small and open; however, the exchange rate can more easily be adjusted in the face of shocks owing to lower abandonment costs, and the output costs of maintaining the peg are smaller.

E. Attacks, Contagion and Shocks

Perfect information and shocks to the economy

In a world of perfect information, where markets know the economy's position in the four-quadrant diagram, and where they know the government's loss function, there is no need for the authorities to establish reputation and credibility. Indeed, it would be unnecessarily costly to do so.¹⁰ Therefore, the only motivation for the government to defend a peg even if instantaneous costs outweigh the benefits, namely, to signal its intentions and establish its reputation, is absent under perfect information.

If the currency is attacked, the R - R curve shifts to the left since the interest rate required to defend the peg rises, pushing the economy to the left in the third quadrant. In this scenario, the costs of maintaining the peg suddenly could outweigh the costs of abandoning it, leading the government to abandon the peg.¹¹ When interest rates can be lowered after the attack, the economy may well swing back to a point where a peg is again worthwhile, and the authorities can reinstall the peg at a different parity. Market participants believe the renewed peg can be sustained, since they know the position of the economy at any point in time.

¹⁰ Since establishing credibility entails suffering some short-term economic losses, this is costly. If it were not, credibility would be meaningless.

¹¹ It is assumed that the central bank does not sell foreign reserves, as this can only be a temporary measure, justifiable only if there are good reasons to assume that the attack will soon subside.

An attack occurs if the economy moves so close to the 45° line, that it is bound to cross it. Then, the risk of devaluation and (partial) debt default increases, and financial investors demand a higher risk premium, thereby shifting the $R-R$ curve to the left and pushing the economy across the 45° line. The point in time when the attack occurs depends on the maturity of the debt outstanding; the shorter the maturity, the shorter is the time horizon of foreign debt-holders. Therefore, the shorter the debt maturity, the later the attack occurs, that is, the closer to the 45° line the economy is allowed to move before the attack. This effect of short debt maturities is dangerous as such a debt structure shortens the time horizon of investors and thereby allows the exchange rate to be sustained longer, while more debt accumulates and productivity deteriorates, *ceteris paribus*. This moves the economy to the southwest of the third quadrant and makes abandonment of the peg, as well as its continued sustenance, more costly.

After devaluation, interest rates fall (still assuming perfect information) and the economy moves back to its original position (or even further to the east in the diagram, if interest rates fall below the preattack level). Although the debt burden, as denominated in domestic currency, has risen, this does not influence the $D-D$ curve or the economy's position on it, as the costs of abandoning the peg are sunk costs. After devaluation, foreign debt must still be serviced, and the economy is in a worse situation than before in this respect. However, the lower interest rates will lead to higher investment and higher growth.¹²

Imperfect information and shocks to the economy

Under imperfect information, however, signals become important, as they can create credibility. The government's actions provide additional information to markets. If the authorities defend an exchange rate, this signals that they are willing to incur present output losses for gains from the peg, such as, for example, the reduction of exchange rate volatility vis-à-vis currencies of important trade partners, or an inflation rate that is lower than without the peg.¹³

If the economy experiences an adverse shock that requires a rise in interest rates pushing the economy to the left of the 45° line, the government may still decide to maintain or, in case of an attack, defend the peg. This decision depends on whether the authorities view the shock as temporary—and, if so, how long it will last—or permanent. Even if the economy is

¹² Under imperfect information, the possibility may also arise that interest rates cannot fall sufficiently after a devaluation, because of inflationary dangers. But this situation is unlikely to last long if the country does not have a history of too high inflation, as this track record will dampen inflationary expectations in the aftermath of devaluation. When the one-off effect of devaluation has fed through the economy, interest rates can be lowered again.

¹³ To an extent, the defense of the exchange rate may also entail a promise to reform those policies that have triggered the attack, or are incompatible with post-shock equilibrium. Whether markets believe this promise is another matter.

temporarily at a point like B_I in the figure where, in the static framework, instantaneous costs outweigh benefits, it may well be worth to maintain and even increase credibility by not devaluing (increased credibility may later even allow interest rates to be lowered below pre-shock levels). If the markets share the impression that the shock is only temporary, they will not attack the currency; otherwise, an attack occurs.

Contagion

Attacks on the currency can also occur as a result of contagion. Financial contagion implies a situation where, although the exchange rate can under normal circumstances be maintained, some event occurring elsewhere triggers an attack on the currency. The channels through which such a spillover can run are manifold: unwarranted changes in market sentiment, trade spillovers, financial linkages, or “demonstration effects” (i.e., a warranted change in market sentiment).¹⁴ “Rational” causes of contagion, like trade or financial linkages, or the demonstration effect, work like an adverse shock on the economy. The interest rate then needs to rise to sustain the parity, which increases the costs of pegging and may lead to abandonment.

If contagion arises from a shift in market sentiment, whether warranted or not, this requires some kind of market failure; information is no longer perfect. In such a setting, financial markets may perceive the economy to be at a different point than it is in reality. One channel through which imperfect information might be accommodated is the financial intermediation system. If foreign creditors lend funds to domestic banks, they have not many possibilities to observe productivity, and they may misperceive the location of the $G-G$ curve. A shift in market sentiment caused by a crisis elsewhere can then trigger an attack on the currency (Masson, 1998).

Contagion may then arise if, in one country, investors have optimistically misperceived the location of the $G-G$ curve (i.e., they have thought it was at G^1-G^1 instead of its real location in the figure at $G-G$). This implies that the economy was much closer to the 45° line than perceived. Then, something occurs to correct this view, e.g., a banking crash, and an attack occurs. The risk premium rises, pushing the $R-R$ curve to the left, and the economy over the 45° line. The decision whether to abandon the peg depends then on the authorities’ assessment of the situation; if the markets’ new perception of the $G-G$ curve is true, the government may abandon the peg without defending. If, however, markets have

¹⁴ Once a country has experienced difficulties, this adds new information to the set that investors already have, leading them to reassess the riskiness of their loans. Countries that are in some respects similar—whether they are in the same geographic region or have similar economic structures—may then be viewed through the “demonstration effect” as less creditworthy than previously thought. If this assessment is true, the first country has demonstrated the vulnerabilities of similar countries. Whether the reassessment of the other countries subject to the demonstration effect has been true or false is difficult to tell in practice since a speculative attack may be self-fulfilling.

misperceived the new $G-G$ curve, and if this misperception is likely to be only short-lived, the central bank may run down reserves (which avoids the interest rate costs but is not sustainable for a long period). Raising interest rates is more costly since it increases servicing costs of both private and official domestic debt and reduces investment, but it preserves reserves and signals the authorities' view of the economy's position and their willingness to defend the peg.

III. POLICY IMPLICATIONS

As the economy becomes more vulnerable as it moves to the southwest in the third quadrant, the authorities need to pursue policies that limit the costs both of maintaining the peg and of abandoning it.

The framework focuses on the influence in a developing country of the financing structure of capital accumulation and of domestic institutions, in particular the banking sector and the trade regime, on the sustainability of an exchange rate peg. The framework thereby points to policy levers that the government can use in order to sustain the fixed exchange rate and limit the potential damage in case of an adverse shock or a contagious attack. Two policy areas emerge as being of particular importance: domestic institutional reform, which comprises financial system reform, trade policies, and domestic competition policy; and the pace, extent, and structure of capital account liberalization. Such policies, however, cannot be implemented overnight and must therefore be initiated long before, for whatever reason, an attack occurs.

A. Domestic Institutional Reform

The body of institutions governing an economy is one of the—if not the single—most important determinants of long-run performance (Olson, 1996). Institutions—together with technology—determine transaction costs (North, 1987).¹⁵ Transaction costs, in turn, influence the opportunities for economic exchange and, ultimately, productivity. Institutions are here defined as consisting of “effective conventions” (i.e., the body of informal and formal rules that governs economic and social exchange), and the effectiveness with which they are enforced.¹⁶

¹⁵ North and Wallis (1986) estimate the size of the transaction sector in the United States in 1970, including government expenditures for transaction services, at about 45-54 per cent of GNP.

¹⁶ The reason for defining institutions to comprise rules **and** their enforcement is that government policies (i.e., the proclaimed rules) and actions may not always coincide, either because the government does not seriously want to enforce its own rules or because it cannot, for lack of administrative capacities.

This myriad of rules is clearly too complex to incorporate into a single model. However, the two most significant institutions having an impact on the exchange rate in the framework outlined above are competition policies and trade regimes, on one side, and financial supervision, on the other.

Trade regimes and competition policies

A high degree of competition is a powerful tool to raise factor (not only capital) productivity. To achieve this may pose a severe problem within the small markets of developing economies if there are economies of scale. A way out of this dilemma of small markets is to implement an outward-oriented trade policy. As is well documented, such export-led development is a sine qua non for a successful growth strategy for developing countries (Krueger, 1995). Apart from static gains along the lines of the classical trade model, export orientation ensures fiercer competition and incentives for innovation, as the world market becomes the reference point for domestic producers.¹⁷ Furthermore, integration with world markets requires an exchange rate that is set at a realistic level (i.e., one that is neither too much overvalued nor undervalued), and thereby improves resource allocation. Thus, not only does a stable exchange rate improve the environment for international trade, but, in turn, trade also facilitates the maintenance of a pegged exchange rate.

Nevertheless, these beneficial effects that arise “automatically” from an export-oriented development strategy must be underpinned by policies that ensure competition in domestic markets. If some import restrictions remain in place and the import-competing sector is thus somewhat insulated from foreign pressure, competent and powerful competition authorities are necessary to maintain competition in the import-competing sector as well as in the nontradables sector.¹⁸ Such a competition policy is not only desirable in its own right, but is also important to reduce the costs of maintaining the exchange rate by facilitating the servicing of debt through increased productivity.

With a fixed exchange rate, borrowing from abroad becomes easier and less risky for the private sector. Domestic agents—banks as well as nonbanks—may then borrow abroad and invest not only in the export sector, which generates foreign exchange earnings, but also in the nontradables and import-competing sectors, which do not. To prevent such a mechanism

¹⁷ However, in several countries in East Asia, following an approach of outward-oriented trade policies has not induced a very rapid pace of innovation. The growth of total factor productivity has been hampered by institutional weaknesses, such as banks that lend not only on the basis of expected profitability of investments but also to sectors deemed “strategic” by the government. Also, “crony capitalism”, i.e. lending to politically well connected investors, has played a role. (Kim and Lau, 1994; and Young, 1994).

¹⁸ Indonesia is an example of an economy that combines strong outward orientation with limited competition in the domestic market, as some sectors of the economy have been dominated by monopolies.

from creating debt service costs that are not covered by sufficient foreign exchange earnings, it is imperative also that competition in the nontradables and import-competing sectors ensures high capital productivity to service the loans.

Financial supervision

An additional instrument to raise capital productivity is financial deregulation, combined with the strengthening of banking supervision. The perpetual moral hazard problem in the financial sector, caused by the systemic risks of banking failures and the consequent government intervention in the form of deposit guarantees, requires regulation and supervision as a counterweight to potentially excessive risk taking on the part of financial institutions.

However, in order to reap the benefits of an efficient financial sector, regulation should not be excessive. The prohibition of certain financial instruments is an easy—if not entirely safe—way to ensure that banks do not take excessive risks, but, as it prevents competition and the full exploitation of financial instruments to spread risk, it thereby jeopardizes the ability of financial markets to achieve a maximum degree of efficiency. The case for capital market liberalization is, therefore, strong; however, if, in line with deregulation, competition in the financial sector increases, banks are more likely to take on higher risks (Leung, 1995), which requires improved supervision. Supervision and remaining regulation therefore become crucial in ensuring a strong and efficient financial intermediation sector. Inadequate supervision is likely to lead to excessively risky lending. The problem becomes especially large in the period when financial sector deregulation is under way, when banks do not have much experience in assessing risks and are likely to overreact in the new, competitive environment. When the financial sector is in transition, the government must also clearly reduce any explicit or implicit protective guarantees that may have existed prior to deregulation to the inevitable protection of depositors. If the authorities fail to take the required actions, the combination of loosened regulation, increased competition, and weak supervision with lingering guarantees is bound to lead to excessive risk taking and an unstable and weak financial sector (Krugman, 1998).

Tight financial supervision—and the adequate staffing and funding of supervisory bodies—is thus an important policy to reduce the costs of pegging. When, in addition, the capital account is liberalized, such policies become imperative. This importance has been highlighted in the Asian financial crisis; almost universally, the forced floating of currencies and the severe contraction of Asian economies have been attributed at least partly to the excessive lending by underregulated and weakly supervised banks prior to the crisis (IMF, 1998; and Greenspan, 1998). It is therefore important that tight rules are not only set but also enforced.

Creating a competitive environment serves to lower the cost of a fixed exchange rate, and this can be achieved through integration into world markets, domestic competition policies, and a strengthening of the financial system. In addition, in order to limit the costs of abandoning the peg, foreign indebtedness must be limited; thus the structure of the capital

account is another area where policies influence the vulnerability of a country with a fixed exchange rate regime.

B. Capital Account Liberalization

When the economy becomes more sophisticated, the number of firms and of transactions increase, and when the domestic financial sector is liberalized, capital controls becomes increasingly difficult and costly to maintain (Leung, 1995).

However, the opening up of the capital account is also not without challenges. Capital inflows, either as portfolio capital or bank loans, which usually accompany the opening of the capital account, lead, under a fixed exchange rate and if there is no spare capacity, to a rise in the domestic price level and, consequently, to a loss of competitiveness of the export sector. However, these capital inflows exert downward pressure on interest rates, thus shifting the R - R curve inward and reducing the costs of the peg.¹⁹ However, the real appreciation lets the current account deteriorate and shifts the production pattern from export- and import-competing sectors toward the nontradables sector, which is shielded from exchange rate movements. This shift not only jeopardizes export-oriented development strategies,²⁰ but may also lead to a specific, more dangerous problem. If a speculative bubble emerges in an important nontradables industry, such as the real estate sector, rising asset prices there threaten to prolong confidence in the entire economy. This confidence, is not sufficiently underpinned by productive capacity in the tradables sector—which earns foreign exchange—any more. Capital inflows—which are the cause and, in a second round, the consequence of the bubble—may prolong the exchange rate parity by hiding a slowdown of capital productivity growth in the tradables sector of the economy (which is likely to occur as the real exchange rate appreciates). If capital inflows consist largely of portfolio investments and bank loans, as opposed to foreign direct investment, this problem is exacerbated as confidence is retained at the price of higher indebtedness.

The composition of capital inflows is important to limit the vulnerability of the economy and reduce its dependency on the peg. If restrictions on foreign ownership are imposed in the nontradables industries, or if foreigners take into account the currency risk (because their revenues are in domestic currency), foreign direct investment is less likely to occur in this sector. In addition, falling returns in the tradables sector imply relatively less foreign direct

¹⁹ Sterilized intervention in foreign exchange markets maintains money supply at preliberalization levels and thereby avoids lowering interest rates and inflationary pressures. However, unchanged high interest rates encourage further capital inflows; consequently, the effectiveness of such a policy is limited (Haque, Mathieson, and Sharma, 1997).

²⁰ The government can also, to a limited degree, use the real appreciation to increase pressure on the tradables sector to improve productivity. If this is the case, however, following a policy of gradualism is important so that the economy gains time to adjust to the higher real exchange rate.

investment there. Loans would then constitute a larger share of capital inflows, increasing the dependency on the peg.

Capital account liberalization therefore carries risks; however, as has been said above, the growing sophistication of the economy, increasing levels of output, and internal financial liberalization necessitate an opening of the capital account. The benefits are not negligible: international capital markets fuel growth as they loosen the constraint of domestic savings on investment, and liberalization can smooth shocks to income and consumption (Johnston, 1998). This advantage of external liberalization is likely to outweigh the dangers, if it is done in such a way as to avoid excessive debt (and pressures on the price level). The structure of capital inflows thus gains overwhelming importance in determining the dependence of the financial sector, in particular, and the economy, in general, on the pegged exchange rate.

To encourage foreign direct investment and reduce debt accumulation even in the face of an opening of the capital account, the government should improve the rule of law in general, and change or abolish rules that limit foreign ownership.²¹ Furthermore, complementary institutional policies should concentrate the government's resources on providing a relatively clean bureaucracy, clear and simple procedures, and the provision of infrastructure. These policies are beneficial in any circumstances, but with regard to foreign investment they are especially important. The seemingly easy circumvention of this task, namely, through borrowing, merely shifts the exchange rate risk from foreign investors (if their earnings are in domestic currency) to the domestic private and public sectors. If this course is adopted, the challenge for the government is hidden, but the long-term costs in the form of a greater dependence on the exchange rate and a higher price of abandoning it eventually reappear.

The sequencing of capital account liberalization then becomes an important issue. Capital account liberalization and the strengthening of the banking system are influencing each other. However, in light of the Asian crisis, it appears imperative that banking systems and supervision be strengthened first, in order to avoid the risks associated with largely free capital flows and a weak banking system. The improvement of supervision cannot be accomplished in a short time, as trained and experienced personnel are not available at short notice; hence, a long period of preparation must be allowed, and a course of gradually opening the capital account while further strengthening supervision and regulation should be adopted.

In order to preserve policy leeway, minimize the dependency on the exchange rate parity, and reduce the costs of abandoning the exchange rate, the level of foreign indebtedness must be minimized. Measures that increase incentives for foreign direct investment, with a view to

²¹ Another straightforward policy would be to liberalize long-term capital flows before short-term ones—a policy that has been pursued by Chile. However, the effect of such policies (in Chile's case, a reserve requirement on short-term capital inflows) is only temporary (IMF, 1998). Still, such a temporary effect may buy valuable time to strengthen financial supervision while opening the capital account at least somewhat.

limiting direct borrowing, are thus important. In addition, supervision of the financial sector—not only to improve allocative efficiency (see previous section) but also to ensure the safety of the financial system and, thus, to protect the economy—must be strengthened so that the financial system is able to cope with capital inflows.

IV. CONCLUSION

The framework presented here focuses on institutions and policies as the crucial factors to support a pegged exchange rate. Prudent macroeconomic policies, manageable fiscal deficits (or surpluses), and a monetary policy geared to maintaining the exchange rate parity are undeniably crucial in protecting a fixed exchange rate. Yet these policies need to be complemented by an outward-oriented trade policy aimed at raising productivity, and by institutional development, including the creation of regulatory bodies.

If these complementary policies are not implemented, macroeconomic policies to maintain the peg may prove so costly that the government is not willing to sustain them. This is not a problem if the costs of abandoning the peg are not too high; however, if indebtedness is high, the costs of abandoning can be substantial. Therefore, it is important to keep the economy in a position where costs of both courses of action (maintaining or abandoning the peg) remain limited.

Most important is the achievement of a high level of productivity, which lowers the direct costs of maintaining the peg. On the potential loss side, at a given level of interest rates, a liberal foreign investment regime limits direct foreign indebtedness and transfers risks to the foreign private sector. This risk transfer is not costless (investors will demand higher returns), but it avoids exposing the economy to excessive foreign debt accumulation. In addition, the higher returns demanded by foreign direct investors can push the economy into a virtuous circle: if the authorities manage to create an investment-friendly environment, foreign investment and the gains therefrom will enable them to further improve foreign investment incentives, such as improved infrastructure and a better-educated workforce.

The problem of the costs of maintaining and abandoning a pegged exchange rate is also important with regard to credibility issues. A government that tries to “borrow” credibility by pegging the currency can reap short-term benefits by lowering inflationary expectations and exchange rate volatility. However, in the medium run, this credibility must be earned by prudent macroeconomic management and institutional development. Not only monetary policy must be devoted entirely to maintaining the peg, but also fiscal, trade, and regulatory policies need to be conducted at least with the exchange rate in view. If these policies do not support the fixed exchange rate, costs will eventually outweigh benefits, and the peg becomes prohibitively expensive to maintain. In this case, it is better to abandon the exchange rate parity sooner, when costs are still moderate, rather than later.

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