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LIBERALIZATION WITH STABILIZATION  
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## LIBERALIZATION WITH STABILIZATION\*

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"Financial and trade liberalization, with borrowing and lending at substantial real rates of interest made possible by a stable price level, is not easy and is full of potential pitfalls. Nevertheless, it remains the only game in town as far as successful economic development is concerned" (McKinnon 1989, p.53).

### 1. Introduction

The growing recognition in developing countries of the distortionary effects of government intervention has led in recent years to numerous attempts at liberalizing the domestic financial system, the exchange rate regime, and international movements of goods and capital. All these efforts, which have spawned a rich and growing literature on both the theory of liberalization and the experience of a number of countries which have embarked on such programs, seem to suggest that there is a clear need for reform of the financial system of many developing countries, both to increase the efficiency of existing financial markets and to develop new markets to enable the financial system to serve better the needs of the real economy.

These policies have also raised a variety of substantive issues, regarding most notably the appropriate sequencing of reforms, the optimal pace at which liberalization policies should proceed, and the conduct of short-run stabilization policy in an economy undergoing extensive structural adjustment. Moreover, aside from the transitional problems that usually reform packages face many economists have started questioning the very content of these packages and have argued that it may be misleading to view all forms of government intervention in financial markets as 'financial repression'<sup>8</sup> calling for a policy of 'liberalization'. It is for this reason that Gibson and Tsakalotos (1994), in their survey on the scope and limits of financial liberalization, suggest that McKinnon's view (cited above) on financial liberalisation being the only game in town' is unhelpful.

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Under the circumstances, what is needed in developing countries a better understanding of how financial markets work and in what way institutions are important, the aim being to develop and promote strategies which combine measures of financial liberalization with the development of old or the creation of new financial institutions\* This is clearly an important issue since liberalization of domestic financial markets has been the leit motif of a number of developing economies of late. Including India, all of whom seem to be motivated by a common goal: less government intervention.

One reason for this motivation seems to be the widely held notion that government-led development policies in many LDCs has resulted in 'shallow finance'<sup>1</sup> rather than 'deepening finance' which, inter alia, matters in promoting economic growth (Show 1973). If inflation occurs, although nominal finance rises, real finance does not rise by the same proportion since it is taxed away by inflation and this state is referred to as shallow finance. When finance is shallow as a proportion of income, real rates of return tend to be very low, even negative. When finance is deepening lone index of which is an increase in liquidity reserves), governments can tend to be less dependent on taxes and foreign savings, capital flight is reversed and real savings grow in financial rather than physical assets.

Thus, the policy prescription of domestic financial liberalization entails a move towards a more market-oriented system. The typical program of liberalization comprises two main components. First, there is an attempt to allow interest rates to be market determined. Thus controls on both deposit and lending rates are abolished or reduced. Second, liberalization involves reducing quantitative controls in an attempt to allow financial intermediaries greater control over the use of their liabilities subject to certain minimum controls required for prudential (supervision).

However, most literature surveys on the set of policies carried out by many developing countries in the 1970s and 1980s seem to suggest that there could be certain theoretical limitations within the corpus of the financial liberalization literature which could have led to mistaken, or at least incomplete, policy programs. Central to much of what is being said here is: (i) that the definition of financial repression is too broad, including as it does not only intervention, which leads to genuine inefficiencies in financial markets but also intervention that can be seen as a response to market failure, and (ii) the need to take the design, operation and sequencing of reforms much more seriously than it has been done hitherto,

This paper briefly reviews the recent theoretical and empirical literature on monetary, financial, and exchange-rate reforms, with an emphasis on its resulting implications for the conduct of macroeconomic policy in the Indian context.. The first part focusen on the effects of domestic monatary and financial liberalization. We discuss in particular the evidence on Asian

countries, which has generated a substantial amount of literature over the years. The integration of domestic and foreign capital markets is examined in the second part, with particular attention being given to the implications of such reforms on monetary autonomy. The third part analyzes speculative attacks and balance of payments (BOP) crises, and highlights the fundamental proposition of open-economy macroeconomics that the viability of a fixed exchange rate regime requires maintaining long-run consistency between monetary, fiscal and exchange rate policies. A model of exchange regime collapse is then spelt out and estimated for the Indian economy in order to demonstrate how the BOP crisis of June 1991 could have been predicted. The last part discusses the optimal sequencing of alternative types of macroeconomic and structural reforms and digresses briefly on the lop-sided pace at which these liberalization policies have been proceeding in the Indian economy.

## 2. monetary Reform and Financial Liberalization

There is a subtle distinction between monetary reform and financial liberalization (see Park 1991). Monetary reform is defined as an increase in controlled interest rates to near equilibrium levels, with the rest of the restrictions on the behaviour of banks being left in place. By contrast, financial liberalization consists of a much more ambitious set of reforms directed at removing at least some of the remaining restrictions on bank behaviour. Full financial liberalization involves privatization of public financial institutions, the removal of restrictions to entry into banking (including those preventing access by foreign banks), the reduction of reserve requirements, the elimination of directed credit, and the freeing of official interest rates. As both monetary reform and financial liberalization have become increasingly common in the developing world, there exists a substantive body of empirical evidence regarding their effects.

### 2.1 Monetary Reform

The arguments for monetary reform, put forward initially by McKinnon (1973) and Shaw (1973), suggest that raising controlled interest rates should increase savings which should increase the quantity of investment (via the "complementarity" hypothesis of McKinnon or the "credit availability" effect of Shaw) as well as improve the quality of investment, thereby increasing the real growth rate. The evidence on these propositions has taken two forms: First, econometric studies have examined the individual links between the immediate policy objective (higher real interest rates) and the intermediate targets (savings and investment rates) or ultimate targets (growth rates). Second, a separate strand of research has evaluated the experience of countries\* that have undertaken monetary reforms.

The episodic evidence associated with specific country cases of monetary reform seem, at first glance, to provide at clear-cut

verdict in favour of the McKinnon-Shaw hypothesis. As an illustration, consider the Korean monetary reform of 1965, as described in McKinnon (1976), nominal deposit rates, which yielded negative real rates prior to the reform, were revised upwards, but not freed, in 1965, and directed credit restrictions were reduced but not eliminated - thus qualifying this episode as a monetary reform rather than a full financial liberalization. Real rates of return rose markedly subsequent to the reform, the savings rate increased, and growth experienced a very strong acceleration. McKinnon interpreted this as supporting his hypothesis of the positive effects of monetary reform on growth.

Fry (1988) undertook a systematic study of the econometric evidence for Asian countries, examining each step in the set of propositions linking monetary reform to economic growth. Using pooled cross-section - time-series regressions, he concluded that the weight of evidence supported a weak positive effect of real deposit rates on national savings rates, but a strong positive effect on the supply of credit. Credit supply, in turn, was found to have a strong positive effect on investment thereby supporting the "credit availability" effect. However, he found no evidence for the "complementarity" hypothesis which was tested by including the investment rate in a money demand function. Finally, Fry found evidence of two types in support of improved quality of investment. First, real deposit rates were positively correlated with the incremental output-capital ratio, taken as a proxy for the efficiency of investment. Second, the real deposit rate had a positive effect on growth. He obtained similar results in a more recent study on a larger set of countries (Fry 1993).

In Table 1, we have provided the relevant post-reform data on some key macroeconomic indicators for the Indian economy which include the nominal interest rate ( $i$ ); the savings rate ( $S/Y$ ); the investment rate ( $I/Y$ ); the real growth rate ( $g$ ); the incremental capital-output ratio (ICOR); the inflation rate ( $\pi$ ); and the ex-post real rate ( $r$ ). All variables, except the ICOR, are measured in percentages.

**Table 1**

Key Macroeconomic Indicators for the Indian Economy:  
Post-Liberalization Scenario

Year	$i$	$S/Y$	$I/Y$	$g$	ICOR	$\pi$	$r$
1992-93	12.5*	22.1	24.0	5.2	4.6	10.1	2.4
1993-94	10.5*	23.1	23.6	6.0	3.9	8.4	2.1
1994-95	10.0*	24.9	26.0	6.9	3.8	10.9	- 0.9
1995-96	12.0*	25.6	27.4	7.0	3.9	7.7	4.3
1996-97	11.0**	23.9	25.3	6.8	3.7	7.5	3.5

Note: \* Annual average of the 3-year term deposit rate

\*\* Annual average of the 1-year term deposit rate

Source: Economic Survey 1996-97

The post-liberalization evidence for the Indian economy, by and large, corroborates the econometric evidence. There is a very weak positive association between real deposit rates and the savings/investment rates, a fairly strong positive association between real rates and growth rates, and a substantially strong negative relationship between real rates and the ICORs. All these results are in general consonance with the pattern discerned for most Asian countries.

However, it has been argued that the finding of a positive association between the real interest rate and growth is equally consistent with causation from growth to interest rates, or from a common third factor (inflation) to both these variables. Gelb (1989) examined this issue in great detail, using a cross-section sample of thirty-four developing countries with data from 1965 to 1985, and concluded that the efficiency effect on investment, and not the volume effect, on savings, accounted for the positive relationship between real interest rates and growth. He also found that including other measures of distortion (specifically the inflation rate) weakened this relationship, although it remained positive. Gelb also found that an increase in the real deposit rate increased the share of domestic savings intermediated through the formal financial system, and that this share had a stronger effect on growth than the level of savings per se, which was interpreted as establishing the causal chain between real deposit rates and growth, that is, through more effective intermediation into high-productivity investment.

Dornbusch and Reynoso (1993), however, have suggested an alternative interpretation of such results. According to them, what matters for contemporaneous growth is the average, and not the marginal, efficiency of capital, which is likely to increase only very slowly through improved efficiency of investment. Their interpretation of the correlation between real deposit rates and growth is that high inflation directly reduces the real interest rate and indirectly impedes the growth rate (primarily through distortions induced by uncertainty) thereby introducing a false positive correlation between these two variables.

Taking the results of Gelb and the arguments of Dornbusch and Reynoso into consideration leaves the evidence on the effects of monetary reform on growth in an inconclusive state, especially if we consider that even McKinnon's findings on the Korean reform were later on challenged by Giovannini (1985) who showed that most of the increase in national savings in Korea in the post-reform period after 1965 arose in the public sector, due to a fiscal correction, and not in the private sector due to the increase in the real interest rate. He pointed out further that the measured increase in household savings after the monetary reform was a one-off event concentrated in 1966, and that the correlation between household savings and the real deposit rate was actually negative after that year. He concluded from this that the measured increase in savings could well have been a statistical error due to the recording of a portfolio shift out of the informal market as a change in savings.

Taking all these results and arguments together suggests that while portfolio shifts towards domestic financial instruments are induced by monetary reform/ nevertheless such a "credit availability" effect may not have a large effect on the volume of investment\*, Under the circumstances, it would be far more prudent in the Indian context to rely on fiscal deficit reduction in order to directly increase national savings, and thereby investment and growth, rather than rely on high interest rates to indirectly increase growth via its volume and efficiency effects. In this context, the recently initiated macroeconomic stabilization measures involving, amongst others, a reduction in the gross fiscal deficit to 4.5 percent of GDP during 1997-98, as well as a reduction in the 1-year deposit rate to 10 percent are both steps in the right direction.

## 2.2 Financial Liberalization

In contrast with the case of monetary reform, the evidence on the effects of financial liberalization is mostly episodic, liven so, a convergence of views - part of which is embodied in the so-called "Washington Consensus\*" - has emerged regarding the lessons to be drawn from the experience of developing countries. The consensus view, as represented by Villanueva and Mirakhor (1990), argues that success in financial liberalization requires macroeconomic stability and a strong and effective system of bank supervision as preconditions; and that success is more likely if controls on interest rates are removed only gradually, while these conditions are established. In the absence of these conditions, full financial liberalization is apt to be associated with sharp increases in real interest rates, bankruptcy of financial institutions and loss of monetary control. Examples of these disastrous outcomes are the Southern Cone liberalizations of Argentina, Chile and Uruguay in the 1970s, as well as the experiences of Philippines and Turkey in the 1980s, where in each case, the liberalization and stabilization programs collapsed in the midst of a financial crisis.

The argument regarding the need for adequate bank supervision runs as follows: Macroeconomic instability increases the riskiness of bank portfolios. If deposit insurance is absent or correctly priced, an analysis along the lines of the Stiglitz-Weiss model of credit rationing under informational asymmetries (Stiglitz and Weiss 1992) predicts that banks would reduce interest rates and ration credit more severely. If bank deposits are insured by the government, by contrast, moral hazard would induce banks to raise interest rates in order to attract deposits and fund high-risk projects, because they in effect face a one-way bets if the projects pay off, banks reap the profits, whereas if they do not, the government steps in and pays off depositors, This outcome can be avoided if deposit insurance is priced correctly, because doing so forces banks to pay for the higher risk that their portfolio choices impose .,on the government. The same result could be ensured by appropriate bank supervision (including loan-loss reserves and capital adequacy standards), even when deposit insurance is free or inadequately priced.

Vliianueva and Mirakhor cite the contrasting experiences of some of the Southern Cone countries, on the one hand, and Asian countries, on the other, to illustrate these general principles. The former moved to full liberalization of interest rates in a very short period. In Argentina, Chile, and Uruguay, rapid removal of interest rate ceilings and credit controls in the mid- to late-1970 was accompanied by the relaxation of bank supervision and the extension of either explicit (Argentina) or implicit (Chile) deposit insurance, all in the context of high inflation and unsatisfactory economic performance. In all of these Southern Cone countries, lending rates quickly rose to very high real levels, distress borrowings by firms ensued, and bankruptcies became common. In each case, all these Southern Cone liberalization and stabilization programs collapsed in the midst of a financial crisis during the early 1980s.

On the other hand, Sri Lanka (in 1977) and Korea (in 1981) both undertook financial liberalization from initial conditions characterized - by unsatisfactory macroeconomic performance. However, unlike the Southern Cone countries, both these Asian countries removed restrictions on interest rates gradually while pursuing macroeconomic stability and stronger regulations over banks. Greater flexibility (although not full liberalization) was permitted in both countries only after macroeconomic stability was achieved and the supervisory mechanism strengthened. Such a phased transition to a liberalized financial system proved to be rather smooth, with only a mild increase in real interest rates and, unlike the Southern Cone countries, there were no widespread bankruptcies culminating in financial collapse.

### **3. Integration of Domestic and Financial Capital Markets**

Financial repression tends to induce disintermediation, which can take the form of the emergence of a domestic informal credit market or financial intermediation through external financial markets. The factors that induce governments to adopt a policy of financial repression will lead them to pre-empt the latter through the imposition of capital controls, and indeed such controls, with varying degrees of effectiveness, have long been ubiquitous in the developing world.

At one extreme, if such controls are completely effective, external financial intermediation is ruled out and the marginal cost of funds in the closed economy becomes the interest rate in the informal credit markets which, being endogenously determined, can be influenced by domestic monetary and fiscal policy. At the other extreme, if controls are completely ineffective and perfect capital mobility prevails, then the interest rate in the informal credit markets must be equal to the uncovered-parity foreign rate, i.e., the exogenous foreign interest rate plus the expected rate of depreciation, which would be unaffected by domestic monetary & fiscal policy - except to the extent that these affect the expected rate of depreciation. Given such polar extremes and considering that the degree of financial openness



which measures the extent and effectiveness of capital control is bound to differ both across countries and over time, it is surprising that very little empirical work has been undertaken to explore this issue for individual cases.

### 3.1 Empirical Evidence

One reason as to why interest parity tests have not been widely applied to developing countries has been that, under financial repression, published interest rates for the formal financial system do not refer to assets with market-determined Rates of return and data on market-determined interest rates in informal credit markets are rarely available. In such cases, inferences about the extent to which market-clearing interest rates in the domestic financial system are affected by world financial conditions become difficult to draw.

To overcome this problem, Edwards and Khan (1985) departed from standard methodology and postulated that the actual domestic interest rate in an LDC could be expressed as a weighted average of the external (uncovered parity) rate and the domestic interest rate that would prevail in a financially closed economy. The latter was expressed as a function of excess money supply and the expected rate of inflation. When the determinants of the closed-economy interest rate are substituted into the weighted-average expression for the domestic interest rate, the result is a reduced-form interest "parity" condition that expresses the domestic interest rate as a function not only of the foreign interest rate, but also of domestic monetary conditions- This approach in effect uses domestic monetary variables to explain the "risk premium". Estimating a reduced form of this type makes it possible to detect any influence of these variables on the domestic interest rate. If uncovered parity holds continuously, the domestic monetary variables should have no explanatory power in the reduced form. By contrast, if the economy is completely closed, the uncovered parity variable should not enter,

Haque and Montiel (1991) adapted the Edwards-Khan methodology to allow testing of uncovered interest parity. Retaining the assumption that the (unobserved) domestic market-clearing interest rate is a stable weighted average of the autarky rate and uncovered parity, they were able to estimate the relevant weights by substituting the resulting expression for the market-clearing rate into the money-demand function and estimating the resulting nonlinear function of observable variables. In such an estimation, the weight corresponding to the uncovered parity can be interpreted as the financial openness index, bounded between 0 (.fully closed economy) and 1 (fully open economy), which indicates the degree of financial integration of the relevant country with the rest of the world. The results of Haque and Montiel for fifteen developing countries during the period 1969-87 are reported in Table 2 below; along with the estimates for Thailand during 1978-80 obtained by Robinson (1991), as well as the estimates for Korea and Taiwan during the decade of the 1980s obtained by Reisen and Yeches (1993).

Table 2  
Estimates of the Capital Mobility Parameter  
for Developing Countries

Country	Estimate	Country	Estimate	Country	Estimate
Brazil	0.723	Korea	0.594	Sri Lanka	0.638
Guatemala	0.708	Malaysia	0.638	Taiwan	0.533
India	0.158	Malta	0.411	Thailand	0.590
Indonesia	0.865	Morocco	0.877	Tunisia	0.833
Jordan	0.500	Philippines	0.577	Turkey	0.525
Kenya	0.600	Singapore	1.000	Uruguay	0.890

seven of the eighteen cases reported above, the weight of the uncovered parity rate could not be statistically distinguished from the perfect-capital-mobility value of unity. For ten countries in the sample (Jordan, Kenya, Korea, Malaysia, Malta, Philippines, Sri Lanka, Taiwan, Thailand and Turkey), an intermediate degree of financial integration prevailed during this period. The financial autarky value of zero failed to be rejected in only one case (that of India), implying that there was very little integration between Indian and external financial markets during this period.

The Edwards-Khan and the Haque-Montiel methodology was applied by Rao and Singh (1995) using post-liberalization data on the Indian economy. Using Kalman filter estimates to model structural changes occurring in the economy, they obtained a financial openness index of 0.53 for the Indian economy for 1995 - more than a three-fold increase from its value of 0.16 in 1987 - which, by being distinguishable from both zero and unity, currently places India in the intermediate group of countries. While this does highlight the success of the ongoing liberalization program, it still indicates that we are still way behind some of the other Asian countries, as far as financial integration is concerned, considering that the current index of financial openness for India is what was prevailing in Taiwan more than a decade ago.

### 3.2 Monetary Autonomy

This brings us to the all-important question as to the optimal extent of financial integration: should we try to maximize the financial openness index? The answer is a qualified "No". This is not based on ideological or political compulsions but on macroeconomic theory, in particular, the Mundell-Fleming models which clearly showed that under perfect capital mobility and fixed exchange rates, monetary policy would be ineffective. Although the Bretton Woods system, and the associated concept of fixed exchange rates, collapsed in the early 1970s, the vast majority of countries in the developing world have not abandoned the policy of determining an official exchange rate for their

currencies. Rather than allowing the foreign exchange values of their currencies to be determined endogenously by market forces, the exchange rate has remained a policy instrument in most LDCs. This has implied a certain amount of stickiness in their exchange rates which, coupled with increasing financial integration, has resulted in a considerable loss of monetary autonomy.

An implication of maintaining some scope for independent monetary policy is that policy-induced changes in domestic financial assets will affect macroeconomic variables other than the capital account. Thus the identification of domestic macroeconomic effects arising from monetary policy shocks under fixed exchange rates provides an indirect confirmation of the retention of at least some degree of monetary autonomy.

This has led researchers to compute the so-called "offset coefficient" that relates changes in the stock of domestic assets of the central bank to changes in reserve flows. Under perfect capital mobility and fixed exchange rates, this coefficient takes a value of -1, since any expansion of the domestic assets of the central bank will give rise to an offsetting capital outflow, leaving the stock of money unchanged and implying a complete loss of monetary autonomy (Kreinin and Officer 1978).

Thus, a separate strand of investigation of the capital mobility issue in LDCs has attempted to test for this loss of monetary autonomy. The estimates for Malaysia during 1978-81 obtained by Smaghi (1982); as well as the estimates for Colombia during 1975-85 by Rennhack and Mondino (1988) suggest high offset to monetary policy through reserve flows. Rao and Nallari (1996), using a merged Fund-Bank framework for the Indian economy, found that, during the post-liberalization period 1991-96, although capital mobility increased substantially, the offset coefficient was fairly low and monetary autonomy was retained even in the long run. The estimated offset coefficients for these three countries, along with their corresponding current capital mobility parameters as well as their existing exchange rate arrangements are provided in Table 3 below.

Table 3

Capital Mobility, Exchange Rate Arrangement and Offset

Country	Capital Mobility	Offset Coefficient	Exchange Rate Arrangement
Colombia	0.840	- 0.40	Crawling peg
Malaysia	0.938	- 0.70	Managed floating
India	0.531	- 0.25	Managed floating

The above table has very important implications for maintaining some scope for independent monetary policy. If full financial integration is indeed the ultimate objective, then we should be prepared to give up the present system of a managed

Floating exchange rate and move onto a market-determined fully flexible exchange rate system. If such a move is inadmissible in the foreseeable future, then we should limit the extent of financial integration because preliminary results indicate that the offset coefficient tends to rise rather rapidly after the financial openness index crosses a threshold level of about 0.85.

#### 4. Speculative Attacks and Balance of Payments Crisis

A fundamental proposition of open-economy macroeconomics is that the viability of a fixed exchange rate regime requires maintaining long-run consistency between monetary, fiscal, and exchange rate policies. Excessive domestic credit expansion leads to a gradual loss of foreign exchange reserves and, ultimately to an abandonment of the existing fixed exchange rate once the central bank becomes incapable of defending the parity any longer, as witnessed in India in June 1991.

Over the past decade or so, a large body of formal literature has focused on the short- and long-run consequences for the balance of payments (BOP) of pursuing incompatible macroeconomic policies. In a pioneering paper, Krugman (1979) showed that under a fixed exchange rate regime, continuous domestic credit creation in excess of money demand growth may lead to a sudden speculative attack against the currency that forces the abandonment of the fixed exchange rate and the adoption of a flexible exchange rate regime. Moreover, this attack will always occur before the central bank would have run out of reserves in the absence of speculation, and will take place at a well-defined date.

We now examine the implications of the literature on BOP crises for understanding the collapse of exchange rate regimes in LDCs. We initially set out a modified version of the model originally proposed by Agenor and Flood (1994) which specifies the basic theoretical framework used for analyzing such issues. We then apply it to the Indian economy in order to determine whether it is possible to approximately predict a BOP crisis of the kind that overtook the Indian economy in June 1991.

##### 4.1 A Model of Exchange Regime Collapse

The model is defined by the following set of equations:

$$m(t) - p(t) = y - \alpha i(t), \quad \alpha > 0 \quad (4.1)$$

$$m(t) = \sigma(1) D(t) + \sigma(2) R(t), \quad \sigma(1), \sigma(2) > 0 \quad (4.2)$$

$$\dot{D}(t) = \mu, \quad \mu > 0 \quad (4.3)$$

$$p(t) = e(t) \quad (4.4)$$

$$i(t) = i^* + \dot{e}(t) \quad (4.5)$$

where  $m(t)$  is the nominal money stock,  $D(t)$  is domestic credit,  $R(t)$  is the domestic-currency value of foreign reserves,  $e(t)$  is the nominal exchange rate,  $p(t)$  is the price level,  $y(t)$  is real output (assumed constant),  $i^*$  is the foreign interest rate (assumed constant), and  $i(t)$  is the domestic interest rate. All variables, except interest rates, are measured in logarithms.

Eq. (4.1) relates the real demand for money positively to income and negatively to the domestic interest rate. Eq. (4.2) is a log-linear approximation of the identity defining the money stock as the sum of reserves and domestic credit. Eq. (4.3) specifies that domestic credit grows at the rate  $\mu$ . Eqs. (4.4) and (4.5) define purchasing power parity and uncovered interest parity, respectively.

Combining eqs (4.1), (4.4) and (4.5) together yields:

$$m(t) - e(t) = \delta - \alpha e(t) \quad (4.6)$$

where  $\delta = y - \alpha i^*$ . As  $e(t) = e$  and  $e(t) = 0$  in a fixed exchange rate regime, eq. (4.6) simplifies to:

$$m(t) - \bar{e} = \delta \quad (4.7)$$

Using eqs. (4.2) and (4.7) yields:

$$R(t) = [\delta + \bar{e} - \sigma(1) D(t)] / \sigma(2) \quad (4.8)$$

which indicates that the central bank accommodates any change in domestic money demand ( $\delta$ ) through the purchase or sale of foreign reserves to the public.

With  $m(t) = 0$ , the time derivative of eq. (4.2) yields:

$$R(t) = -\mu/\theta \quad (4.9)$$

where  $\theta = \sigma(2)/\sigma(1)$ . Eq. (4.9) indicates that if domestic credit expansion exceeds the growth rate of money demand (which depends on  $\delta$  as shown in eq. (4.7) and is assumed here to be zero), reserves are run down at a rate proportional to the rate of credit expansion. Thus, any finite stock of reserves will be depleted in a finite period of time.

Suppose now that the central bank announces at time  $t$  that it will stop defending the current fixed exchange rate after reserves reach a lower bound,  $R^*$ , at which point it will withdraw from the foreign exchange market and allow the exchange rate to float freely thereafter. With a positive rate of domestic credit expansion, rational agents will anticipate that, without speculation, reserves will eventually fall to the lower bound, and will therefore foresee the eventual collapse of the system. To avoid losses arising from an abrupt depreciation of the exchange rate at the time of the collapse, speculators will force a crisis before the lower bound on reserves is reached. The issue is then to determine the exact moment at which this happens.

The length of the transition period can be calculated by using process of backward induction, which was formalized by Flood and Garber (1984). Formally, the time of collapse is found at the point where the "shadow-floating rate", which reflects market fundamentals, is equal to the prevailing fixed rate. The shadow-floating rate is the exchange rate that would prevail with the current credit stock if reserves had fallen to the minimum level and the exchange rate were allowed to depreciate freely. As long as the fixed exchange rate is more depreciated than the shadow-floating rate, the fixed rate regime is viable; beyond that point, the fixed rate is not sustainable.

From eq. (4.3), we have:

$$D(t) = D(0) + \mu t \quad (4.10)$$

where  $D(0)$  is the initial stock of reserves. The exact time of collapse,  $t^*$ , is then given by (see Agenor and Montiel 1996):

$$t^* = \{[\bar{e} - \sigma(1) D(0) - \sigma(2) R^*] / \sigma(1)\mu\} - \alpha \quad (4.11)$$

Eq. (4.11) indicates that higher the fixed exchange rate,  $e$ ; or lower the initial stock of domestic credit,  $D(0)$ ; or lower the critical level,  $R^*$ ; or lower the rate of credit of credit expansion,  $\mu$ ; the longer it will take before the collapse occurs. The interest rate (semi-) elasticity of money demand determines the size of the downward shift in money balances and reserves that takes place when the fixed exchange rate regime collapses and the nominal interest rate jump to reflect the expected depreciation of the domestic currency. The larger the value of  $\alpha$ , the earlier the crisis.

The analysis implies, therefore, that the speculative attack always occurs before the central bank would have reached the minimum level of reserves in the absence of speculation. Setting  $\delta = \mu$ , and using eqs. (4.8), (4.10) and (4.11) yields the stock of reserve\* just before the speculative attack ( $R^-$ ):

$$R^- = R^* + (\alpha\mu/\theta) \quad (4.12)$$

Thus it is seen that with no "speculative" demand for money, i.e.,  $\alpha = 0$ , the collapse will occur when reserves are run down to the minimum level,  $R^*$ . With  $\alpha > 0$ , the analysis implies that the speculative attack always occurs before the central bank reaches the minimum level of reserves.

However, as  $R^*$ , i.e., the pre-announced minimum level of reserves at which the central bank would withdraw from the foreign exchange market, is an unobservable variable, we can use eq. (4.12) to re-write  $R^*$  in terms of  $R^-$ , i.e., the actual stock of reserves just before the speculative attack, which is an observable variable. Substituting this expression for  $R^*$  into eq. (4.11) yields the following modified expression for  $t^*$ :

$$t^* = \{[\bar{e} - \sigma(1) D(0) - \sigma(2) R^-] / \sigma(1)\mu\} \quad (4.13)$$

## 4.2 Empirical Evidence

In order to apply the above theoretical framework to the Indian economy, consider Table 4 below which provides the necessary monetary data on adjusted money supply (M), domestic credit (D), and foreign exchange reserves (R) over the 5-year period 1986-87 to 1990-91 which witnessed a continuous fall in foreign exchange reserves culminating in the BOP crisis of 1991. In this table,  $t$  is the time index with 1986-87 being designated as the base year, i.e.  $t=0$ ; 1987-88 as the first year, i.e.  $t=1$ , and so on. As the steady erosion of reserves over  $t = 1, 2, 3, 4$ , is well in keeping with the basic assumptions of the above model, it should be heuristically possible to predict  $t^*$  in terms of this time framework.

Table 4

Key Monetary Aggregates for the Indian Economy:  
Pre-Liberalization Scenario

(Rs. crores at current prices)

Year	$t$	M	D	R
1986-87	0	174,406	166,761	7,645
1987-88	1	199,144	191,857	7,287
1988-89	2	230,962	224,357	6,605
1989-90	3	274,642	268,855	5,787
1990-91	4	316,350	311,962	4,388

From the above table, it is seen that the annual rate of growth of domestic credit over the sample period was 16.95 percent, i.e.,  $y = 0.1695$ . The estimated version of eq. (4.2) yielded:  $\phi(1) = 0.9798$  and  $\phi(2) = 0.0319$ . The initial stock of domestic credit in 1986-87 was Rs. 166,761 crores, implying that  $D(0) = \ln(166761) = 12.0243$ ; while the terminal stock of reserves in 1990-91 just before the speculative attack was Rs. 4388 crores, implying that  $R = \ln(4388) = 8.3866$ . Assuming that the nominal exchange rate remained fixed at its initial level in 1986-87, i.e., Rs. 12.78 per US \$, yields  $e = 12.78$ . Substituting all these values into eq (4.13) yields:  $t^* = 4.4$ . In terms of our time framework, with  $t = 4$  denoting the period 1990-91, any value of  $t > 4$  would imply a period beyond this fiscal year. In effect,  $t=4.4$  technically implies 4.8 months ( $0.4 \times 12$ ) into the fiscal year 1991-92, i.e., August 1991.

While the fact that the actual BOP crisis occurred in June 1991, i.e., barely two months before the predicted collapse time, can be considered to be a remarkable coincidence, nevertheless the results do indicate that even such a simplified model is capable of providing rather robust guidelines regarding the need to maintain long-run consistency between monetary, fiscal and exchange rate policies in order to pre-empt such speculative attacks on the currency in the future.

## 5. The Optimal Sequence of Liberalization Measures

While the focus of the foregoing discussion has been largely on the macroeconomic effects of specific reforms (in the domestic financial system, capital markets and the exchange rate regime), the determination of the appropriate pace of reform and the sequential order of specific policies that should be followed when implementing comprehensive reform packages also raise important practical and conceptual questions.

### 5.1 The Sequencing of Reforms

The costs accrued as a result of being out of equilibrium suggests that the most desirable approach to reform is the simultaneous removal of all distortions. However, the existence of adjustment costs, as well as political and administrative constraints, pre-empts this possibility and raises the issue of the optimal order in which an economy should liberalize. Determining the appropriate sequencing of policy reforms is thus an inescapable issue for policymakers as it has a considerable bearing on the success of the liberalization program.

These possibilities, which raise the issue of the optimal order in which an economy should liberalize, form the two main concerns of the literature on the sequencing of reforms. The first one is to determine the optimal order for liberalizing the domestic real sector, the domestic financial sector, the external real sector and the external financial sector. Should all these sectors be liberalized simultaneously or does the trade-off between adjustment costs and the costs of being out of equilibrium imply that there is an optimal path? The second concern is how the order of liberalization fits into the overall framework of macroeconomic stabilization and adjustment programs. In particular, this forms the major concern of much of McKinnon's later work (e.g. McKinnon 1991) where he seeks to determine whether there are any macroeconomic prerequisites to liberalization. Curious, but was he, in fact, disenchanted by the experience of liberalization programs in many developing countries or did he, in fact, finally succumb to the rather belated realization that there should first exist a set of "rules"\* before playing the "only game in town"<sup>1</sup>?

Figure 1 describes the kind of reforms which liberalization of each sector broadly entails and the numbers in each box suggest the, by and large, accepted order of the sequencing of reforms. It is agreed that domestic financial liberalization should come only after domestic real liberalization but before external financial liberalization. Assume, for example, that a country decides to liberalize the financial system before it has liberalized the domestic real sector. In such a case, credit is likely to flow only to industries that are considered profitable because relative prices are distorted. The issues of whether domestic financial liberalization should come before or after external real liberalization is however not entirely clear. If for example,  $m$  country liberalizes its domestic financial sector



Initially, then once again credit could flow to a tradeable sector, which could be profitable because of the barriers to trade. Alternatively, if the sequence is reversed, then this would hamper the ability of domestic industry to compete in the world markets. Finally, it is agreed that domestic financial liberalization should come before external financial liberalization. If external financial liberalization occurs while domestic interest rates are still below world levels, then a capital flight could take place. More generally, domestic banks would find it difficult to compete with foreign banks because they are still subject to a variety of controls and regulations which only serve to increase the cost of intermediation (the so-called "level playing field" argument). Overall, this therefore leads to the conclusion that domestic financial liberalization should be second in the overall sequence of reforms.

Figure 1

SEQUENCING OF ECONOMIC REFORMS

	DOMESTIC	EXTERNAL
REAL	<p># 1</p> <ul style="list-style-type: none"> <li>■ Setting up of a market-price system</li> <li>■ Removal of subsidy</li> <li>■ Tax base widening</li> <li>■ Reduction of fiscal deficit</li> <li>■ Privatization</li> </ul>	<p># 3</p> <ul style="list-style-type: none"> <li>■ Reduction of tariffs/subsidies</li> <li>■ Unification of foreign exchange markets</li> <li>■ Current account convertibility</li> </ul>
FINANCIAL	<p># 2</p> <ul style="list-style-type: none"> <li>■ Raising domestic interest rates</li> <li>■ Central Bank autonomy</li> <li>■ Improving domestic capital markets</li> <li>■ Prudential banking regulations</li> </ul>	<p># 4</p> <ul style="list-style-type: none"> <li>■ Financial integration</li> <li>■ Short-term capital account convertibility</li> <li>■ Market-determined flexible exchange rates</li> </ul>

However, the post-liberalization evidence for the Indian economy suggests that, rather than following the optimal sequence charted out in the above figure, the external real sector seems to be liberalizing the fastest, followed by the domestic financial sector, with the domestic real sector lagging behind considerably. While the fact that the external financial sector is also proceeding slowly is perfectly understandable, given the caveats associated with rapid external financial liberalization, what is rather alarming is the very slow pace at which domestic real liberalization is proceeding, considering the fact that it should have been at the forefront of the liberalization process. This does not auger well for the long-run success of the

Liberalization program launched in 1991, and urgent remedial measures must be undertaken to speed up the pace of reforms in this sector, failing which one would have to slow down the pace of reforms in the other sectors, especially the external real sector, because of the very grave dangers associated with liberalizing the external sectors prior to the domestic sectors.

## 5.2 Stabilization and Control

Stabilization is generally viewed as a precondition for the implementation of a full-fledged liberalization program. Three arguments are conventionally advanced to defend this proposition (see Musaa 1987, Rodrik 1995). First, macroeconomic instability, typified by high and variable inflation rates, distorts the signals transmitted by changes in relative prices brought about by reforms, especially trade reforms. Second, to the extent that liberalization generally entails substantial reductions in tariffs as well as certain direct/indirect taxes which may have an adverse effect on tax revenue unless compensated by other sources, large initial macroeconomic imbalances may severely constrain the scope of measures that can be taken to hasten the pace of such reductions. Finally, the real devaluation that accompanies liberalization is often brought about by large nominal devaluations, which could exacerbate inflation if monetary and fiscal policies are not tight enough. Such an accompanying inflation could lead to frequent nominal devaluations (especially in the case of a crawling peg exchange rate arrangement) which could affect the role of the exchange rate as a nominal anchor and undermine the credibility of the stabilization effort.

Thus, experience has shown that the question of exchange-rate policy is crucial to the success of liberalization, not least because it affects capital flows through its impact on the expected rate of depreciation. Usually liberalization leads to capital flows because it entails an increase in the domestic interest rate above world levels and, since stabilization programs often involve a prior devaluation in the exchange rate, the resulting interest rate differential may not be offset by any further expected depreciation of the domestic currency. In addition, capital flows are likely because, since the marginal productivity of capital is usually higher in recently liberalized developing countries, firms can afford to borrow from abroad. Such inflows could undermine the ability of the monetary authorities to control the monetary base, therefore putting the stabilization program in jeopardy.

The open economy extensions to the McKinnon-Shaw hypothesis and the issue of capital flows raise the general issue of the relationship between domestic financial liberalization and external liberalization. One way in which capital flows could be prevented, would be to maintain controls on capital movements until domestic financial liberalization and the stabilization program are completed. Another way would be sterilization of reserves to prevent an erosion of control over the monetary base.

What about the issues of macroeconomic control? McKinnon (1991) argues that there are two main macroeconomic prerequisites to successful liberalization. First, there is a need for control over domestic banks for monetary policy purposes. Often financial liberalization is associated with a loss of control by the authorities over credit creation. Such arguments warn against the removal of reserve requirements as a means of liberalization. Second, there is the need for fiscal control. Many of the regulations imposed on domestic banks raise revenue which helps to finance the government deficit. Since liberalization involves the removal of many of these regulations, it is clear that other sources of revenue need to be tapped. Thus, this sets up a case for widening the tax base as well as developing proper means of tax collection before liberalization.

More importantly, collection lags for taxes should be reduced substantially. Using data on 18 developing countries, including India, over the period 1970-88, Choudhry (1991) estimated that the average collection lag - defined as the time between the moment taxes are due and the moment that they are actually paid - was about 6.5 months for current revenue, but varied from 4 months (for taxes on international transactions) to about 13.7 months (for profits and capital gains). Based upon these estimates, the results obtained by Rao and Nallari (1996) indicate that the average annual fiscal erosion (the so-called Olivera-Tanzi effect) in the Indian economy over the period 1980-91 was as high as 0.61 percent of GDP at current market prices. If applied to the predicted GDP for 1997-98, it would imply a loss of almost Rs. 8750 crores worth of tax revenue, which is almost 15 percent of the projected gross fiscal deficit. If this loss can be avoided by eliminating collection lags altogether, then the fiscal deficit for 1997-98 can be reduced to 3.9 percent of GDP from its currently projected level of 4.5 percent. This clearly underscores the need for containing fiscal erosion if the government seriously intends to reduce the fiscal deficit over the coming years and thereby pave the way for a successful conduct of macroeconomic stabilization policies.

## **6. Conclusions**

The issue of financial liberalization is now seen as much more complex than what was originally envisaged. Because the needs of the real economy can be met only through liberalization, the literature still holds as its ultimate goal the full liberalization of the economy. However, the speed and sequencing of liberalization, the manner in which liberalization should be integrated into macroeconomic stabilization and structural adjustment programs, and the prerequisites for the eventual success of liberalization are all still matters of ongoing concern. Much of the work on these transitional problems has arisen from the experience of liberalization in a number of developing countries and it is on such experiences that we must draw upon if we are to determine whether or not there might actually be limits to the liberalization process.

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