

FINANCE AND DEVELOPMENT RESEARCH PROGRAMME

WORKING PAPER SERIES

Paper No 6

**CAPITAL SURGES, INVESTMENT INSTABILITY
AND INCOME DISTRIBUTION AFTER
CAPITAL LIBERALIZATION**

**E.V.K. FitzGerald
Oxford University**

1999

ISBN:

Series Editors: Colin Kirkpatrick
Further details: Maggie Curran, Marketing and Publicity Administrator
Published by: Institute for Development Policy and Management, University of Manchester,
Crawford House, Precinct Centre, Oxford Road, MANCHESTER M13 9GH
Tel: +44-161 275 2804/2800 Fax: +44-161 273 8829
Email: idpm@man.ac.uk Web: <http://www.man.ac.uk/idpm/>

1. Introduction

The benefits to developing economies of their comparatively recent integration to international capital markets are clearly substantial: access to international savings allowing the rate of investment (and thus industrial progress and income growth) to be raised; the ability to dampen exogenous shocks by borrowing abroad; and efficiency gains from the transfers of competitive technology and financial skills by foreign banks. None the less, there is increasing concern as to the destabilizing effect of short-term capital flows after financial liberalization, which can bring about sudden shifts in real exchange rates, domestic interest rates, asset values and domestic credit levels. National authorities are frequently forced to undertake sudden shifts in fiscal and monetary policy in order to offset such shocks, while international institutions become even further involved in policy conditionality and last-resort lending.

This concern about the impact of short-term capital movements clearly goes beyond the traditional concerns with systemic risk in the financial system arising from the differing maturity of assets and liabilities and the consequences of uncertain expectations being transmitted from one institution or market to others ('contagion'). It is often implied that the 'real economy' - that is production, investment, wages, social services etc - is in some way negatively affected by these flows, but the transmission mechanisms involved are not fully specified. The stabilization policies recommended by the IMF under such circumstances are mainly based on fiscal retrenchment, very high real interest rates and severe credit restrictions. These measures are aimed at stabilizing the exchange rate and strengthen the foreign currency reserves of the central bank - but may well also have the effect of weakening the real economy. Again, the transmission mechanisms do not appear to be fully appreciated by policy makers.

The design of institutional reform and macroeconomic policy required to reduce this instability is hotly debated, but not the economic consequences of the instability itself. However, unless these consequences are fully understood it is difficult to see how an appropriate policy might be designed. The purpose of this chapter is thus to explore these 'real effects' in greater depth.

The chapter opens with a discussion of the macroeconomic consequences of short-term capital flow instability arising from changes in investors' planned holdings of liquid assets in the face of uncertainty in Section 2. The transmission mechanism towards the real economy is found to consist of two elements: the price effect through variables such as the interest rate and the real exchange rate; and the volume effect through changes in bank deposits and government bonds sales. Section 3 examines the impact of short-term capital inflows and outflows on fiscal behaviour, demonstrating that the shifts in the primary budget deficit consistent with solvency can shift dramatically with investor sentiment, forcing large fluctuations in public investment expenditure. The impact of these capital surges on firms through the availability of bank credit is analysed in Section 4, where it is shown that the impact on output and investment is not only considerable, but also asymmetric. This then creates financial vulnerability in domestic firms and has serious consequences not only for employment but also for long-term private investment as this is particularly sensitive to uncertainty. In Section 5 the effect of these capital flows on employment and the real wage

rate is shown to be transmitted through the fluctuations in the real exchange rate and aggregate output. However, the relative adjustment of employment and wages depends upon the macroeconomic stance adopted by the government in its attempts to restore monetary stability. Section 6 concludes with some tentative implications of the analytical results for national and international policy makers concerned with mitigating the negative effects of short term capital flows.

2. Capital Market Stability in Open Developing Economies

‘Short term capital flows’ take a wide variety of forms: in this chapter they are assumed to include the purchases (or sales) by non-residents (including foreign banks) of corporate equities and government bonds on local capital markets, and their deposit (or withdrawal) of funds in or credits to domestic banks, with maturities of less than one year. This working definition could easily be extended to include changes in the net position of residents in foreign assets (‘capital flight’) without analytical difficulty, but this reduced definition makes the exposition clearer.

While resident financial investors are evidently behave differently from non-residents, much of this difference arises from their respective portfolio compositions - resident investors have a much greater weighting of local assets (‘home bias’) - which leads to a different response to sovereign risk (Hallwood and MacDonald, 1994). Access to information and control over investment outcomes also seems to differ between residents and non-residents, although here distinction may well be between large and small investors rather than their location. Moreover, as the result of decades of overseas asset acquisition by domestic wealth-holders (‘capital flight’) not only do their portfolios have a large foreign-exchange denominated component, but also much of what appears to be ‘foreign’ portfolio investment inflows is often in fact the reduction of external asset positions by domestic investors (‘repatriation of flight capital’).

Finally, annual fluctuations in flows conventionally regarded as ‘long term’ such as foreign direct investment (FDI) and sovereign debt issues may also reflect short-term liquidity considerations. However, they are not considered here because, the *stock* of such capital cannot be sold by non-residents to residents through the domestic capital market in the short run and thus the same destabilizing consequences for the domestic economy do not occur.

These fluctuations in short-term portfolio flows cannot sensibly be considered ‘perverse’. Indeed the very attraction of these assets to non-resident investors is precisely their *liquidity*. This means that uncertainty as to future asset values can be to some extent controlled by the ability to dispose of these assets quickly to a local market maker such as a commercial bank or the government treasury itself. In contrast, international banks involved in long-term government loans attempt to reduce uncertainty by inter-bank syndication, better information through their local branches and - in the last resort - by obtaining support from international financial institutions; because their debt is not traded locally. Again, a foreign corporation engaged in FDI can reduce uncertainty about the future value of its assets in the local economy by direct participation in management and - again in the last resort - by appeals to international legal arrangements. In the absence of efficient insurance markets, liquidity thus becomes the best means of hedging against uncertainty.

High-risk emerging market assets with high returns have a positive attraction for global portfolio investors because the riskiness of their overall portfolio is considerably reduced by the low covariance between regional markets; but this does not prevent fund managers from switching frequently between markets in attempt to maximise short-term profitability. Although capital movements towards 'emerging markets' should depend upon 'fundamental valuation efficiency' on the part of international portfolio managers in assessing future income streams; because this is very difficult in practice and relies to a great extent on observing the behaviour of other investors, so that in practice misallocation is widespread and sudden corrections are frequent (Tobin, 1984).

The volatility of portfolio flows thus cannot be attributed to investor irrationality or even to 'speculation' except in the technical sense of international or intertemporal arbitrage (Hirschliefer and Riley, 1992). Rather it is the scale of these flows in relation to the size of the domestic capital market - in terms of both the proportion of the domestic capital stock that is effectively 'on the market' and the size of the local market in relation to the international market in which the non-resident investors operate - and the high covariance between asset prices within a given developing economy or even region, which renders them problematic. Further, since asset values themselves are the result of investor behaviour, the volatility of their investment decisions reflects the lack of coordination between them.

In this chapter the *changes* in the short-term asset holdings of non-residents are considered to be exogenous to fluctuations in the real economy - output, investment, employment and wages. It is widely agreed that the larger part of the fluctuations in short-term capital flows to any one developing country are caused by changes in global capital markets (IMF, 1997). Moreover financial markets - particularly in developing countries - are supply-constrained (Stiglitz & Weiss, 1992) so that they are in stable disequilibrium with adjustments determined by creditors rather than debtors because demand is in effect infinitely elastic at the equilibrium interest rate. In consequence, changes in the asset demand pattern (reflecting international portfolio composition) of non-resident investors, rather than the supply of liabilities by residents, can be taken as the immediate cause of short term capital flows.

The conventional view of the effect of capital flows in the policy literature derives from the presumed mechanics of the 'debt cycle'. External savings (ie the acquisition of domestic financial assets by non-residents) raise domestic fixed capital formation and provide foreign exchange, and thus potential output expands. Subsequently, domestic saving rises too, which eventually permits the debt to be repaid through an increased domestic surplus available to the debtor through increased tax yields (if public) or company profits (if private). Simultaneously, the excess of new saving over new investment should be reflected in an increased surplus (or reduced deficit) on the current account of the balance of payments, which provides the foreign exchange required to complete the cycle.

These relationships are reflected in the 'accumulation balance' - the national accounting identity which relates the savings of the public sector (S_g) and the private sector (S_p) and investment in the two sectors (I_g, I_p) on the one hand, and the changes in the short-term asset position of non-residents (A), long-term external debt and foreign investment stocks (H) and the level of reserves (R) on the other - which must hold ex-post at all times.

$$(I_g - S_g) + (I_p - S_p) \equiv \Delta A + \Delta H - \Delta R$$

Public saving depends on fiscal revenue (T) and current expenditure (G), while private

$$(I_g + G - T) + (I_p + C - Y + T) \equiv M - X \equiv \Delta A + \Delta H - \Delta R$$

savings are disposable income ($Y - T$) less consumption (C) so we have

Thus if short term liabilities (A) rise *ex-ante* and the other capital account items (H , R) are given, then one of the left hand side variables must adjust *ex-post*: the key issue in evaluating the effect of short-term capital flows is to determine which variable or variables do adjust, and what the consequences of this adjustment are.

In effect, if the debt cycle is to end virtuously, this adjustment must involve increased rates of investment. Specifically: (i) capital inflows should increase investment rather than consumption ($dI/dA > dC/dA$); (ii) the resulting investment should be efficient in the sense of leading to factor productivity growth ($dY/dA > 1$); (iii) investment must be in tradeables to create the required trade surplus ($dX/dA > dM/dA$); (iv) and marginal savings rates must exceed the average ($dS/dY > S/Y$).

This essentially optimistic picture has been modified by experience since private capital flows returned to developing countries in the early 1990s: the initial belief was that the virtuous circle could be guaranteed by eliminating the fiscal deficit (or at least the ‘primary’ deficit before interest payments) so as to prevent excess pressure on capital markets and the balance of payments. Subsequently, however, attention has been drawn to the needs to strengthen the domestic financial system in order to prevent bank insolvency from poor asset management in the face of rising liquid liabilities. In addition, the danger is well known of capital flows being skewed towards non-traded sectors through the so-called ‘Dutch Disease effect of exchange rate appreciation and speculative investment in sectors such as real estate. In either case, the foreign exchange subsequently required to service debt and repatriate dividends may not in fact available.

Apart from the longer-term effects on saving and investment, capital inflows are generally regarded as being expansive in the sense of increasing domestic absorption (Y), unless they are fully sterilized by increasing reserves (R). Thus the orthodox policy response to short-term capital flows is based on the need to maintain an external account target reflected in the maintenance of a minimum and maximum reserves level. For instance, in the IMF ‘monetary programming model’ (Khan and Huq, 1990), an autonomous inflow of capital will permit the government to relax monetary policy and increase growth; a subsequent outflow would lead to the opposite policy. However, this expansive process is not the same as an autonomous rise in government expenditure (or even an export-led boom) because a financial asset has been acquired from a domestic agent and much depends upon that domestic agent’s consequent response - to consume, invest or acquire external assets in the case of private agents, or to spend, invest or reduce debt in the case of government. The different maturity of the assets and liabilities created in this process may also be crucial - a short-term deposit in a banking system is converted into a medium-term loan to a firm, which acquires fixed capital. By the same token, a broad notion of the ‘lifting of a foreign exchange constraint’ as in the World Bank ‘standard macroeconomic model’ (*loc cit.*) does not seem very helpful unless we

are considering an administered economy where the central bank assigns foreign exchange directly to producers. It is necessary to define more clearly how more or cheaper imports affect the behaviour of governments, firms and households.

The conditions for a 'virtuous debt cycle' based on short-time flows have also been made more difficult due to the very financial liberalization that makes these flows possible. Unsterilized short-term capital inflows often lead to an unsustainable appreciation of the exchange rate, which prevents export promotion and generates an import boom, while the expansion of domestic credit tends to result in unsafe loans being made by banks at low rates of interest in the expectation of rapid growth in not only income but also asset prices. The subsequent outflow usually forces cutbacks in domestic absorption to restore external balance, which lead in turn to a fall in current output levels to the extent that rigidities prevent resource reallocation, so that the contractionary disabsorption effects on non-traded sectors outweigh any expansionary substitution effects in traded sectors. The fragile banking system often then collapses under the pressure of bad debts and the fall of asset prices as interest rates rise and domestic activity declines (Rojas-Suarez and Weisbrod, 1994).

Financial deregulation can thus be regarded as a permanent shock to the banking sector which alters the environment in which the intermediation is carried out (Bachetta, 1992).

Specifically, the lifting of regulations on asset portfolios and reserve ratios combined with privatization are designed to encourage better risk management and narrower margins, but may lead to excessive risk acquisition in the search for market share. Monetary policy becomes more difficult to implement as the behaviour of monetary variables becomes more volatile with the reduction in market segmentation and consequently increased elasticities of substitution between assets (Melitz and Bordes, 1991). The high real interest rates associated with financial liberalization can thus actually *increase* banking fragility.

As Minsky (1982) points out, a recession generally causes a deterioration in the asset quality of financial intermediaries due to bankruptcies in the real sector, although these problems are often seen as transitory by regulators reluctant to intervene in major institutions due to the risk of contagion. Inflation and exchange rate instability has usually given large windfall profits to banks before liberalization; but lending skills (such as risk appraisal) are generally weak due to the previous experience of oligopolized credit markets. Banks cannot become efficient overnight as they have poor information on borrowers and depositors may believe banks to be more solvent than they really are. Real interest rates rise not because of an increase in real capital productivity but because of tight monetary policy and competition with domestic government bond issues. Regulators appear to underestimate the problems faced by an underdeveloped banking system with a weak domestic savings base; because high interest rates and rising asset prices attract foreign portfolio investors as well as generating large short-term profits and there are strong domestic pressures on regulators to permit the boom in asset values to continue. It takes a number of years for distress lending to build up to the point where bad loans cannot be rolled over any more; during which time things seem to be going well and the reforms continue. The subsequent collapse of asset values becomes contagious, spreading from individual firms to entire sectors, and eventually affecting country risk evaluations.

This experience underlines the fact that local capital markets do not clear according to textbook principles. The local interest rate does not perform the expected role of resource

allocation for two fundamental reasons. On the one hand, capital market equilibrium is determined by quantity adjustment, due to the prevalence of asymmetric information and agency problems, which require lenders to ration credit - and much the same is true of equity investors (Stiglitz and Weiss, 1992). On the other hand, financial intermediation involves the conversion of liquid into illiquid assets, and thus the assumption of risk which cannot be expressed in interest rates due to the adverse selection effect. In the face of incomplete financial markets - particularly for long-term assets - any large imbalance tends to be thrown onto the most liquid markets, those for quoted securities and foreign exchange.

Moreover, interest rates in small open economies exposed to the international capital market are not determined by the marginal productivity of capital or the intersection of the investment and savings schedules as textbook theory indicates. Rather the domestic interest rate (i) is determined by the international interest rate (i_s), the expected depreciation of the exchange rate ($E_e - E$) and the country risk proper (ρ):

$$i = i_s + (E_e - E)/E + \rho$$

Of these three terms, the first is clearly exogenous and fluctuates considerably in the short term; while the second depends not only on the current macroeconomic policy of the government but also on expected policy in the future and fluctuations in *other* currencies. The third term depends on foreign investors' perceptions of the country in the context of changing circumstances in the region and the world as a whole, and reflects the lack of substitutability between domestic and foreign assets (that is, their liquidity) as well as default risk proper. The domestic interest rate is thus a consequence of much the same domestic and external factors that determine short-term capital flows, rather than being a domestic capital market clearing mechanism as such.

In consequence, small open market economies in general - and developing countries in particular - can be characterised as 'credit constrained' in the sense that firms require working capital in order to undertake production and that this is limited by banks' behaviour. Blinder (1987) sets out a complete exposition of a model of a credit-constrained economy where supply is constrained by asymmetric-information type of bank lending behaviour - which creates a category of 'effective supply'. Another approach to asymmetric shocks transmitted through the credit system - based on interest rate spreads rather than credit rationing - which produces similar results is suggested by Edwards & Vegh (1997). Interest rate changes are considered as essentially exogenous, with the exchange rate as the main instrument of government macroeconomic policy. Portfolio flows are considered as affecting the real economy through their effect on bank credit: the purchase of an existing security by a non-resident from a bank makes more credit available, while purchase from an individual has much the same effect when she deposits the proceeds in her bank account. If a *new* security is issued by a firm and purchased by a non-resident, this can be seen as reducing the firm's use of bank credit and thus releasing this resource for other uses. Similarly, purchases of new government securities by non-residents increases the resources available to the public sector.

3. *The impact on government borrowing and public investment*

The main direct impact of short-term capital flows on the fiscal balance is through the conditions on the government bond market: in particular the ability to maintain or increase the planned public sector borrowing requirement at reasonable rates of interest. None the less, the impact of short-term capital inflows and outflows on fiscal behaviour is mainly felt through the local bond market, the creation and expansion of which has been one of the main features of financial liberalization. The impact is not so much through the interest rate itself as through market perception of fiscal solvency, which is in effect a form of credit rationing.

There are three other ways in which short-term capital flows can affect the budgetary balance indirectly. First, any variations in the exchange rate caused by capital flows will have an effect on the budget, although the direction and scale depends upon the currency composition of income and expenditure: normally the main effect will be through the cost of external debt service, so capital inflows causing appreciation improve the budget balance; but in the case of primary exporters where revenues are dollar-based such appreciation may even cause a deterioration. Second, fluctuations in the domestic interest rate accompanying capital inflows will also impact on the cost of debt service: in theory inflows should cause interest rates to fall (and thus reduce the budget deficit) but in practice as these inflows are closely associated with financial liberalization involving high real interest rates. To the extent that these inflows are sterilized by the monetary authorities, interest rates will also remain high. However, outflows will generally be accompanied by further increases in interest rates. Third, to the extent that monetary policy has become less effective due to the integration of capital markets, or confined to a single target such as price stability, fiscal policy will have an increased role in the maintenance of macroeconomic stability and countering external shocks. In the face of revenue inflexibility and large fixed commitments to wagebills, transfers and debt service, capital expenditure may become the only macroeconomic instrument available to do this.

Formally fiscal solvency can be said to exist when the discounted sum of future income (T) and expenditure (G) at some discount rate (i) is greater than or equal to the present debt - in

$$\sum_{t=0}^{\text{infinity}} \frac{T_t - G_t}{(1 + i_t)^t} \geq D_0$$

other words, that debt can eventually be paid off, rather than rising explosively. Conventionally, fiscal solvency models assume that fiscal revenue and expenditure are constant ratios of GNP (r , g), that there is a fiscal surplus ($r > g$) and that the growth of output (y) and interest rate (i) are fixed to an infinite time horizon ($i > y$), so that the solvency

$$z_0 = \frac{D_0}{Y_0} \leq \frac{r - g}{i - y}$$

condition is simply reduced to a critical debt-output ratio (z)

In practice, such parameter stability does not occur and fiscal consolidation tends to lie in an uncertain future. It is more realistic to regard governments (and bond purchasers) as targeting a particular debt to GNP ratio (z^*) which reflects their assessment of the prospects of fiscal consolidation (r , g), output growth (y) and capital market conditions (i) without perfect

foresight. At best, this ratio should fall over time and at worst should not rise. The level of the primary (ie before interest payments) fiscal deficit as a proportion of GNP (c) is given by the *accounting* definitions that link the debt level (D), GNP (Y), the rate of amortization of

$$\begin{aligned} D_t &= D_{t-1}(1 - d) + B_t \\ B_t &= i_t \cdot D_{t-1} + d \cdot D_{t-1} - c_t \cdot Y_t \\ Y_t &= Y_{t-1}(1 + y_t) \\ z_t &= \frac{D_t}{Y_t} = \frac{D_{t-1}}{Y_{t-1}} \cdot \frac{1 + i_t}{1 + y_t} - c_t \\ &\approx z_{t-1}(1 + i_t - y_t) - c_t \end{aligned}$$

the debt (d) and the gross borrowing requirement (B)

From this accounting balance the rule for the minimum level of the primary fiscal balance consistent with fiscal solvency is derived, based on the requirement that the debt ratio (z) does not rise over time beyond its target level - in other words, an equilibrium solution

$$\begin{aligned} z_1 &= z_0 = z^* \\ c_1 &= z^*(i_1 - y_1) \end{aligned}$$

$$\begin{aligned} f^* &= c^* + i \cdot z^* \\ &= z^* \cdot y \end{aligned}$$

The corresponding fiscal *deficit* (f^*) consistent with debt solvency is then found to be:

However, in the case of large short-term capital flows into (and out of) a developing country we are considering by definition *disequilibrium* situations. In general the debt ratio desired by the government is larger than that which international investors regard as sustainable (due perhaps to asymmetric information but more probably to distinct incentives) so that the government is in effect rationed by not being able to place sufficient bonds on the local capital market under acceptable conditions to fund the programmes it desires to undertake. The circumstances of the inflow of short-term capital are characterized by a marked change in market perceptions as to the sustainable public debt ratio (z^*) due to improved expectations for economic growth, exchange rates and country risk in the future. These expectations are often reinforced by the effects of public enterprise privatization, even though the revenue is rarely used to write off debt.

Consider the situation where as a result of these changes, the (apparently) sustainable level of the debt ratio (z^*) rises sharply between the initial level in one period (0) and the next period (1), these rate being maintained in the following period (2). In consequence, not only does the permitted fiscal deficit (f), rise, but in the 'transition' period (1) this deficit can be very large in order to adsorb the sudden change in the debt ratio (from z_a to z_b) in addition to the increased growth rate (y_a to y_b) arising from the demand expansion

$$\begin{aligned}
 f_0 &= z_a \cdot y_a \\
 f_1 &= (z_b - z_a) + z_a \cdot y_b \\
 f_2 &= z_b \cdot y_b \\
 f_1 &\ll f_2 > f_0
 \end{aligned}$$

In practical terms, the effect is large. For quite modest changes in the parameters (z^* , y), the acceptable (ie 'compatible with public debt solvency') primary fiscal balance can shift suddenly from a conservative primary balance ($c = 0$) to several percentage points of GNP in the period of transition; but thereafter, with the debt ratio stabilized at its new value, the primary balance should return towards zero again.

However, once foreign investors see the macroeconomic result of their individual decisions, sentiment shifts back suddenly, probably even to a lower solvency ratio (z^*) than before the shock. In consequence the market demands that the government achieve a large fiscal *surplus* (ie the previous exercise in reverse) in order to finance the repayment of enough of the *existing* debt stock to reduce the debt ratio sharply. This would presumably be followed by a new equilibrium in the medium term, but meanwhile panic selling of government bonds sets in when the foreign exchange reserves are insufficient to permit them to be cashed in *and* the proceeds repatriated.

The government is obliged to adjust the remaining fiscal variables in order to allow for the exogenous fluctuations in its borrowing capacity. Tax revenue is difficult for developing countries to adjust in the short run, and in practice it appears that public investment takes the main brunt of the shock. On the one hand, the traditional rule is that budgetary borrowing should only be used for capital expenditure (Heller, 1975), so that the current expenditure and revenue budget can be kept in balance. In consequence, any fluctuation in the primary deficit would be fully reflected in public investment expenditure. On the other hand, when borrowing capacity rises, it is always politically attractive for governments to initiate new projects to gather political support. When there is a need to reduce the deficit, it is always politically easier to postpone promised investment programmes rather than lay off teachers and nurses.

The consequences of these sharp fluctuations in public investment (even if the mean is stable over the longer term) are clearly negative, due to the inability of public services such as transport, health and education to maintain an effective development programme. This leads to losses in efficiency both when new projects are implemented without proper planning in order to take advantage of unanticipated resources while they are available, and when ongoing projects are delayed or frozen during construction. Furthermore, reductions in public investment due to lack of access to capital markets have negative multiplier effect on private investment and thus on employment levels in the economy as a whole (FitzGerald and Mavrotas, 1997).

4. The impact on firms, output and private investment

Short-term capital flows clearly have a marked affect on credit availability, because the inflows directly affect the deposit base of the banking system. This can occur through direct deposits of funds or purchases of bank paper, through the deposit of the proceeds of equity

sales to non-residents, through the reduction of government credit requirements due to bond sales to non-residents, and through the general relaxation of monetary policy which tends to accompany them. The reverse will be true with outflows, exacerbated by bad debt accumulating in banks' asset portfolios.

In developing economies (and indeed in most developed ones too) firms do not depend on securities markets directly for their long-term funding requirements; relying rather on retained profits for the bulk of their investment funds, and on bank finance for much of their working capital. In addition, the control of companies in developing countries is usually retained by families groups or foreign corporations; so securities markets do not act as a medium for 'disciplining' management because a controlling shareholding cannot be obtained through the open market. Of course the control of domestic corporations is not the objective of non-resident portfolio investors, or even the receipt of dividends - but rather capital gains on the resale of the securities as the aggregate market index rises. In consequence, the long-run effect of portfolio capital inflows on private sector fixed capital formation in LDCs has been found to be insignificant (FitzGerald *et al*, 1994; FitzGerald & Mavrotas, 1997).

This also explains why equity markets in developing countries are so narrow and shallow - and thus oscillate widely in response to changes in foreign investor interest. As equity markets in developing countries do not represent a significant source of fresh investment capital of a way of improving firms' efficiency; it might appear to follow that equity market fluctuations would not have a great effect on firms' behaviour. Unfortunately this is not the case, because the aggregate effect of stock market fluctuations on expected variations in external reserves and monetary policy is considerable.

Firms' response to changes in short-term capital flows can be conveniently analysed through the effect of changes in bank credit to them as a result of changes in bank deposits by non-residents. Consider a representative firm with a capital structure (C) made up of variable capital (V) in the form of cash balances (for wages etc) and inventories, fixed assets (K) which define productive capacity, and bank credit (D) and own equity capital (S) as liabilities.

$$V + K = C = N + Z$$

The balance sheet is then composed as follows:

The level of output (Q) at a given level of prices is directly related to the amount of variable capital (V) committed to production, is which is in turn constrained by the level of fixed

$$Q = a.V \leq b.K$$

capital:

The firm has a desired ratio () between variable and fixed capital when there is also full

$$K/V = \alpha = a/b$$

utilization of capacity ($Q = b.K$) so that

This ratio we assume corresponds to the point of maximum efficiency in the sense of maximising the net present value of profits accruing to the representative firm (Sen, 1994), so

the firm will attempt to adjust towards this capital structure in the long run. The firm also has a desired balance () between bank debt (N) and its 'own' capital (Z) made up of equity and reserves - which can only be increased out of retained profits (we ignore dividend payments as new equity issues for convenience), themselves a constant proportion (s) of net output (Q)

$$Z = Z_{-1} + s.Q - i.N$$

less debt service ($i.N$) at a given interest rate (i)

The firm has a *demand* for bank credit, expressed a gearing ratio between debt and equity, based on its optimal exposure to creditors which in principle depends on interest rates and tax patterns. However, in a credit-constrained economy the level of debt desired by the firm is not met so loan capital (N) is exogenously set by the banks on the basis of collateral available in the form of assets which can be resold by the creditor.

In effect, the banks define the maximum level of credit which banks are willing to extend to firms in terms of a collateral ratio (n) of fixed assets (K)

$$N \leq n.K$$

Banks' opinion as to the desirable collateral ratio (n) varies in two senses. On the one hand, it rises or falls according to the level of business confidence or threats to the banks' own solvency. On the other hand, the collateral ratio varies between firms of different sizes - small firms have lower ratios due to information asymmetry, while larger firms may benefit from direct ownership links with banks, or in the case of multinational firms with implicit collateral larger in the firm of headquarters backing.

In consequence, at the credit-constrained equilibrium, the firm has a liability structure

$$C = S + D = S_{-1} + s.Q + (1 - i)N$$

determined by its own past saving and its exogenously determined borrowing capacity: Banks will set the credit level (N) according to the deposits they receive. We assume that banks renew credit to firms annually, so that they can reduce as well as raise firms' debt levels at will. The maximum lending level will be determined by the firm's own fixed assets

$$C = S + D \leq S_{-1} + s.Q + (1 - i)nK$$

(K), beyond which the bank will not lend further even if it has sufficient resources.

At any one point in time, the firm will adjust its output and thus its asset structure, so that

$$C = V + K = \frac{Q}{a} + \frac{Q}{b}$$

capacity is fully used and profits are maximised:

The firm's continual adjustment of the balance between assets and liabilities yields the level of output (Q) as a function of the level of credit (N):

$$Q\left(\frac{1}{a} + \frac{1}{b}\right) = Z_{-1} + sQ + (1 - i)N$$

$$Q = \frac{Z_{-1} + (1 - i)N}{a^{-1} + b^{-1} - s}$$

Thus the level of output (Q) depends not only positively on the level of bank credit (N) - or the collateral ratio (n) if the banks have enough liquidity - but also negatively on the interest rate (i) as this affects retained profits and thus the ability to finance production from the firm's own resources. These credit restrictions will in turn constrain the fixed assets that a firm can hold (K) and thus the level of investment ($I = \partial K$); assuming that the level of investment desired by the firm (not specified here) is always greater than the level of bank credit will permit.

We are interested in the consequence of fluctuation in short-term capital flows, which produce similar fluctuations in bank credit levels (N). To do this we must assume that the banks are lending less to firms than they would wish, otherwise greater foreign deposits will

$$N < nK$$

not lead to further lending to firms but rather to the accumulation of liquidity in banks. An increase in the allowed credit level ($\partial N > 0$) allows output to rise proportionately by providing resources for working capital, but as the firm is already at full capacity in its credit-constrained equilibrium point, fixed assets will rise (ie investment is undertaken) as well.

$$\partial Q = \frac{(1 - i)}{\theta} \partial N ; \text{ where } \theta = \frac{1}{a} + \frac{1}{b} - s$$

Specifically,

$$I = \partial K = \frac{(1 - i)}{b \cdot \theta} \cdot \partial N$$

New fixed investment (I) is determined by

Finally, if we assume that increased short-term deposits of foreign capital (∂A) are all passed

$$\text{when } \partial A > 0 ; \partial Q = \frac{1}{\theta}(1 - i)(1 - r) \cdot \partial A ; I = \frac{(1 - i)(1 - r)}{b \cdot \theta} \cdot \partial A$$

on to firms in the form of bank credit (net of the banks' reserve requirement, r) then we have: Now, if bank credit *falls* ($\partial N < 0$) by the same amount, the effect is not 'equal but opposite'. Investment decisions are irreversible (Dixit and Pindyck, 1994) - in other words, fixed assets once installed cannot easily be sold - especially on a declining market - so it is not possible to adjust the fixed capital stock downwards to achieve the new (credit-constrained) desired capital structure. Because K is fixed, *all* the downward adjustment must be undertaken by reducing working capital (V) and thus output (Q), so that:

$$\partial Q = \frac{(I - i)}{\phi} \partial N ; \text{ where } \phi = \frac{I}{a} - s < \theta$$

In other words, the downward movement of firms' output following a given outflow of short-term capital will be much larger than the upward movement in output following an inflow of

$$\text{where } \partial A < 0 ; \partial Q = \frac{I}{\phi}(I - i)(I - r)\partial A ; I = 0$$

the same size, while fixed investment is zero:

This asymmetry means that the greater variability of capital flows and bank credit around the mean, the lower will the average output level be. In consequence, volatile capital flows reduce output and investment.

Unless the short term capital flows are fully sterilized, there is presumably a close correlation between capital flows and the domestic rate of interest: either because perceived risk declines (rises) and stimulates greater inflows (outflows) at a given international interest rate; or because the international interest rate falls (rises) and there are greater inflows (outflows) for a given risk. This correlation will reinforce the asymmetric effect on output and investment: the capital inflow will drive down the interest rate (i) and thus stimulate output (Q) and investment (I) even more due to the increase in resources available to the firm; vice-versa for the capital outflows. The fluctuations in domestic output and investment will thus be even larger than in our simple model - in other words, local capital markets will have a pro-cyclical effect rather than buffering external shocks.

5. The Impact on households, employment and wages.

Households are affected by real macroeconomic shocks through the level of employment and wages on the one hand, and the availability of government services and bank credit (particularly for residential construction and consumer durables purchases) on the other. To a great extent, therefore, the impact of short-term capital flows on households will reflect the consequence of the response of the fiscal and firms sectors to external shock in the way described above. First, the negative effect of these flows on public investment stability, and thus on the effective provision of social infrastructure; leading to a reduced supply of and effectiveness in health and education services, public transport systems and urban services. Second, the asymmetric effect of these flows on the volatility of corporate output, and thus on the level of current 'formal sector' employment and, through the level of investment on longer term employment. Third, the negative effect of these flows on capital market and exchange rate volatility, and thus on the level of private investment; with long-term consequences for the level of sustainable employment and thus income distribution.

However, the most significant negative consequence on welfare is probably - as in the case of trade liberalization - felt through the long term consequences for private investment, because this (rather than low wage rates or even labour skilling) is the main source of sustainable long-term employment (FitzGerald and Perosino, 1999). None the less, the broader effect of capital flows on the real exchange rate is of considerable interest, because this affects the level of aggregate employment in the economy as a whole (including the small-scale sector)

and the level of real wages through relative prices.

Consider an economy with a current account composed of exports (X), imports (M), interest (i) on external debt (D) and short-term assets (A); which is balanced by changes in short term assets held by non-residents, changes in external debt and changes in reserves (R).

$$M + i(D + A) - X = CAB = \Delta D + \Delta A - \Delta R$$

As in the case of fiscal solvency, external debt solvency relates to the long-term ability to repay external debt; and from this a sustainable debt-to-GNP, or debt-to-exports, ratio can be derived (World Bank, 1997b). On exactly the same basis as our analysis of fiscal debt solvency set out in Section 3 above; the level of current account deficit (b) as a proportion of GNP consistent with a stable external debt to GNP ratio () and a given GNP growth rate (y)

$$b^* = \pi \cdot y$$

is given by:

Again, as in the case of the fiscal deficit, when asset demand constrains the international capital market, a small change in the perceived creditworthiness of a particular country permits a large increase in current account deficit that foreign investors will finance, but this

$$\begin{aligned} b_0 &= \pi_a \cdot y_a \\ b_1 &= (\pi_b - \pi_a) + \pi_a \cdot y_b \\ b_2 &= \pi_b \cdot y_b \end{aligned}$$

is a transitory feature:

As the following table shows, relatively small shift in non-resident investors' view of creditworthiness (ie) generates a large current account deficit financed from short-term inflows, during the transition period. This in turn permits an 'import boom' with imports rising by one-quarter even though GNP growth rates have only risen slightly, if the authorities take no compensatory action. The mechanics of this boom often take the form of banks extending consumer credit backed by the short-term capital inflows; rather than extending it to companies as in our earlier model. This boom is not sustainable, however, and to remain consistent with market expectations of solvency the current account should be closed again in the subsequent period and imports should fall sharply again *even if the capital inflow is not reversed*.

In practice, halting an import-and-credit boom generated by short-term capital inflows is very difficult: partly for the technical reason that reducing credit levels to consumers implies rapid repayment of debt which cannot be achieved by selling the corresponding household assets (eg houses or consumer durables); and partly for the political reason that the euphoric sense of economic success is difficult to abandon. In consequence, it is not surprising that the authorities seek to sustain the boom in the hope that *further* short term capital inflows can be attracted. However, when foreign investors reach the conclusion that the deficit is unsustainable, the reverse process starts. Capital outflows require that the domestic economy

generate a large *surplus* on the current account of the balance of payments; and when drastic reductions in domestic demand have caused widespread bankruptcy and household distress, to borrow heavily from international financial institutions in order to - in effect - acquire the domestic assets of non-resident investors.

The macroeconomic consequences depend upon the policy response of the authorities to the capital inflow - whether to adjust the real exchange rate or the level of activity. Consider the situation where external trade is a function of the real exchange rate (e) and the demand - world output (H) for exports and domestic output (Y) for imports, respectively. So

$$M = m_1.Y + m_2.e ; \quad X = x_1.W + x_2.e$$

Policy makers can, in principle at least, achieve any current account balance (CAB) in response to an external capital flow; which then determines how much the reserves change

$$\Delta R = CAB - \Delta A$$

(that is, how much of the inflow is sterilized) if long term debt is taken as given:

The desired current account deficit can be attained by adjusting either the real exchange rate (e) or the level of domestic output (Y) - or both - by an appropriate monetary and fiscal stance in the familiar way. As we shall see, the employment and wage effect of short-term capital flows depends crucially on which stance is adopted.

$$\frac{\partial e}{\partial A} = \frac{I}{-x_2 + m_2} < 0 ; \quad \frac{\partial Y}{\partial A} = 0$$

Consider two scenarios. First, if output is held stable (conventionally by fiscal means) then

$$\frac{\partial Y}{\partial A} = \frac{I}{m_1} ; \quad \frac{\partial e}{\partial A} = 0$$

Second, if the real exchange rate is held stable (conventionally by monetary means) then

In the case of a capital inflow, an active monetary policy would involve some domestic inflation in order to force up (ie devalue) the real exchange rate and allow output to rise, which may well be politically unattractive. On the outflow of short capital, exactly the reverse situation should hold; but as nominal prices are more or less rigid downwards in practice, it is much more difficult devalue the real exchange rate than to revalue it, so that a forced reduction in output (Y) is much more likely. In sum, an inflow followed by an equal outflow is likely to have an asymmetric character: the real exchange rate falling (ie appreciating) with the inflow, and output falling on the outflow.

We can now go on to analyse the employment and wage effects of this cycle. In LDCs there is widespread unemployment and surplus labour held in the informal sector; so that employment can rise without inflationary consequences if output rises unconstrained by the

balance of payments. The employment effect can thus be seen as the effect of the increase (or decrease) in aggregate demand if the real exchange rate (and thus real wages, as we shall see)

$$Y = K^\alpha \cdot L^\beta$$

is held steady. Consider an aggregate production function has the familiar form

$$\frac{\partial L}{\partial A} = \frac{\partial L}{\partial Y} \cdot \frac{\partial Y}{\partial A} = \frac{\beta}{m_1} \cdot \frac{L}{Y} > 0$$

Then under these circumstances we can simply derive

The impact on real wages is a little more complicated, but may be derived using the approach set out in Dornbusch (1980). The real exchange rate is defined in terms of the relationship between the nominal exchange rate (E), domestic prices (P) and world prices (p); and the real

$$e = \frac{E \cdot p}{P} ; \quad w = \frac{W}{P}$$

wage rate (w) as the ratio between the nominal wage rate (W) and domestic prices

World prices are of course exogenous, but domestic prices are formed by a markup (r) on

$$P = (1 + r)(u \cdot W + m \cdot p \cdot E)$$

costs composed of labour inputs (u) and imported inputs (m) so that

These three relationships yield a simple expression of the real wage in terms of the real exchange rate, where the higher (ie more depreciated) the real exchange rate, the lower will

$$w = \frac{1}{u} \cdot \left[\frac{1}{1 + r} - m \cdot e \right]$$

$$\frac{\partial w}{\partial A} = \frac{\partial w}{\partial e} \cdot \frac{\partial e}{\partial A} = (m_2 + x_2) \frac{m}{u} > 0$$

be the real wage

In the case where output (Y) does not vary, we can derive a relationship between short term capital flows and the real wage rate, where an inflow causes the real wage to rise and vice versa:

This analysis of the response of the real exchange rate and aggregate demand to short term capital inflows and outflows also reveals asymmetric implications for wages and employment. The real exchange rate rises on the inflow, but does not fall proportionately on an equal outflow; so that aggregate demand falls more on the outflow than it had risen on the inflow. To the extent that real wages will rise with the inflow but employment will remain the same. With the outflow, real wages would not fall but employment would decline. As a key

problem of income distribution is the balance between the incomes of the employed and those of the un- (or under-) employed; fluctuations in external capital flows can be expected to have a negative effect on income distribution.

6. Conclusions: Volatile Capital Flows, Private Investment and Public Policy

In this chapter the following general propositions have been established with respect to the impact of exogenous changes in short-term capital flows:

- i) the main direct transmission effects on the real economy are through variations in credit available to firms and in the demand for government bonds; the main indirect effects are through variations in the real exchange rate and the level of economic activity;
- ii) the impact on the fiscal sector is mainly seen in sudden shifts in the perceived solvency of the public sector, and thus upon the level of debt believed by foreign investors to be sustainable; the effect of these fluctuations is felt in volatile levels of public investment, which reduce the efficiency of public provision of infrastructure and social services;
- iii) the impact on the firms sector is mainly through the supply of working capital, which generates asymmetric responses in terms of investment and output due to the impact on firms' balance sheets; the volatility of expected profits resulting from this has a strong depressive effect on private investment;
- iv) the impact on the household sector is the result of the employment and wage effects; these occur both directly through firms' response to short term capital flows, and as a result of the consequences of fiscal instability; and also indirectly through the effects of real exchange rate variations on real wages and aggregate employment levels.

Although financial liberalization and integration to international capital markets clearly have important longer-term implications for sustainable growth and income distribution (Dutt, 1996; FitzGerald, 1996), we have focussed here on the short-to-medium term.

However, there is a further and potentially even greater consequence of volatile short-term capital flows for private investment, and thus for the growth of employment and productivity in the longer run. This is derived from the effect of this volatility on the expectations of firms about the profitability of investment through the impact of macroeconomic variables such as the real exchange rate as well as the credit conditions for the firm itself.

Most investment expenditures are largely irreversible - sunk costs that cannot be recovered if market conditions turn out to be worse than expected. In an open developing economy these conditions are as much the consequence of macroeconomic conditions as they are of the circumstances of a particular sector. As firms can delay investments until more information arrives, there exists an opportunity cost of investing now rather than waiting. In consequence, the value of a unit of investment must *exceed* the purchase and installation cost, by an amount equal to the value of keeping the investment option alive - which will increase with the level of uncertainty (Dixit and Pindyck, 1994). Increased uncertainty will reduce the level of private investment: for reasonable parameter values, a standard deviation as low as 20 percent in annual profit expectations can generate an option value of twice the original

investment cost - requiring a far higher expected rate of return in order to justify investment. In consequence, the literature on irreversible investment suggests that if the goal of macroeconomic policy is to stimulate investment (and thus growth), stability and credibility may be much more important than particular levels of taxes or interest rates (Pindyck and Solimano, 1993). What is more, policy reforms such as tax incentives designed to stimulate investment may themselves have very little effect if there is a probability that the policy will be reversed (Rodrik, 1989). These findings would apply *a fortiori* to short-term capital flows.

Moreover, firms are not in fact a homogeneous group in LDCs, and in practice react in quite different ways to similar macroeconomic shocks (FitzGerald, 1995). The affiliates of multinational corporations will not face the same liquidity constraints as local firms as they can always rely on their headquarters as 'lender of last resort', or raise credit from international banks with the international assets of the corporation as implicit collateral. Large domestic firms - often organized as 'groups' - have preferential access to bank credit at any one time (often because they have a bank within the group) and thus should suffer less from capital market fluctuations. Indeed it is often the case that banks are vulnerable to the non-financial firms in the group rather than the other way around. In contrast, independent domestic firms are the most vulnerable to shifts in bank credit. Small enterprises outside the formal credit system are also vulnerable to the business cycle because they rely on sub-contracts from larger firms or the expenditure of wages by their employees.

The policy implications of the argument set out in this chapter are considerable. The design of the appropriate macroeconomic policy should logically be preceded by an identification of the causes of the original fluctuation in short term capital flows - and indeed a judgement as to whether this represents a temporary or a permanent shock (Reisen, 1996). Flows which will soon be reversed would presumably be handled through compensatory reserve management, while permanent flows require some form of macroeconomic adjustment - in the absence of any clear basis for such a judgement, the proverbial admonition to "treat all positive shocks as temporary and all negative shocks as permanent" is a good guide. None the less, the source of fluctuations in short capital flows vary widely: alterations in local conditions (both structural such as banking liberalization and privatization, and policy shifts such as in interest rates), changes in international capital markets (such as variations in prudential regulation or in domestic asset yields), or perhaps - and most importantly, as we have seen - shifts in the perceived risk associated with a particular market. Each source implies a distinct policy response: for instance, increased demand for money domestically can be countered by monetary accommodation, while a change in international perceptions of risk may be best handled by sterilization of capital flows - particularly if the policy objective is to maintain a stable real exchange rate in order to promote exports. However, the overriding goal should presumably be to maintain high rates of private investment in traded sectors through macroeconomic stability and low real interest rates.

Such 'fine tuning' is not easy, particularly since much of its effect depends upon the reputation of the economic authorities. Indeed, Obstfeldt (1995) suggests that because of the international integration of capital markets the only way to reduce the shocks arising from external capital flows is either a completely clean float or an irrevocable currency union. However, a pure float is probably unworkable in most developing countries due to the fact

that monetary aggregates do not provide a reliable policy anchor, particularly in a period of financial liberalization. In any case, the resulting fluctuations in real exchange rates would have the negative real-economy effects we have discussed above. Monetary union is not a feasible option for most developing countries - and for those for which it is a real prospect (such as Mexico) the fiscal implications for the central economy of the region (eg the USA) are probably unacceptable. In practice, therefore the options appear to be: the design of fiscal policy to reduce the pressure on domestic debt markets; sterilized intervention as the basis of monetary policy, combined with a strong reserve level and low real interest rates; high but flexible marginal reserve requirements on banks in order to mitigate the effects of capital flows on credit provision; and active management of the nominal exchange rate in order to maintain a stable, competitive real exchange rate.

The direct implications of this chapter for such policies are as follows:

- i) Sustain public investment programmes by avoiding the use of short term debt as a source of funds; undertake a tax reform sufficiently extensive to generate a structural fiscal balance; and avoid the refinancing of long-term external debt with short term internal debt;
- ii) Avoid high real rates of interest, which do little to stimulate aggregate savings, but clearly depress private investment and in this context, attract volatile capital flows while increasing the budgetary cost and also the vulnerability of domestic firms.
- iii) Ensure that long-term credit is available to firms in order to sustain private investment through the cycles caused by short-term capital flows; possibly by the provision of rediscount facilities at the central bank and tax incentives to long-term profit retention;
- iv) Protect small firms and homebuilding from the effect of credit restrictions by dedicated loan schemes; and restrict the capacity of larger firms and banks to borrow abroad if this makes their capital structures vulnerable to exchange rate fluctuations;
- v) Maintain a stable real exchange rate in order to avoid excessive fluctuations in real wages resulting from capital inflows and outflows; using capital flows sterilization and variable reserves requirements on banks in order to avoid fluctuations in employment.

Insofar as domestic capital markets form part of a global capital market, the stabilizing measures listed above would be greatly strengthened by appropriate action at an international level. In particular, international taxation and regulatory arrangements could provide the incentives to foreign investors to support longer-term investment in tradeable production and human capital formation in developing countries (FitzGerald, 1997). Insistence by international financial institutions on financial deregulation and capital account liberalization alone as ends in themselves (eg World Bank, 1997a), without a clear view of the implications for the 'real economy', is not generally consistent with sustainable economic development.

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