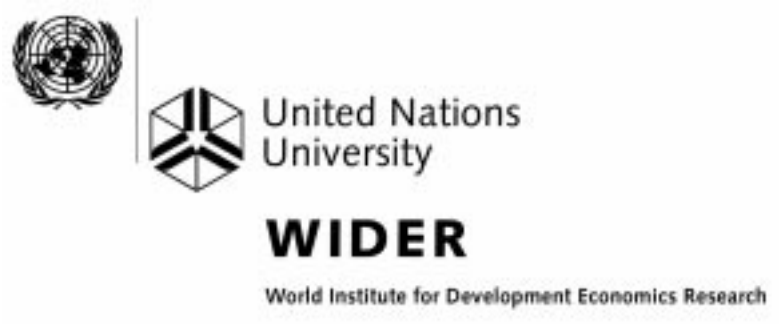

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Macroeconomics of Fiscal Policy in Developing Countries

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Abstract

This paper considers some aspects of the effects of fiscal policy on macroeconomic adjustment in developing countries. First, the paper reviews the notion of the fiscal deficit in the particular context of developing countries. It then spells out the conditions under which the internal and external debts are sustainable and points out the role of the "twin deficits". The paper then presents some evidence on the sustainability of the internal and external deficits in the context of some developing countries. Finally the paper develops the theme of endogeneity of money supply to fiscal policy and international capital flows and points out the difficulties faced by stabilization policy under these conditions.

Keywords: fiscal policy, domestic debt, foreign debt

JEL classification: O23, H20, H62

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1 Introduction

This paper purports to examine the macroeconomic effects of fiscal policy, particularly deficits, in developing countries. The roles of the fiscal authority in developed and developing countries *vis à vis* developed countries are markedly different. In both developed and developing countries there is a concern for raising living standards over time, but this need is much more pronounced in developing countries, given the extent and depth of poverty in these countries. In the relative absence or perpetual weakness of institutions to mobilize and direct savings, the role of the state is crucial in harnessing the resources for development. Since the regulatory apparatus is weak and market signals imperfect, the state has an important role to play in allocating investment funds. Further, with widespread poverty, there is the expectation that fiscal expenditures would play a major role in anti poverty programs. Pressures for populism through price controls and the like are considerable.

At the same time, and for some of these same reasons, the state in developing countries is handicapped in its ability to play an activist role. First, the state in a developing country is a weaker entity politically than in most developed countries. This means that there is often very little consensus on the contours of a tax and expenditure program. (See Heady (2000)). Second, the resources available with the government are meagre since tax bases are small and tax administration weak. Much of tax revenue comes from inefficient and distortionary indirect taxes such as excise duties. International trade is heavily taxed. Effective personal income taxes are low and easily evaded and corporate taxes are high. Even so expenditures routinely, and even increasingly, outpace revenues. With poor credit and bond markets and fiscal expenditures that are inflexible in the downward direction, some of the financing of the resultant deficit spills over onto the external sector and the central bank.

Even within the developing country group there is considerable heterogeneity in experience with respect to the fiscal deficit. The differences are more pronounced between the middle and low-income country categories but they exist even within the low-income category of countries. For example low income countries differ sharply in regard to the depths of their financial markets. Thus in 1999 in Burkina Faso net foreign assets as a percentage of broad money were –1.9%. The corresponding figure for India[1] was 14.3%. Thus there are sharp differences within countries in the developing country group with respect to the options available for public borrowing in the event of there being a large fiscal deficit.

Indeed the poorest among the LDCs are caught in an insidious resource trap. (UNCTAD (2000)). The relation between per capita income and savings appears no different in these countries than in the presently developed nations. However, because of low per capita incomes, savings are low and because of this economic growth is low. In addition, as UNCTAD (2000) estimates external shocks have a far more serious effect in the least developed countries than other developing countries. To quote this report

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1 The Burkina Faso figure is taken from IMF (2000) whereas the figure for India comes from the *Reserve Bank of India Bulletin* (2000).

"The average least developed country economy has, since the 1970s, been exposed to adverse external trade shocks with an impact, in the worst years, more or less double the average of other developing countries". The fact that the least developed countries can spare far fewer resources to combat the effects of these external shocks, then, exacerbates this problem. External finance is the obvious way to get around this sharp resource crunch. However, such supplies are meagre. Large, stable market economies such as India and South Africa attract considerable capital inflows whereas most poor economize of the sub Saharan region get poor inflows. Thus in 1997 South Africa had FDI flows of US$27,483 million and portfolio investment assets of US$7,817.77 million whereas[2] the corresponding figures for Botswana were US$404 million and US$204 million. Both FDI as well as portfolio flows are poor. FDI flows are concentrated largely in resource extraction[3]. The reasons for such poor flows are not hard to discover. These are related to "costs of asset development, risks which are rooted in the vulnerability of the least developed countries to shocks, lack of business support services, weak physical, social and administrative infrastructure, and the small scale of projects" (UNCTAD (2000)).

With rapidly diminishing official aid and poor private equity flows, external financing of the fiscal deficit in the poorest countries has to rely increasingly on private loans. These are available at increasingly difficult terms, as Harberger (1985) has noted, as the domestic resource cost of servicing these goes up with additional borrowing. Furthermore, typically, this resource cost is underestimated.

Other reasons for differences across countries include continuity and stability of policy regimes. Thus Zambia, which has had a history of policy reversals, would be associated with higher risk than Botswana and Mauritius, which have had credible and stable policy regimes. The costs of borrowing abroad will typically be higher for countries with frequent reversals of policy stance as the risks associated with lending will go up sharply.

A consequence of these factors for financing the fiscal deficit is that many of these countries have to rely, to a considerable extent, on non-bond (monetary) financing of the deficit. When this occurs, the distinction between fiscal policy and the monetary base of the central bank is blurred and the independence of monetary from fiscal policy is compromised.

This paper is addressed to several objectives. First, in Section II, I review the notion of the fiscal deficit in the particular context of developing countries. Section III develops the notion of sustainable fiscal deficits. It also articulates a critical deficit that makes for a sustainable internal debt. In section IV, the notion of sustainable external debt is articulated. Section V assesses the notion of sustainable "twin deficits". I apply the sustainability tests to a cross section of low and medium income countries for the period

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2 The data are from the IFS CD rom.

3 Most of the least developed countries effectively face vertical supply curves of external capital inflows. Various reasons can be attributed toward this. Macro policy disasters such as those in Tanzania have played an important role. Others such as Guinea are just too small. Countries such as Angola do manage to get some FDI in resource extraction. Angola, for example, borrows externally by mortgaging its potential oil revenues but there are limits to this when debt rises to high levels and additional loans can be obtained only at very high interest rates.

since 1950. Section VI considers some problems associated with the problem of international capital flows and indicates the difficulty of pursuing stabilization policies under these conditions and the role that fiscal policy can play to ameliorate this difficulty. Section VII concludes.

2 The fiscal deficit: what does it measure?

The conventional measure of the fiscal deficit as the difference between total government expenditure and current government revenue while being clear as an accounting concept, is not above controversy as an economic entity. Tanzi (1993) for, example, mentions the following three difficulties: (i) the conventional measure of the deficit fails to recognize that different tax and expenditure categories have different types of effects on aggregate demand. For example, an excess of expenditure on the infrastructure creates productive capacity and will have a different impact than an excess of expenditure due to consumption subsidies[4]. (ii) A second problem arises because tax revenues are not exogenous of expenditures. The level of public expenditures determines national income, which then determines tax revenue, at least in part. It is in this context that during the Kennedy-Johnson presidencies in the US—a period of full employment—the notion of a *full employment budget surplus* was defined and used. In the context of developing countries, such a notion would be suspect since the binding constraint on output in their cases is not the supply of labor. A more relevant constraint would be the availability of credit in terms of hard currencies[5]. (iii) Finally there is the problem of sources of financing the deficit. In developing countries several sources of financing have been used e.g., central bank financing, commercial bank financing, domestic sale of government bonds to cover the deficit and foreign financing. Each of these has different macroeconomic consequences. Central bank financing raises the monetary base and the money supply, thereby blurring the distinction between monetary and fiscal policies. Foreign financing will raise the cost of servicing external debt whereas domestic bond issues will raise interest rates. An additional difficulty is that some sources of finance are available only under certain circumstances. For example, a country with a thin bond market (which is the case in almost all of sub Saharan Africa except South Africa) can hardly afford to issue bonds to cover the fiscal deficit and may have to rely on central bank financing or some such measure. A country with large external debt would, in all probability, be able to finance its deficit externally only by borrowing short term at high rates of interest. This would make it difficult to finance the external debt and may put pressure on the currency.

Some authors such as Buiter (1985, 1993) have gone much further ahead and argued that even cyclically adjusted and inflation adjusted measure of the deficit are only imprecise indicators of the true deficit. For example, the capital gains/losses on government assets and liabilities are not included in the conventional flow of funds accounts. Examples of these would include changes in relative prices (say changes in

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4 For a further elaboration of this point see Hermes and Lensink (2000) and Gemmell (2000).

5 The distinction is sharply illustrated by the recent experience of the US. For the past five years or so, tax revenues in the US have been very buoyant following high employment conditions. As a result a stubbornly high US budgetary deficit has turned into a surplus. The US economy, of course, does not face a foreign exchange constraint so that this transformation was possible.

mineral prices) and changes in the real value of nominal debt during an episode of inflation.[6]

Particularly in those developing countries where public investment has played a significant role in the economy, a distinction is made between revenue or current deficit and capital deficit. The former is the deficit on expenses of a recurrent nature after netting out investment expenditure. Surely, if a country is running a large and growing deficit on such current transactions it is a reason for worry. However, it should be pointed out that the distinction between capital and current expenditures is often an artificial one (for example, in aid dependent economies, large amounts of aid-financed current expenditure connected with aid financed projects are placed in the capital expenditure category—the case of Mozambique, for example. It would be meaningful only if it was clear that all capital expenditures were productive in nature. Although capital expenditures are associated with capacity building activity, it might be the case that some such expenditures are wasteful in nature. This would typically be the case if the project in question has not been evaluated carefully and/or involves equipment that is highly capital intensive or has an unduly import intensive or is, in some other way, inappropriate for the economy. For example, a substantial part of Nigeria's public investments have low social rates of return, reflecting inappropriate technology choices and long standing overvaluation of the currency that cheapened the cost of capital equipment. Furthermore, this current or revenue deficit says nothing about the impact of the deficit on the balance of payments or on economic growth.

There are some other problems associated with the measurement of deficits that are worth mentioning. First, is the problem of arrears. This becomes particularly relevant in the case of repayment of foreign debt. If, for example, the interest payment on the foreign debt is rescheduled—which is the case in many Heavily Indebted Poor Countries (HIPCs) such as Tanzania—should we say that the deficit has gone down? Similarly, if the government delays some payments (often the public wage bill) whereas it takes in all its revenues does fiscal deficit go down? These questions become particularly relevant during a period of high inflation when delaying payments denominated in nominal terms can have significant impact on the real value of such payments. For example, Angola's government receives large resource revenues from oil but in the recent past it has nevertheless accumulated large wage arrears, the real value of which would have declined rapidly with hyperinflation. (See Aguilar (2000)).

A further important problem arises when the fiscal deficit reported is only that of the central government. In countries with different levels of government this would be an inappropriate indicator of the deficit. Even if the deficits of state and lower levels of government are included, there may be other government agencies that are running a deficit, which does not get reflected, in the measured fiscal deficit. Examples would include the deficits of central banks in some Latin American countries, the deficits of local (particularly municipal) governments in India and the so-called "oil pool" deficit in India where excesses of payments for petroleum imports over what is collected from

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6 Recent arguments along the lines suggested by Buiter include those by Easterly (1999) who argues that fiscal adjustment can be illusionary. In particular, this would be the case when such adjustment lowers the public debt but leaves unchanged the net worth of the government. In other words, governments may find ways of maintaining their consumption even when they are actually involved in a process of reducing public debt.

consumers is recorded. The oil pool deficit, for example, can become large during a period of rises in the international prices of petroleum products and difficulties in raising the domestic prices of such products. In the Indian[7] case, for example, part of the burden of this adjustment has been shifted to the future by issuing "oil bonds". Such transactions do not get reflected in the fiscal deficit. All this then tends to make the fiscal deficit a not entirely satisfactory measure of the excess of government expenditure over revenues.

The difficulties in measuring and interpreting the deficit notwithstanding, it is useful to understand whether the underlying fiscal stance is sustainable. The literature on this issue is growing rapidly. In the next section I develop the extant notion of internal debt sustainability and apply it to select developing countries for which continuous data are available. Subsequently the notion of external debt sustainability is discussed.

3 Sustainability of the domestic fiscal debt

Rapid accumulation of domestic debt can lead to severe macroeconomic problems, and can impede control of the fiscal deficit itself. To take only one example, Zimbabwe's fiscal deficit is estimated to be close to 20 percent of GDP in 2000. "Public debt is rising rapidly, with new debt being issued to meet interest payments (the so-called 'Ponzi' game). Interest payments on domestic public debt are expected to exceed 50 percent of total government revenues by end-2000, thereby squeezing development and social spending." (source EIU (2000)). This section develops the simple analytics of sustainability for the domestic as well as the external deficit and applies it to a spectrum of developing countries.

3.1 The government intertemporal budget constraint

The most straightforward way to assess the sustainability of a public debt situation is to start from the governmental intertemporal budget constraint. This is written in nominal terms as:

$$G_t - T_t + r_t B_{t-1} = B_t - B_{t-1} \qquad (1)$$

Where G_t is the value of government expenditures (purchases of goods and services plus transfer payments); B_t is the government debt at the end of period t, T_t is the

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7 In India the prices of petroleum products are administered by the government through an "oil pool" mechanism. The stated purpose of this is to provide uniform and stable prices of such products to consumers within the country and reasonable profit margins for the oil companies. The oil pool accounts are supposed to be self financing. The inflows into the pool account are from collection of surcharge on the sale of petroleum products while the outflow is for meeting the variation in the elements of standard cost. The difference between inflows and outflows represents the surplus/deficit position of the ol pool account. And is not included in the budgetary deficit of the central or state governments. In recent years this account has persistently been in deficit since revisions to consumer prices of petroleum products have been farr from complete. This tendency has been exacerbated with the recent sharp rises in world petroleum prices. Some of the deficit in the oli pool account is covered by the issue of "oil bonds" issued by the government and bought by oil companies, which can redeem these bonds at specified future dates. See Ministry of Finance (1997).

government's tax revenue and r_t is the one-period rate of interest payable on the government debt. (1) states that in the absence of money finance, the government budget deficit must be financed by new debt creation[8]. Hence, expressing (1) in terms of ratios to gross GDP we will have:

$$b_t = (1+r_t)(1+\pi_t+\eta_t)^{-1}b_{t-1} + (g_t - \tau_t) \qquad (2)$$

Where the lower case letters denote the ratio of the corresponding uppercase variables to nominal GDP: $b_t = B_t / P_tY_t$; $g_t = G_t / P_tY_t$; and $\tau_t = T_t / P_tY_t$; with P and Y being the price level and real GDP respectively. $\pi_t = (P_t - P_{t-1})P_{t-1}$ is the rate of inflation and $\eta_t = (Y_t - Y_{t-1}) / Y_{t-1}$ is the rate of growth of real GDP. In the derivation of (2) we have used the relation that:

$$P_tY_t = (1+\pi_t)(1+\eta_t)P_{t-1}Y_{t-1} \approx (1+\pi_t+\eta_t)P_{t-1}Y_{t-1}$$

$(g_t - \tau_t)$ is the primary deficit expressed as a percentage of GDP. We have the following cases:

Case 1: $r_t - \pi_t < \eta_t$

In this case in (2) the debt ratio will stabilize and the economy will remain solvent if:

$$\lim_{t\to\infty} E(b_t) = 0$$

If the initial debt to GDP ratio (b_0) is strictly positive, this requires two conditions:

$r_t - \pi_t < \eta_t$ *for all t* so that the debt ratio stabilizes rather than explodes. This is the so-called sustainability condition and makes any stable path of the primary deficit consistent with a stable public debt to GDP ratio. In addition we have condition (*b*) that $g_t - \tau_t \le 0$ on average, if not in every period, so that the debt burden is ultimately liquidated.

These two conditions are necessary and sufficient and ensure that the debt, no matter how large, can be paid off through tax increases or expenditure cuts or inflation. Thus the government is solvent. The steady state (finite) value of the debt-GDP ratio is

$$\bar{b} = b_t = b_{t-1} = (1+\eta+\pi)(\eta-(r-\pi))^{-1}(g-\tau) \;\; if\; r-\pi<\eta \qquad (3)$$

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8 The left hand side of the government's budget constraint must also include exchange rate changes and privatization which reflect changes in government net debt due to revaluation of the government's financial assets. In the empirical work reported in this paper this broader definition is used.

(3) emphasizes a strong link between the government's indebtedness and its primary deficit.

Case 2: $r_t-\pi_t > \eta_t$

In this case the debt is unsustainable and the debt stock will become infinite no matter what sequence of primary deficits are chosen unless the debt stock itself can be offset by matching the sequence of increasing but discounted primary surplus in the future. To consider sustainability further here transform (2) to get:

$$b_t = (1+\theta_t)b_{t-1} + (g_t - \tau_t) \qquad (4)$$

Where we have used the fact that:

$$(1+r_t)(1+\pi_t+\eta_t)^{-1} = 1+r_t-\pi_t-\eta_t$$

$\theta_t = r_t-\pi_t-\eta_t$ is the real interest rate minus the rate of growth of real GDP. (4) will always hold *ex post*. Looking forward we can write the identity in (4) for time period t+1 as:

$$b_t = E_t\left[(1+\theta_t)^{-1}b_{t+1} - (g_{t+1}-\tau_{t+1})\right] \qquad (5)$$

where b_t is known in period t. For this one period constraint to hold in expectational terms, this must equal the expected discounted net debt-to-GDP ratio in period t+1 conditional on information at time t. For fiscal policy to be sustainable for one time period (5) must hold. Writing the budget constraint of (5) for subsequent time periods t+2, t+3 etc. and solving forward we get

$$b_t = E_t\sum_{s=0}^{\infty}\prod_{i=1}^{s}(1+\theta_{t+i})^{-1}(\tau_{t+s}-g_{t+s}) + E_t\prod_{i=1}^{s}(1+\theta_{t+i})^{-1}b_{t+s} \qquad (6)$$

It is apparent that

$$\prod_{i=1}^{s}(1+\theta_{t+i})^{-1}$$

is a time-varying real discount factor adjusted for the growth of real GDP with $\theta > 0$. A necessary and sufficient condition for sustainability is that as $s \to \infty$ the discounted value of the expected debt-to-GDP ratio converges to zero. This is a transversality condition and can be expressed as:

$$\lim_{s\to\infty} E_t\prod_{i=1}^{s}(1+\theta_{t+i})^{-1}b_{t+s} = 0 \qquad (7)$$

(7) implies that a government is solvent if the transversality condition guarantees the non- explosiveness of the public debt and when no Ponzi games are allowed, i.e., no

new debt is issued by the government to meet interest payments. Hence it follows that the current debt is offset by the sum of the current and expected future discounted surpluses, implying that the budget constraint holds in present value terms with:

$$b_t = \lim_{s\to\infty} E_t \sum_{s=0}^{\infty} \prod_{i=1}^{s} (1+\theta_{t+i})^{-1} (\tau_{t+s} - g_{t+s}) \qquad (8)$$

3.2 The critical value of the debt-GDP ratio

Given (8) and using $z_m (= \tau_{\max} - g_{\min})$ as a definition of the maximum level of the government's primary surplus we can determine the critical value of the public debt ratio (b^C), which will satisfy the sustainability condition:

$$b_t \le b^C = z_m (r - \pi - \eta)^{-1} \qquad (9)$$

We can also determine the necessary primary surplus, given the initial debt ratio, b_0, the real interest rate and the growth rate of real GDP, to stabilize the future debt to GDP ratio. When $r\text{-}\pi > \eta$ we can use (2) to define the finite value (b_0) to which b converges as:

$$z^{**} = (r - \pi - \eta)(1 + \eta + \pi)^{-1} b_0 \qquad (10)$$

The gap between the stabilizing primary surplus (z^{**}) and the actual primary surplus (τ_t-g_t) may be used as a sustainability indicator. This indicator gives the magnitude by which either revenue must be increased or expenditure must be cut relative to income to stop the debt ratio from growing. (10) seems helpful when assessing empirically the fiscal policies and the debt situation for developing countries. For example, it would be useful to compare this with the debt ceiling the IMF may have prescribed for these countries at the times of their agreeing to stabilization programs.[9]

From the above analysis it is clear that sustainability of the public debt is essentially an intertemporal question. In particular, every temporary deficit can be sustainable so long as it is matched by an adequate future surplus. Most empirical tests on sustainability

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9 The task of sustaining a debt ceiling is easier aid than done, particularly in low income countries with poor tax institutions. This is primarily because investment and productivity of tax institutions would probably grow at a lower rate than the public debt itself. Thus countries trying to cut the debt by raising more revenues would probably need to raise taxes – particularly distortionary taxes such as trade and indirect taxes. This may cut the debt/GDP ratio in the short term but may end up hurting growth and, therefore, the tax potential in the medium run. Hence the bulk of adjustment must come from cuts in expenditure. This is typically associated with cuts in social expenditures and spending on infrastructure. If international donors are willing to provide more concessional loans (or outright grants) where the interest rate charged is lower than that prevailing, then some of the debt can be retired using these foreign funds and cut its domestic interest bill. This policy has yet to be tried in a significant way anywhere.

apply time series methods and ask whether the observed characteristics of debt-related variables satisfy the solvency condition in (7). This solvency condition can be tested in a variety of ways depending on the processes postulated for the primary deficit (g_t-τ_t) and the real interest rate adjusted for output growth (θ_t). Hamilton and Flavin (1986) and Trehan and Walsh (1988), among others, examine the case where (g_t-τ_t) is strictly exogenous and θ_t is constant. Wilcox (1989) considers the case with exogenous (g_t-τ_t) but variable θ_t. Uctum and Wickens (1997) consider the case where θ_t is stochastic and (g_t-τ_t) could be exogenous or endogenous. For the sake of simplicity, we will assume that the real interest rate adjusted for output growth, θ_t, is constant with an unconditional mean. To proceed further now take the first difference of (6), substitute for Δb_t using (4) and simplify to get:

$$\Delta b_t = d_t - \tau_t = \sum_{s=0}^{\infty}(1+\theta)^{-s-1}E_t(\Delta\tau_{t+s} - \Delta d_{t+s}) + \lim_{s\to\infty}(1+\theta)^{-s-1}E_t b_{t+s} - \lim_{s\to\infty}(1+\theta)^{-s-1}E_{t-1}b_{t+s-1} \quad (11)$$

where $\Delta b_t = g_t + \theta b_{t-1} - \tau_t = d_t - \tau_t$ with $d_t = g_t + \theta b_{t-1}$

defined as total government expenditure inclusive of expenditure on goods and services, transfer payments and interest on the debt. If the government satisfies its intertemporal budget constraint then the expected limit term in (11) is zero so that the sum of the current budget surplus (τ_t-d_t) and the expected present discounted value of future surplus will equal the amount needed to repay the principal and the interest on the initial debt. When this condition holds, it can be said that the current expected paths of government spending and taxation are sustainable.

As Papadopoulos and Sidirpoulos (1999) demonstrate if the limit terms on the right-hand-side of (11) are zero, then a certain cointegrating relationship emerges. Hence cointegration is a necessary condition for the intertemporal budget constraint to hold. To see this assume that d_{t+s} and τ_{t+s} follow random walks with drift. Thus these variables follow the following time series processes:

$$\Delta d_t = \alpha_d + v_{d,t+s} \quad (12)$$

$$\Delta \tau_t = \alpha_\tau + v_{\tau,t+s} \quad (13)$$

where α_d and α_τ are constants and v_d and v_τ are zero-mean stationary processes. Hence (11) can be rewritten as:

$$\alpha = \sum_{s=0}^{\infty}(1+\theta)^{-s-1}(\alpha_d - \alpha_\tau)$$

$$v_t = \sum_{s=0}^{\infty}(1+\theta)^{-s-1}(v_{d,t+s} - v_{\tau,t+S})$$

with

$$d_t - \tau_t = \alpha + \lim_{s\to\infty}(1+\theta)^{-s-1} E_t b_{t+s} - \lim_{s\to\infty}(1+\theta)^{-s-1} E_{t-1} b_{t+s-1} + v_t \qquad (14)$$

Given that d_t and τ_t are I(1) and given that (12) and (13) imply stationarity on the right hand side of (11), the left hand side of (11) must also be stationary for which a necessary condition is that (14) be stationary, which will be the case when d_t and τ_t are cointegrated. Thus a test for sustainability of the debt would check for the cointegration of these two variables if they are I(1). This cointegrating regression would take the form:

$$\tau_t = \alpha + \beta d_t + v_t \qquad (15)$$

Formally, then, if d_t and τ_t are I(1), the null hypothesis is that d_t and τ_t are cointegrated and that β =1. If this null hypothesis is not rejected then the public debt is sustainable.

According to Hakkio and Rush (1991) the condition $0<\beta \leq 1$ also guarantees sustainability. To see this substitute $\alpha^*+\beta d_t$ for τ_t in (2) to get $b_t = b_{t-1}+k_t$ with $k_t \equiv (1-\beta^*)d_t + \alpha^*$. By iterating forward we will get:

$$E_t b_{t+s} = \sum_{j=0}^{s}\left[(1+\theta(1-\beta^*))^{s-j}(1+\theta)^{-s-1}\right]E_t k_{t+j} + \left[(1+\theta(1-\beta^*))^{s}(1+\theta)^{-s-1}\right]E_t b_{t-1} \qquad (16)$$

Using (16) the limit term

$$\lim_{s\to\infty} E_t b_{t+s}$$

in (14) must equal

$$\lim_{s\to\infty} E_t\left(\sum_{j=0}^{s}[(1+\theta(1-\beta^*))^{s-j}(1+\theta)^{-s-1}]k_{t+j} + [(1+\theta(1-\beta^*))^{s}(1+\theta)^{-s-1}]b_{t-1}\right)$$

Using this relation and a similar expression for

$$\lim_{s\to\infty} E_{t-1} b_{t+s-1}$$

it can be shown that the expected limit terms on the right-hand-side of (14) are equal to zero so long as $0<\beta^* \leq 1$. However, although the limit terms equal zero, the limit of the undiscounted value of b equals infinity when $\beta^* <1$. Thus this notion of sustainability is not as unambiguous as that which requires that $\beta^* =1$.

Tests for sustainability of the fiscal deficit were conducted for the sample of low and middle-income countries. The data set used was that provided by the IFS CD rom. Annual data for the period 1950-99 was considered. Time series analysis of the sort

considered in this paper requires long data sets. For several of the countries such data was not available. In Table 1 I report results on the internal deficit sustainability tests for all countries for which a reasonable long data set was available.[10]

Table 1. Sustainability of internal deficit of low and middle income countries

Country	Period	Characteristics of revenue and expenditure	Cointegration between revenue and expenditure	Sustainability Restriction Satisfied
Costa Rica	1971–1999	Revenue: I(1) Expenditure: I(1)	Yes	No
Dominican Republic	1970–1998	Revenue: I(1) Expenditure: I(1)	Yes	No
Ecuador	1952–1998	Revenue: I(1) Expenditure: I(1)	No	No
Egypt	1977–1997	Revenue: I(1) Expenditure: I(1)	Yes (at 10%)	No
El Salvador	1956–1999	Revenue: I(1) Expenditure: I(1)	Yes	No
Fiji	1972–1998	Revenue: I(1) Expenditure: I(1)	No	No
Ghana	1967–1997	Revenue: I(1) Expenditure: I(1)	No	No
Guatemala	1960–1997	Revenue: I(1) Expenditure: I(1)	Yes (at 10%)	No
Guyana	1963-1997	Revenue: I(1) Expenditure: I(1)	Yes	No (restriction rejected at 7.2%)
Honduras	1952-1998	Revenue: I(1) Expenditure: I(1)	Yes	No
India	1952-1998	Revenue: I(1) Expenditure: I(1)	Yes	No
Indonesia	1971 – 1998	Revenue: I(1) Expenditure: I(1)	No	No
Iran	1972-1998	Revenue: I(1) Expenditure: I(1)	No	No
Ivory Coast	1972 – 1999	Revenue: I(1) Expenditure: I(1)	Yes	No

[10] A relevant aspect of the tests for sustainability is to ascertain whether the time series involved have a break. Tests along the lines of Gregory, Hansen and Bruce (1996) were conducted but are not reported here since the data set involved are not long enough to give robust results. However, results of these tests are available from the author.

Table 1. Continued

Jordan	1961 – 1997	Revenue: I(1) Expenditure: I(1)	No	No
Kenya	1972- 1999	Revenue: I(1) Expenditure: I(1)	No	No
Morocco	1967 – 1995	Revenue: I(1) Expenditure: I(1)	No	No
Nepal	1960 – 1996	Revenue: I(1) Expenditure: I(1)	No	No
Nigeria	1967 – 1994	Revenue: I(1) Expenditure: I(1)	No	No
Pakistan	1955 – 1999	Revenue: I(1) Expenditure: I(1)	No	No
Paraguay	1960 - 1993	Revenue: I(1) Expenditure: I(1)	Yes	Yes
Philippines	1959 – 1999	Revenue: I(1) Expenditure: I(1)	No	No
South Africa	1962 – 1998	Revenue: I(1) Expenditure: I(1)	Yes	Yes
Sri Lanka	1952 – 1998	Revenue: I(0) Expenditure: I(0)		
Tanzania	1970 – 1998	Revenue: I(1) Expenditure: I(1)	No	No
Thailand	1952 – 1998	Revenue: I(1) Expenditure: I(1)	Yes (at 10%)	No.
Tunisia	1974 – 1996	Revenue: I(1) Expenditure: I(1)	No	No
Uganda	1972 - 1996	Revenue: I(1) Expenditure: I(1)	No	No
Zambia	1966 – 1996	Revenue: I(0) Expenditure: I(1)		

The results in Table 1 are quite striking. In almost all countries both government expenditure as well as government revenue are non stationary. In the case of Sri Lanka both expenditure as well as revenue are stationary whereas in the case of Zambia, revenue is stationary whereas expenditure is not. Thus Sri Lanka appears to have a stable fiscal situation whereas the Zambian deficit situation is worrisome. In the rest of the countries only in the case of Paraguay and South Africa is the deficit sustainability condition satisfied. In all the other countries, either government expenditures and revenues are not cointegrated or, if cointegrated, the sustainability restriction does not hold. Thus, the fiscal deficit in these countries is not sustainable in the long run.

4 Sustainability of the external debt

In line with the arguments developing the notion of a sustainable internal deficit, a case can be made to ascertain the sustainability of the external deficit (typically the current account balance or trade balance) of a country. Just as a government cannot borrow in the domestic market indefinitely to finance its budgetary deficit, it cannot borrow indefinitely in global capital markets to finance its trade account deficit. This notion can be formalized in a manner similar to that expressed above.

It should be noted that it is only rather recently that the notion that large current account deficits may cause problems has achieved acceptance. As late as 1994, Max Corden espoused the virtues of the Lawson[11] doctrine. Thus Corden (1994) wrote:

> The current account is the net result of savings and investment, private and public. Decentralized optimal decisions on private saving and investment will lead to a net balance – the current account – which will also be optimal. There is no reason to presume that governments or outside observers know better how much private agents should invest and save than these private agents themselves, unless there are government- imposed distortions. It follows that an increase in a current account deficit that results from a shift in private sector behavior should not be a matter of concern at all. On the other hand, the public budget balance is a matter of public policy concern and the focus should be on this.

Notwithstanding the Lawson doctrine large current account imbalances were associated with currency attacks in Chile (in early 1980s), in the UK and Nordic countries (late 1980s); in Mexico and Argentina (mid 1990s) and in several Asian countries and Russia in 1997 and thereafter.[12] Hence, there seem to be some problems with the Lawson doctrine. The literature lists the following five reasons for the failure of this doctrine:

i) When there is Ricardian equivalence,[13] a public sector deficit will be interpreted by rational, forward-looking agents as implying higher taxes in the future. In response, current consumption will fall to pay for these higher taxes.

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11 After Nigel Lawson, UK Chancellor of the Exchequer, who in 1988 dismissed the possibility of any causal link between internal deficit and the current account deficit.

12 It is important to underscore the point that there is a subtle difference between low and middle income countries with respect to the links between external sustainability and currency crises. Surely, large current account deficits financed by capital flows are possible only in countries that are successful in attracting such flows. This would typically be possible primarily in middle income countries. The banking systems in most low income countries, with the possible exception of India, are simply not robust enough to attract and retain such flows. Even in India major capital flows, particularly in crucial infrastrutural areas are attracted by the central government providing counter guarantees to the investing corporation. This then creates difficulties for Indian balance of payments similar to those for middle income countries. These problems may become more common with more low-income countries exploring the counter guarantee route to attracting capital flows. Hence supplementing domestic savings with foreign savings is a strategy open only to a few countries and even then this is fraught with some difficulty.

13 For evidence on Ricardian Equivalence in the developed country context see, for example, Bayoumi and Masson (1998).

This will then impact on the current account deficit. By assuming that the current account deficit will be impervious to changes in the fiscal deficit, the advocates of the Lawson doctrine assume that Ricardian Equivalence does not hold at all.

ii) Typically in the case of developing countries, many private sector (foreign) liabilities are contingent liabilities, which, in a crisis, can be changed into public liabilities under pressure from external creditors. This would then have impacts on the fiscal deficit. This has happened explicitly in the case of private banking liabilities in the case of the Asian countries and implicitly in the case of so called counter guarantees given to independent producers of electricity in India. As Kaminsky and Reinhart (1996) observe, the distinction between private liability and public liability seems to get blurred when the financial institution concerned is "too large to fail".

iii) This follows from Harberger (1985). He argues that there is an externality in that as developing countries (particularly those with poor credit rating) borrow more, they face an upward sloping schedule for foreign credit. Furthermore, as McKinnon and Pil (1995) argue, developing countries may have overly optimistic estimates of the increase in their permanent income in response to a policy shift. This over optimism may lead to higher foreign borrowings, which may exacerbate current account and fiscal deficits.

iv) As the current account deficit worsens there would arise the need to attract more capital inflows. This would then lead to an appreciation of the real exchange rate. In a globalizing world in which export promotion is an integral part of the development strategy, such appreciation would lead to a drop in growth rates and, therefore, potential tax revenues. Thus Agosin (1994) finds large swings in the real exchange rate because of temporary capital flows to significantly depress machinery and equipment investment, and thus long run growth. This then translates into lower tax revenues.

v) Finally, markets typically look at a country's total debt and just its internal public debt. Once the current account deficit exceeds some level, at given exchange rates, it becomes ever more attractive, from the perspective of an individual borrower to borrow abroad. This might lead to a speculative bubble.

We now discuss the standard approach to determining the sustainability of the external deficit. Let F_t be the foreign liabilities of a country. This is typically defined as external debt less foreign assets including international reserves denominated in real foreign currency terms. Further let TB_t denote the real trade balance expressed in domestic currency. Foreign liabilities (expressed in domestic currency) will then evolve as:

$$e_t F_{t+1} = (1 + r_t^*) e_t F_t - TB_t \qquad (17)$$

Where e_t is the reciprocal of the average real exchange rate, and r_t^* is the world interest rate. Clearly a positive trade balance would reduce this country's external indebtedness whereas an increase in the world interest rate would worsen it. To simplify the algebra define $(1+r_t^*)$ as R_t^*. To obtain this country's external constraint along the lines of Hakkio and Rush (1991) and Chalk and Hemming (2000) we solve (17) forward to get

$$F_t = \sum_{j=0}^{\infty} R^*(t,t+j)^{-1} TB_{t+j} + \lim_{T\to\infty} R^*(t,t+j)^{-1} e_{t+T} F_{t+T+1} \qquad (18)$$

Where $R^*(t,t+j) = \left(\prod_{k=0}^{j} R^*_{t+k} \right) e_{t+j}$

(18) is to be interpreted as this country's intertemporal external sustainability condition. Meaningful statistical tests of sustainability have to be derived from (18). For external sustainability we must rule out Ponzi games with external debt. In other words net foreign liabilities cannot grow faster than the interest rate, i.e.

$$\lim_{T\to\infty} R^*(t,t+T)^{-1} e_{t+T} F_{t+T+1} = 0$$

is a necessary condition for external sustainability. This requires that

$$F_t = \sum_{j=0}^{\infty} R^*(t,t+j)^{-1} TB_{t+j} \qquad (19)$$

(19) makes explicit the fact that external debt is sustainable only insofar as it can be financed by future trade surpluses. In the extant literature this requirement has been interpreted to imply stationarity of the current account deficit or the cointegration of exports and imports inclusive of net interest payments, if exports and imports are I(1). A simple way of interpreting the sustainability of (19) is to divide both sides by output to get

$$(1+q_t)(1+\eta_t)\, f_{t+1} = R^*_t f_t - tb_t \qquad (20)$$

where lower case letters denote values as proportions of GDP and q_t is the real appreciation of the domestic currency. Net foreign liabilites as a ratio of GDP are reduced by a positive trade balance, an appreciating currency, or by faster economic growth. Now, if

$$f_t = \frac{tb_t}{r_t^* - q_t - \eta_t} = \bar{f} \qquad (21)$$

Then, when

$$f_t > \bar{f}$$

net foreign liabilities will increase relative to output over time. This can be regarded as unsustainable.

5 The twin deficits

It is straightforward to connect sustainability on the domestic fiscal and the external side – the so-called twin deficits. To see this write the national income identity as:

$Y_t = C_t + I_t + G_t - T_t + X_t - M_t$

where Y_t is national income, C_t is private consumption, I is investment, and X and M are exports and imports respectively. Defining private saving as income minus consumption we have:

$$S_t - I_t - D_t = TB_t \qquad (22)$$

where D_t is the government budgetary deficit. Using covered interest parity and summing (22) over all time periods in net present value terms we have

$$e_t \sum_{j=0}^{\infty} R^*(t,t+j)^{-1} TB_{t+j} = -\sum_{j=0}^{\infty} R(t,t+j)^{-1} D_{t+j} + \sum_{j=0}^{\infty} R(t,t+j)^{-1}(S_{t+j} - I_{t+j}) \qquad (23)$$

where $(1+r) = R$.

Using the internal and external sustainability conditions, we can write (23) as

$$e_t\left(F_t - \lim_{T\to\infty} R^*(t,t+T)^{-1} e_{t+T} F_{t+T+1}\right) = \left(B_t - \lim_{T\to\infty} R(t,t+T)^{-1} B_{t+T+1}\right) + \sum_{j=0}^{\infty} R(t,t+j)^{-1}(S_{t+j} - I_{t+j}) \qquad (24)$$

With both fiscal and external sustainability the "lim" terms in (24) will disappear and we will have:

$$e_t F_t = B_t + \sum_{j=0}^{\infty} R(t,t+j)^{-1}(S_{t+j} - I_{t+j}) \qquad (25)$$

If there is domestic fiscal sustainability but the external deficit is unsustainable then the R^* term gets added to (25). Thus:

$$e_t F_t = B_t + \sum_{j=0}^{\infty} R(t,t+j)^{-1}(S_{t+j} - I_{t+j}) - \lim_{T\to\infty} R^*(t,t+T)^{-1} B_{t+T+1} \qquad (26)$$

If the external deficit is sustainable but the domestic deficit is not, then we will have

$$e_t F_t = B_t + \sum_{j=0}^{\infty} R(t,t+j)^{-1}(S_{t+j} - I_{t+j}) - \lim_{T\to\infty} R(t,t+T)^{-1} B_{t+T+1} \qquad (27)$$

(26) and (27) make it explicit that both the internal and external deficits figure in the government budget constraint.

We report some results on sustainability of the external deficit in Table 2. Time series properties of exports, imports and the trade balance are reported. Some countries like Nepal for which the internal sustainability result could be worked out do not have long enough external data series so that they are not reported in Table 2. Even middle income countries such as South Africa and low-income with well developed markets such as India, do not perform well in the external sustainability test. Paraguay seems to satisfy external as well as internal deficit sustainability. In addition, Ecuador, Egypt, Ghana, Iran, Thailand and Tunisia have stationary trade balances so their external deficits would appear sustainable on this count. However, in the case of Tunisia and Iran exports and imports are not cointegrated so external sustainability becomes suspect. Even in the case of Sri Lanka the coefficient on imports is much higher than that on exports. In the case of Zambia this coefficient is fifty times higher.[14]

Table 2. Sustainability of external deficit of low and middle income countries

Country	**Period**	**Characteristics of Exports and Imports**	**Cointegration Properties**	**Characteristics of Trade Balance**
Costa Rica	1971 – 1999	I(1)	Cointegrated. The null that imports are three times the size of exports is accepted.	I(1)
Dominican Republic	1970 – 1998	I(1).	Cointegrated with each other and with net factor payments from abroad.	I(1)
Ecuador	1952 - 1998	I(0)		I(0)
Egypt	1961 – 1999	I(0)		I(0)
Fiji	1965 – 1993	I(1)	Not cointegrated.	I(1)
Ghana	1957 – 1997	I(1)	Not cointegrated	I(0)
Guatemala	1952 – 1998	I(1)	Cointegrated.	I(1)
Guyana	1954-1997	I(1)	Not cointegrated	I(1)

[14] One largely unresolved issue is whether net FDI flows should be included in the calculations for sustainable current account deficits. Frankel and Rose (1996) find in a panel of 100 developing countries from 1971 to 1991 that a high ratio of FDI to debt is associated with a low likelihood of a currency crash. Between 1970 and 1982, for example, Singapore ran a current account deficit between 12.1% to 20% of GDP. Almost one half of the gap consisted of FDI. The savings rate within this period doubled from 21% to 40%, the economy grew at an average rate of 8% and there was no currency crash. Hence, there is some presumption that since FDI is determined by long-term considerations, generates positive externalities and does not exert pressures on the real exchange rate if it is the outcome of a privatization program, is in a different category when reckoning sustainability of current account deficit. However, if capital is fungible this optimism may be misplaced as Reisen (1999) argues.

Table 2. Continued

Country	**Period**	**Characteristics of Exports and Imports**	**Cointegration Properties**	**Characteristics of Trade Balance**
Honduras	1952 – 1999	Exports I(0), Imports I(1).		I(1)
India	1952 - 1997	I(1)	Not cointegrated.	I(1); Current account balance I(1)
Indonesia	1962 – 1999	I(1)	Cointegrated with each other.	I(1)
Iran	1961 – 1998	I(1)	Not cointegrated.	I(0)
Ivory Coast	1952-1999	I(1)	Cointegrated. Null hypothesis that imports are ten times exports not rejected.	I(1)
Jordan	1961 – 1998	I(1)	Not cointegrated	I(1)
Kenya	1972-1999	I(1)	Not cointegrated	I(1)
Morocco	1954 – 1998	I(1)	Cointegrated with each other and with net factor payments from abroad.	I(1)
Nigeria	1953- 1993	I(1)	Cointegrated with each other and with net factor payments from abroad.	I(1)
Pakistan	1962 – 1998	I(1)	Cointegrated with each other and with net factor payments from abroad.	I(1)
Paraguay	1952 – 1997	I(0)		I(0)
Philippines	1952 – 1998	I(1)	Cointegrated with each other and with net factor payments from abroad (at 7%).	I(1)

Table 2. Continued

Country	Period	Characteristics of Exports and Imports	Cointegration Properties	Characteristics of Trade Balance
South Africa	1952 – 1998	I(1)	Not cointegrated.	I(1)
Sri Lanka	1952 – 1998	I(1)	Cointegrated, with coefficient of imports significantly larger.	I(0)
Tanzania	1962 – 1998	I(1)	Cointegrated with each other and with net factor payments from abroad.	I(1)
Thailand	1952 – 1997	I(1)	Cointegrated. The restriction that the coefficient on imports is half that on exports is accepted.	I(0)
Tunisia	1962 – 1999	I(1)	Not cointegrated.	I(0)
Zambia	1959 – 1997	I(1)	Cointegrated. The restriction that the coefficient on imports is 50 times that on exports is not rejected.	I(1)

It is quite apparent, then, that developing countries have considerable difficulties in meeting internal and external deficit sustainability conditions. The fact that external sustainability conditions[15] are hard to meet would imply the need for continual capital inflow in order to keep the balance of payments in equilibrium. This would necessitate the maintenance of a substantial rate of return wedge between domestic and foreign rates of return. In particular, this would translate into substantially higher domestic rates of interest as compared to global interest rates. This acts as a drag on higher growth and makes the problem of debt servicing harder, which, in turn, exacerbates the problem of internal fiscal deficit.[16]

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15 There is an argument that financial bailouts by international bodies such as the IMF lead to an adverse selection problem in that countries know that since they will be bailed out they may follow imprudent macroeconomic policies. IIF (1999) however, reports that the evidence on this is weak—particularly in the case that has often been cited as the most important example of such imprudent macroeconomic behaviour—the Mexico financial support package of 1995. It has been argued that this package caused moral hazard that was a force behind the large volume of lending at low spreads that occurred in emerging markets in 1996 through mid-1997. On the contrary, the study finds that the empirical evidence does not support the moral hazard diagnosis. Instead, the decline in emerging market spreads can be explained statistically by buoyant international liquidity conditions (as measured by high-yield US corporate spreads) and (to a much smaller extent) by improving economic fundamentals in borrowing economies.

16 A good illustration of this point comes from South Africa. The government has been quite prudent in terms of domestic financing, despite facing large demands for public spending to rectify the inequalities of apartheid and accelerate employment growth. But the need to defend the rand against speculative attack, has led to domestic interest rates significantly above world rates for the last three to

The higher internal fiscal deficit in many of these countries also contributes towards higher interest rates and the crowding out of private investment. In addition, in several of these countries the fact that the domestic bond market is rather thin, implies that the proportion of the deficit that is covered by money or non-bond finance as opposed to bond finance remains disturbingly high. This is reported in Table 3 for select countries for the 1990s. This table compares non-bond financing in the developing countries used in this study with that in a few OECD countries.

Table 3. Forms of financing of the government deficit

Country	1996					1997					1998					
	NBF	DF	F	ratio	ratiof	NBF	DF	F	ratio	ratiof	NBF	DF	F	ratio	ratiof	NBF
Costa Rica			72.54													
Dominican Republic			518.2					-844.8								
Ecuador																
Egypt			4411					5178								
El Salvador	501.4	-399.9	462.9	-1.25	1.08	813.9	-143	580.7	-5.69	0.98						
Fiji	149.17	149.17	147.4	1	1.01					1.81						
Ghana																
Guatemala			1108.4					1565.9								
Guyana										-0.07						
Honduras																
India*	577	638.9	668.8	0.90	0.86	852.9	860	872	0.99		425.5	908.8		0.47		
Indonesia	-3511	-3521	-6180	1.00	0.57	7613	8886	4212	0.86	0.21	-21851	-21851		1		
Iran																
Ivory Coast																
Jordan	-15.1	-126.6	66.3	0.12	-0.23	-11.6	-38.6	163.3	0.30							
Kenya	5795	5795	4785	1	1.21					-14.21						
Morocco										0.27						
Nepal	3500	3500	10981	1	0.32	2318	3968	10909	0.58	-0.21	3323	5572		0.60		991
Nigeria																
Pakistan			169477					189788		0.76						
Paraguay																
Phillippines	-54419	-251	-6256	216.81		22219	5254	-1564	4.23							
South Africa	2516	2516	31846	1.00	-0.40	6198	6198	22852	1		-3174	-3174		1		
Sri Lanka	14827	49753	59913	0.30	0.47	-8397	30276	40234	-0.28		19366	71363		0.27		
Tanzania										-0.62						
Thailand	-93101	-1E+05	-1E+05	0.84		32038	31747	41956	1.01	-0.23	-98394	98162		-1.00		
Tunisia	476	72.6	599	6.56	-0.004											
Uganda										0.26						
Zambia			96.2					488.5								
OECD										0.07						
Australia	-179	-3123	4840	0.06	-0.04	1285	1202	-2062	1.07	0.32	-11598	-11676	-16368	0.99	0.71	
Austria	22	87.85	99.71	0.25	0.22	-15.63	68.6	67.24	-0.23							
Finland	2734	36203	36571	0.08	0.07	4090	34419	15523	0.12							
France	-36.1	397.9	413.3	-0.09	-0.09			284.4								
UK	9449	20446	27440	0.46	0.34	1085	18064	16136	0.06		67	-4665	-4876	-0.01	-0.01	
USA	-40.63	-66.67	114.6	0.61	-0.35	6.98	-164.9	21.72	-0.04		37.59	-64.87	-70.69	-0.58	-0.53	

Source: Government Financial Statistics, IMF

Notes: DF= Domestic Finance, F=Foreign Finance, Ratio =NBF/DF, Ratiof=NBF/F, NBF = DF minus Short term and long term bonds financing plus local government financing

*1997 and 1998 are provisional figures

To the extent that non-bond finance is relied upon, there exists an automatic link between the fiscal deficit and the credit side of the central bank's balance sheet. The government issues bonds to be "bought" by a captive central bank. This changes the monetary base and, hence, the money supply in the economy. The independence of

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four years with damaging effects on private sector investment and growth. For aid dependent economies such as Tanzania this problem may be less severe insofar as they rely on aid inflows to finance the current account deficit on concessional or grant terms. In the case of Mozambique, for example, much of the external deficit—which widened during recontruction—as essential imports exceeded war-damaged exports is aid financed. In this case, then, the focus of attention should ideally be the interenal and not the extenal deficit.

monetary and fiscal policy is compromised and the ability of the central bank to pursue stabilization policies[17] is reduced.[18]

Some have argued that, if this effect was quantitatively strong, there would be a link between the fiscal deficit and inflation—particularly if developing countries wish to use seignorge revenues to close the budgetary gap.[19] However, in developing countries this association is weak. Thus, de Hann and Zelhorst (1990) and Easterly and Schmidt-Hebbel (1993) find a positive correlation between inflation and the fiscal deficit in developing countries only when the inflation rate is high and there is a clear seignorage motive to get additional revenue from money creation. However, Buffie (1999) argues that this result can be ascribed to the behaviour of the public sector wage cycle and that the relation between the fiscal deficit and inflation remains intact once this is factored out. Buffie's argument is that once public expenditure is restrained, perhaps as part of an IMF stabilization program, there is the clear expectation that any cut in the real wage in the public sector that this involves would not be expected to last long. It would be expected that once the strictures of the program are lifted, the real wage would climb back up. The disinflationary program, therefore, lacks credibility. Buffie considers two possible cases:

i) in which the low wage phase is followed by a high wage phase of equal length so as to leave the average wage remains unchanged over the wage cycle.

ii) The low real wage phase is followed by a return of the real wage to its prestabilization level.

In the first case, since the market expects the real wage rate to rise, inflation picks up even as the deficit falls. It is indeed possible that deficit and inflation will be inversely correlated with high inflation prevailing through the low deficit phase. In the second case this result is weaker and depends upon money and consumption being Edgeworth substitutes. The upshot of this argument that the links between fiscal deficit and inflation remain intact even when there is little observed correlation between the two.[20]

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17 Schuknecht (1999) argues that using a nominal anchor like a fixed exchange rate regime may not be sufficient to pursue stabilization objectives. He models electoral business cycles in the case of 25 developing countries and shows that governments indeed try to improve electoral prospects by pursuing expansionary fiscal policies around election time. This is more likely to occur, *ceteris paribus,* in an economy with a nominal anchor such as a fixed nominal exchange rate. These episodes would than be followed by higher inflation and exacerbation of fiscal deficit pressures.

18 In this context, Sargent (1999) argues that monetary policy can be constrained by fiscal policy whenever fiscal deficits grow large enough to require monetization. This can happen in developed as well as developing countries and irrespective of whether the central bank is independent or not. In such situations the central bank loses its ability to influence income or interest rates and can influence only the time path of prices.

19 Issler and Lima (2000) illustrate the importance of this phenomenon in the case of Brazil. They show that not only is Ricardian Equivalence important (so that the fiscal deficit and the current account deficit are linked), but also that without seignorage revenues the Brazilian deficit would not be sustainable.

20 To be sure, Buffie's argument is valid principally for the non sub Saharan Africa region countries. In low income countries of this region such as Zambia, low real wage phases have not typically beeen followed by high real wage pahses.

6 Fiscal policy, capital flows and the money supply process

In the presently rapidly globalizing world economy, a liberal capital regime is often promoted in the interest of optimal international allocation of capital. This change has been assisted by an emerging consensus, both in academic and policy making circles, on the type of policies that promote growth with equity. The new development model emphasizes macroeconomic stability, competitive market structures, globalization (integration into the world economy) and a role for the government and fiscal policy that emphasizes facilitating the growth of the market and the private sector.

To achieve these objectives public finances must be put in order and this paper has spelt out some of the conditions under which this will be possible. Exchange rate policy should emphasize a reduction in the rate of inflation. Further, stabilization policy packages advocated by the IMF and the dire necessity of attracting international capital flows has tempted many developing countries to pursue fiscal policies to attract capital inflows. These include maintaining interest rate differentials, providing favorable tax treatment to foreign capital and the like.

Starting from the late 1980s, developing countries have experienced surges in capital flows. According to the World Economic Outlook (1996), net capital inflows into developing countries, as measured by the capital account surplus (inclusive of errors and omissions) increased from $18 billion in 1988 to $164 billion in 1993 and $250 billion in 1995. Most of this increase has occurred in the private sector. Net private capital flows to developing countries consisting of FDI, portfolio equity, bond issues, loans and other liabilities, rose from $33 billion in 1988 to $167 billion in 1995. FDI and portfolio investments account for over 70% of these flows. Some information on these flows is provided in Table 4. Some aspects of the regional distribution of such flows are portrayed in Table 5.

Table 4 Net Capital Flows to Developing Countries, 1990-98 (in billions of US dollars)

Year	Official Flows	Private Flows	International Capital Flows	FDI	Net long term resource Flows	Net short term resource flows
1990	56.9	43.9	19.4	24.5	100.8	-
1991	62.6	60.5	26.2	34.4	123.1	22.0
1992	54.0	98.3	52.2	46.1	152.3	37.6
1993	53.3	167.0	100.0	67.0	220.2	-
1994	45.5	178.1	89.6	88.5	223.6	-
1995	53.4	201.5	96.1	105.4	254.9	64.2
1996	32.2	275.9	149.5	126.4	308.1	30.7
1997	39.1	299.0	135.5	163.4	338.1	21.6
1998	47.9	227.1	72.1	155.0	275.0	10.2

Source: *Global Development Finance*, The World Bank (1999).

Table 5 Regional Distribution of Capital Flows to Developing Countries

	1977-82	1983-89	1990-96	1994	1995	1996	1997
Developing Countries Total	30.5	8.8	163.4	158.0	226.9	231.1	202.7
Net FDI	11.2	13.3	63.1	75.4	84.3	105.0	119.4
Net Portfolio Flows	-10.5	6.5	54.1	85.0	20.6	42.9	40.6
Other flows	29.8	-11.0	46.2	-2.4	122.0	83.2	42.7
Asia	15.8	16.7	64.3	69.3	96.9	111.5	56.2
Latin America	26.3	-16.6	47.5	43.4	57.7	67.1	83.8
Other	-11.6	8.7	51.6	45.3	72.3	52.5	62.7

Source: IMF World Economic Outlook (1995) for figures upto 1989 and IMF World Economic Outlook (1998) for other years.

Such large capital flows have turned out to be a major welcome as well as worrisome macro economic development for these countries. Some of the obvious positive features are: (i) acquiring capital for higher economic growth; (ii) smoothing out consumption over time; and (iii) acquiring new technology and expertise through FDI.

At the same time, these inflows have also posed major challenges for the conduct of monetary policy. Thus there is a tendency for the real exchange rate to appreciate as a result of the build-up of foreign exchange reserves and associated expansion of monetary base, greater speculative activity on the part of the domestic asset markets and possible disruption associated with sudden reversal of flows. Capital inflows lead to increased expenditures some of which will spill over onto tradable goods. This will increase the size of the trade deficit. If this were the only adjustment required, there would be no grounds for concern because the higher trade deficit will be financed directly by the capital inflow with no disequilibrium in the market for non-tradable goods. Thus the principal reason to worry about the trade deficit would be to understand whether the implied external debt was sustainable. However, some of the additional expenditures would spill over onto the non-tradable goods sector. The size of the tradable goods sector will, therefore, shrink and that of the non-tradable sector rise.

Further, this sudden increase in the balance sheet on both the asset and liability sides for the banking system may make it possible to finance investment/consumption decisions of agents that are not sustainable over the long run. This would lead to a further external current account deficit, increasing the private sector's indebtedness and the emergence of non-performing assets. Unless sterilized, these additions to the debit and credit sides of the financial sector's balance sheet will lead to inflationary consequences. Further, the buildup of international debt through recurrent current account deficits can undermine the country's creditworthiness. If the domestic monetary authority attempts to sterilize the capital flows, the domestic monetary base becomes endogenous. However, sterilization may not insulate the economy from the effects of capital inflows

in these inflows are triggered by an increase in the domestic money demand that raises domestic interest rates. In addition, it might have quasi-fiscal costs for the central bank to the extent that monetary authorities purchase low-yielding foreign assets and sell high-yielding domestic assets. Moreover, if sterilization were achieved through increased reserve requirements, it would act as a tax on the banking system and may promote disintermediation. Hence, sterilization is at best a partial solution.

It follows, therefore, that money supply becomes endogenous or, at least, hard to target because of the presence of capital flows. (Some suggestive evidence of this variety for the Indian economy is presented in the Appendix to this paper.) Hence, it is imperative from the point of view of attaining macroeconomic stability that forces of endogeneity of money supply emerging from the fiscal side be abated. If the money supply has to bear the burden of adjustment from the fiscal side as well as that of international capital flows, it would be difficult to pursue stabilization policy.

7 Conclusions

This paper has considered some aspects of the effects of fiscal policy on macroeconomic adjustment in developing countries. Broadly, two areas of concern are delineated. First, is spelling out the conditions under which the internal and external debts are sustainable and pointing out the role of the "twin deficits". In this context this paper presents some evidence on the sustainability of the internal and external deficits in the context of some developing countries. The second broad theme of this paper is tracing the sources of endogeneity in money supply to fiscal policy and international capital flows and pointing out the difficulties faced by stabilization policy under these conditions.

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Appendix One source of endogeneity of the money supply

This appendix models one possible source of endogeneity of the money supply—capital flows—and illustrates it using recent Indian data. The surge in capital flows to India in the 1990s has come in different forms through the routes of FDI and portfolio flows as compared to the debt-created flows through non resident Indian (NRI) and other forms of banking capital in the 1980s. The magnitudes of such flows have been on the rise in the 1990s with significant macroeconomic implications.

This increase in capital flows occurred against the background of a relatively lower Current Account Deficit (CAD)-GDP ratio. This is to be contrasted with the capital flow of the 1980s with a dominance of debt-created flows in the context of high CAD-GDP ratio, such that the capital flows financed the current account deficits with no significant monetary effects. As such, the surge in capital flows of the 1990s resulted in accretion of international reserves with obvious monetary impacts, (partial) sterilization programs of the Reserve Bank notwithstanding.

Our approach to understanding the implications of this capital flow models the impact of capital flows on the monetary process by developing an interest rate reaction function along with conventional money demand function (Kamin and Wood (1997)).

Let the money demand function be:

$$\log (M_3/P) = \alpha - \beta i + \delta y + e_M \qquad \text{(A1.1)}$$

where domestic interest rates is i and real income is y.

If money demand function is stable, then capital inflows can affect M_3 in the long run by affecting its demand—through the domestic interest rate i. We posit an interest rate function in which the monetary authority sets the domestic interest rate in response to prevailing level of inflation, output growth and capital flows. Increase in inflation leads to a rise interest rates to keep the real interest rate from declining while increase in output growth elicits a counter-cyclical rise in interest rates, and increase in capital flows induces the authorities to lower the interest rate. The interest rate reaction function is:

$$i = \nu + \lambda \hat{P} + \phi \hat{y} - \theta KA + e_1 \qquad \text{(A1.2)}$$

where a hat ($\hat{}$) refers to log change *i.e.*, $\hat{P} = \log P_t - \log P_{t-1}$ etc. Based on (A1.2) and the money demand function (A1.1), the impact of KA on i and then the impact of i on M_3 can be calculated as:

$$dM_3 / d\,KA = (dM_3 / d\,i) * d\,i / d\,KA = (-\beta)(-\theta) > 0 \qquad \text{(A1.3)}$$

Using this framework, dynamic versions of money demand and interest rate reaction functions were estimated separately for the Indian economy. Through simulation a counterfactual path of interest rates and money balances that would have occurred had there been no surge in capital flows the way they did was then charted.

Then capital inflows were added as an explanatory variable in the money demand function which was then estimated using two-stage least squares since the interest rate

in the money demand function already incorporates the effects of capital inflows. The money demand function is:

$$\log (M_3/P) = \alpha - \beta i + \delta y + e_M$$

$$= \alpha - \beta (v + \lambda P^{\wedge} + \phi y^{\wedge} - \theta KA + e_1) + \delta y + e_M$$

$$= \alpha - \beta (v + \lambda P^{\wedge} + \phi y^{\wedge} + e_1) + \beta \theta KA + \delta y + e_M \quad (A1.4)$$

where the terms within the parentheses represent that part of interest rates which is not determined by capital flows while the θKA term represents that part of interest rates which is determined by capital flows. We estimate equation (A1.4) using a two-stage least square procedure in which we first estimate a partial version of the interest rate equation:

$$i = v + \lambda P^{\wedge} + \phi y^{\wedge} + \sigma Z + e_i \quad (A1.5)$$

where Z represents other potential instruments that are correlated with the interest rates i but not with KA. We then take the fitted values for i, (denoted as i'), and use them as explanatory variables in the second stage regression:

$$\log (M_3/P) = \alpha - \beta i' + \beta \theta KA + \delta y + e_M - \beta e_I \quad (A1.6)$$

We use the estimated version of the above equation to determine how the money supply would have evolved had capital flows not surged in the 1990s and then compare with those calculated using our first method.

In implementing this approach, we estimate error correction versions of the static money demand and the interest rate functions. Two conventional measures of capital inflows are used: the capital account which measures the net flow of capital and the change in international reserves which measures the extent to which capital flows would increase the monetary base with no sterilization.

Results using monthly data from 1981M6 to 2000M3 are reported in Tables A1.1 to A1.5. (IIP stands for index of industrial production and WPI for the wholesale price index). In Table A1.1 the capital flow account term is insignificant. This is understandable since the major part of this period did not experience significant capital flows since significant such flows started actually from the year 1993.

Table A1.1. Full period parsimonious results for interest rate reaction function on monthly data (with capital flow)

Dependent Variable: Change in call money market rate of interest
226 observations used for estimation from 1981-6 to 2000-3

Regressor	Coefficient	Std. Error	t-statistics [Prob]
INPT	1.6334	.77517	2.1071 [.036]
INT(-1)	-.24605	.066517	-3.6991[.000]
DLWPI(-1)	182.378	98.4415	1.8527 [.065]
DLIIP(-1)	-11.7594	3.7971	-3.0970[.002]
DLNFA(-1)	-1.9977	2.3099	-.86484[.388]
DINT(-1)	-.15773	.081512	-1.9351[.054]
DINT(-2)	-.25802	.076734	-3.3625[.001]
DINT(-3)	-.23286	.070343	-3.3104[.001]
DINT(-4)	-.10029	.066947	-1.4980[.136]
DDLWPI(-1)	-231.4764	86.6946	-2.6700[.008]
DDLWPI(-2)	-225.1815	79.6050	-2.8287[.005]
DDLWPI(-3)	-186.9466	72.1787	-2.5901[.010]
DDLWPI(-4)	-171.1842	68.5435	-2.4975 [.013]
DDLWPI(-5)	-164.0979	58.8729	-2.7873 [.006]
DDLWPI(-6)	-123.0555	54.9079	-2.2411 [.026]
DDLWPI(-7)	-116.9016	46.1432	-2.5334 [.012]
DDLWPI(-8)	-93.3639	39.3610	-2.3720 [.019]

R-Bar-Squared = 0.25852 ; D-W Statistic 2.011

Table A1.2 gives the parsimonious equation for the interest rate for the period of heightened capital flows since 1993M4. As can be seen, there is a significant improvement in goodness of fit with highly significant coefficients for lagged capital flows and for changes in capital flows with various lags.

Table A1.3 gives the parsimonious equation for the interest rate for the period of heightened capital flows, after dropping the capital flow terms from the OLS regression. As can be expected, there is a significant decline in goodness of fit, and only the lagged interest rate term remains significant.

Table A1.2. Part period parsimonious results for interest rate reaction function on monthly data (with capital flows)

Dependent Variable: Change in call money market rate of interest 84 observations used for estimation from 1993-4 to 2000-3			
Regressor	Coefficient	Std. Error	T-statistic [Prob]
INPT	2.5248	1.6373	1.5421[.130]
INT(-1)	-.77183	.11648	-6.6265 [.000]
DLNFA(-1)	-39.9240	21.5172	-1.8554 [.070]
DLIIP(-1)	498.0998	196.8923	2.5298 [.015]
DLWPI(-1)	494.2467	262.6650	1.8817 [.066]
DINT(-4)	.34039	.11296	3.0132 [.004]
DINT(-5)	.45195	.14546	3.1072 [.003]
DINT(-6)	.38373	.16352	2.3467 [.023]
DINT(-7)	.40406	.15921	2.5379 [.015]
DINT(-8)	.28202	.14535	1.9402 [.058]
DDLNFA(-1)	61.4968	19.4698	3.1586 [.003]
DDLNFA(-2)	50.6345	18.4804	2.7399 [.009]
DDLNFA(-3)	48.0017	16.2335	2.9570 [.005]
DDLNFA(-4)	48.5367	13.8977	3.4924 [.001]
DDLNFA(-5)	36.0854	10.8063	3.3393 [.002]
DDLWPI(-1)	-328.7736	252.5748	-1.3017 [.200]
DDLWPI(-2)	-542.2812	251.4040	-2.1570 [.036]
DDLWPI(-3)	-300.3750	246.7512	-1.2173 [.230]
DDLWPI(-4)	-324.5521	229.9105	-1.4116[.165]
DDLWPI(-5)	-400.7135	214.8934	-1.8647 [.069]
DDLWPI(-6)	-391.0953	202.8677	-1.9278 [.060]
DDLWPI(-7)	-499.5484	194.2671	-2.5715 [.013]
DDLWPI(-8)	-693.2791	185.8752	-3.7298 [.001]
DDLWPI(-9)	-636.5860	173.3911	-3.6714 [.001]
DDLWPI(-10)	-429.0230	149.1816	-2.8758 [.006]
DDLWPI(-11)	-132.1504	127.3181	-1.0380 [.305]
DDLIIP(-1)	-499.7257	186.8652	-2.6743 [.010]

Regressor	Coefficient	Std. Error	T-statistic [Prob]
DDLIIP(-2)	-428.2095	169.4123	-2.5276 [.015]
DDLIIP(-3)	-352.3203	151.8819	-2.3197 [.025]
DDLIIP(-4)	-323.8446	135.3321	-2.3930 [.021]
DDLIIP(-5)	-328.7223	119.8221	-2.7434 [.009]
DDLIIP(-6)	-303.3085	104.7861	-2.8945 [.006]
DDLIIP(-7)	-293.9443	90.2261	-3.2579 [.002]
DDLIIP(-8)	-277.4831	76.5747	-3.6237 [.001]
DDLIIP(-9)	-246.3014	63.4092	-3.8843 [.000]
DDLIIP(-10)	-187.6575	50.0376	-3.7503 [.000]
DDLIIP(-11)	-124.9295	35.9202	-3.4780 [.001]
DDLIIP(-12)	-57.1440	22.7651	-2.5102 [.016]

R-Bar-Squared = 0.45389; DW-statistic = 2.1338

Table A1.3. Part period parsimonious results for interest rate reaction function on monthly data (without capital flows)

Dependent Variable: Change in call money market rate of interest 84 observations used for estimation from 1993-4 to 2000-3			
Regressor	Coefficient	Std. Error	T-statistic [Prob]
INPT	4.7075	1.1677	4.0314 [0.000]
Interest Rate(-1)	-0.48036	0.095312	-5.0398 [0.000]
DLIIP (-1)	-3.4389	8.2116	-0.41879 [0.676]
DLWPI (-1)	-42.2460	92.1950	-0.45822 [0.648]

R-Bar-Squared = 0.21659; DW-statistic = 2.0454; F-statistic. F(3,80) = 8.6492 [0.00]

Estimates of the money demand function with and without capital flows are presented in Table A1.4 and Table A1.5. As per expectation, capital flow terms turn out to be significant.

Table A1.4. Part period parsimonious results for money demand function on monthly data (with capital flows)

Dependent Variable: Change in Logarithm of Real M_3 84 observations used for estimation from 1993-4 to 2000-3			
Regressor	Coefficient	Std. Error	T-statistics [Prob]
INPT	-0.19774	0.054125	-3.6534 [.000]
DINT(-1)	.3463E-3	.2615E-3	1.3242 [.189]
DINT(-2)	0.6541E-3	0.2808E-3	2.3292 [.023]
DINT(-3)	0.5606E-3	0.2787E-3	2.0119 [.048]
DINT(-4)	0.5016E-3	0.2636E-3	1.9029 [.061]
LIIP(-1)	0.058229	0.019485	2.9884 [.004]
DLIIP	0.030781	0.022710	1.3554 [.179]
LNFA(-1)	-0.011308	0.0062094	-1.8211 [.073]
DLNFA	0.10022	0.033548	2.9875 [.004]

R-Bar-Squared = 0.23311; DW-statistic = 2.1141; F-statistic F(8,75) = 4.1536 [.000]

Results for the parsimonious equation without capital flow terms are reported in Table A1.5. As can be seen, there is a drop in the goodness of fit and interest rate terms become insignificant.

Table A1.5. Part period parsimonious results for money demand function on monthly data (without capital flows)

Dependent Variable: Change in Logarithm of Real M_3 84 observations used for estimation from 1993-4 to 2000-3			
Regressor	Coefficient	Std. Error	T-statistics [Prob]
INPT	-0.043556	0.046521	-0.93625 [.352]
DINT(-1)	-0.3711E-4	0.2804E-3	-0.13235 [.895]
DINT(-2)	0.4138E-3	0.2975E-3	1.3909 [.168]
DINT(-3)	0.1897E-3	0.2965E-3	0.63980 [.524]
DINT(-4)	0.2906E-3	0.2790E-3	1.0417 [.301]
LIIP(-1)	0.0088042	0.0082096	1.0724 [.287]
DLIIP(-1)	0.043689	0.022347	1.9551 [.054]
DLIIP(-2)	0.058878	0.024510	2.4022 [.019]
DLIIP(-3)	0.086227	0.024517	3.5171 [.001]
DLIIP(-4)	0.054035	0.022056	2.4499 [.017]

R-Bar-Squared = 0.17615; DW-statistic = 2.3377; F-statistic. F(9,74) = 2.9718 [.005]

Charts 1 and 2 portray the fitted values of changes in the rate of interest and real money demand *vis-à-vis* their actual values. Next we simulate the interest rate function to obtain the rate of interest that would have prevailed had there been no capital flows. For this exercise, we use the assumption that the coefficient of term relating to capital flows is zero. Chart 2 plots the simulated interest rate *vis-à-vis* the actual. Using these simulated rates of interest, the money demand function as per equation without capital flows is estimated and plotted *vis-à-vis* the actual money demand.

Chart 1. Changes in Actual (DINT) and Fitted Values (DINTHAT1) of Interest Rates on Monthly Data

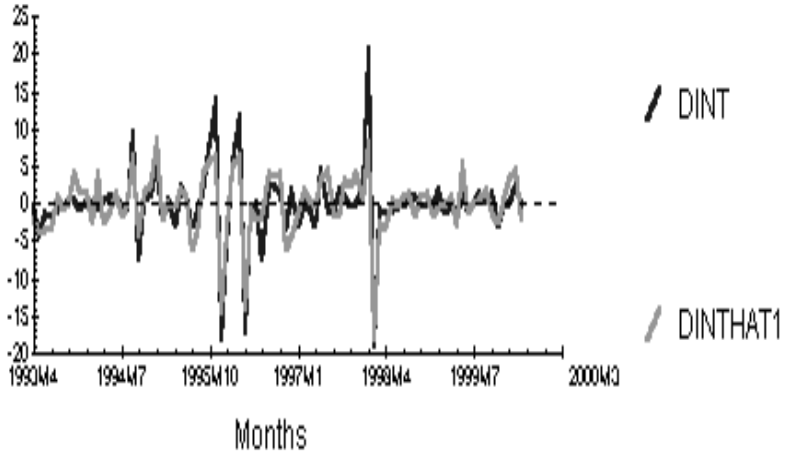


Chart 2. Changes in Actual (DINT) and Simulated Values (DINTHAT2) of Interest Rates on Monthly Data

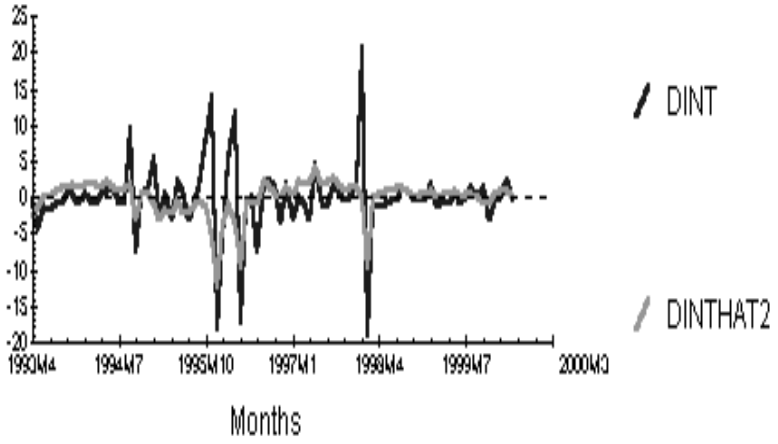


Chart 3. Changes in Actual (DLREALM3) and Fitted Values (DRLM31) of Logarithmic Real Money Demand on Monthly Data

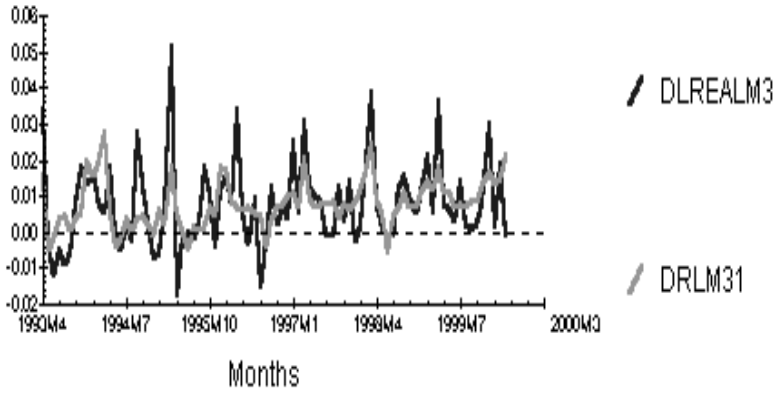
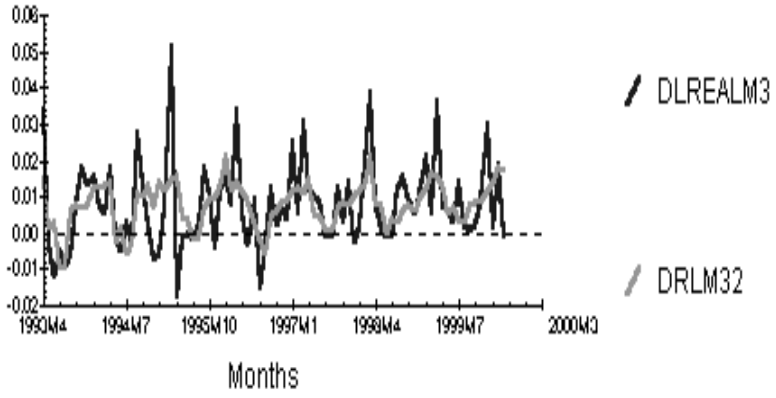


Chart 4. Changes in Actual (DLREALM3) and Simulated Values (DRLM32) of Logarithmic Real Money Demand on Monthly Data



This analysis leads to some conclusions.

By adopting a framework involving construction of interest rate reaction function along with a money demand function in the framework of a two-stage recursive system, we are able to model the impact of capital flows on money supply in India. Controlling for inflation and output at the levels they were at, simulation analysis provides a useful way

of constructing a counterfactual exercise to visualize the scenario that would have emerged in the absence of the influence of capital flows on money supply. Such an exercise points towards a definite monetary impact of capital flows especially in the 1990s. Such a phenomenon could turn out to be extremely important especially if there are limits to the central bank's ability to sterilize because of high quasi-fiscal cost or some other impediments.

Furthermore, the actual path *vis-à-vis* the counter factual simulated scenario of interest rates and change in real money demand do broadly follow a similar pattern. This may be a pointer to the fact that factors purely domestic to the economy (other than capital flows) remain quite important in the money supply process. As the magnitude of capital flows grows, the relative influence of these domestic factors may decline.

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