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Budget Deficits and Private Saving in India: Evidence on Ricardian Equivalence

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The paper examines the implications of rising public deficit for saving activity in India under the framework of Ricardian Equivalence Theory. While the tests based on overall fiscal deficit reveal some evidence of Ricardian behaviour, it is inferred that such an outcome may reflect the 'direct crowding out' impact of government expenditure on private consumption. A more direct test based on public saving establishes significant non-Ricardian consumption behaviour of the private sector in India. The tests based on 'direct crowding out' hypothesis reveal that Government consumption and transfer payments have an expansionary outcome on the consumption level in the economy, while public investment and interest payments generally dampen private consumption and contribute to national saving.

Introduction

Among many unsettled issues in public economics, the relation between budget deficit and saving activity is perhaps the most controversial. There are competing theories which attempt to establish either direct or indirect relation between the two, but what is unique in this branch of literature is that under some theoretical framework budget deficit is seen to have no impact on national saving. Much of this theoretical framework owes its origin to Ricardian Equivalence Theory (RET), which has remained a focal point of theoretical and empirical research in public economics ever since Barro (1974) reformulated the theory in its modern version [for reviews on RET see, for example, Bernheim (1987), Buiter and Tobin (1979), Leiderman and Blejer (1988) and Seater (1992)]. What has made this branch of macro-economics controversial is the fact that under RET fiscal deficit can not affect economic activities, for good or for bad. The impact of budget deficit on private saving, therefore, has been a subject of recurrent interest and especially so in developing countries where fiscal policy has the overriding importance for domestic capital formation and growth.

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Essentially, at a more general level, there are three major routes through which fiscal deficit could have implications for private saving. First, fiscal deficits through the Keynesian framework increase aggregate absorption in the economy and therefore, reduce the saving potential in the economy. Under the neoclassical Life Cycle Theory, fiscal deficits increase private consumption but not to the extent anticipated by the Keynesian school, as agents discount future tax liability in their disposable income. However, as agents are assumed to possess finite life horizons, tax discounting remains incomplete and fiscal deficit stimulates private consumption. A completely different result would emerge under the Ricardian paradigm, where the discounting of future tax liability in order to repay and service the debt incurred today is assumed to be complete. Under this scenario, deficit will reduce private consumption, rupee for rupee, without any diminutive impact on national savings. Hence, as is the case with RET, if private sector is sufficiently forward looking and internalises government fiscal policy in its intertemporal budget constraint, then swapping debt for current taxation is simply to substitute an equal amount of private saving in place of public deficit. As such, deficit and taxes have equivalent implications for economic activity. A second route of impact of budget deficit on private saving stems from direct complementary and substitution possibilities involved between public and private expenditures. This route of impact, or what is known as "direct crowding-out", is generally found to be significant in developing countries. Private sector's consumption and investment may exhibit complementary relation with public consumption and investment. In this case, with rising public sector deficit, private financial balance will also deteriorate and the final impact of deficit could be reduced national saving and increased reliance on foreign saving. The opposite would be true if private expenditures are substitutes for public expenditure. A third route of impact can arise, if deficit is due to the growing fiscal incentives meant for promoting saving activities in the economy. In this case deficit could be positively associated with private savings.

This paper is set against the growing concern for rising public deficit in India and its possible adverse implications for saving activity. For this concern to be valid, the Ricardian proposition must be invalidated in the Indian context. At a purely theoretical level and by hindsight, in the Indian context, it would not be very difficult to establish non-Ricardian relation between budget deficit and private saving, as most of the assumptions of RET viz., infinite life horizon, perfect capital market, lump sum taxes and absence of uncertainty fail to hold in practice. Nonetheless, the empirical literature in the developing country context is far from a posi-

tion of consensus on this issue [Haque (1988) and Rossi (1988)]. On the contrary, a recent work by Ghatak and Ghatak (1993) reported substantial evidence in favour of RET in the Indian context. The objective of this paper is therefore, to collect empirical evidence on the impact of budget deficit on private saving in India. The issue is approached from the consumption side : whether budget deficit leads to a contraction in private consumption in India, and if so, at what degree of impact? The rest of the paper is organised as follows. Section II sets out the theoretical exposition of the RET in the context of the developments in Indian public finance. Section III presents empirical test of the hypothesis in India while Section IV includes the concluding observations.

SECTION II

An Exposition of Debt Neutrality Theory and Indian Fiscal Scene

Following Frankel and Razin (1987) and Leiderman and Blejer (1988), the Ricardian Equivalence Theory can be stated through a simple stylised version of two period budget constraint of the private and public sectors. Private sector's consolidated budget constraint in the present value term takes the following form :

$$C_o+\alpha^P_1 C_1 = (y_o-t_o)+\alpha^P_1(y_1-t_1)-(1+r^P_{-1})b^P_{-1} \qquad ...(1)$$

where C, Y, t and b^P refer to consumption, income, tax liability and borrowing of the private sector, respectively; r^P is private sector interest rate, and subscripts 0, 1 and -1 refer to the initial period, second period and the previous period. The left hand side of Equation (1) shows the total consumption of the private sector in present value term, which consists of consumption in the current period (C_o) and the discounted value of second period consumption(C_1); where the discount factor, $\alpha^P_1 = (1/1+r^P_0)$. The three terms in the right hand side of equation (1) show disposable income in the current period, discounted value of disposable income in the second period, and repayment of debt together with interest contracted in the previous period. The private sector budget constraint at (1) imposes the solvency constraint that total consumption equals disposable income minus the discharge of debt obligations. Government's consolidated two-period budget constraint can be analogously expressed as:

$$g_0+\alpha^g_1 g_1 = t_o+\alpha^g_1 t_1-(1 + r^g_{-1})b^g_{-1}$$

or

$$t_o+\alpha^g_1 t_1 = g_o+\alpha^g_1 g_1 + (1 + r^g_{-1})b^g_{-1} \qquad ...(2)$$

Where the government discount factor, $\alpha^g_1 = (1/1 + r^g_o)$; t, g and b^g represent taxes, government expenditure and borrowing, respectively. The implication of the government intertemporal budget constraint as shown by equation (2) is that the present value of the government's expenditure plus its initial liabilities must equal the present value of its tax revenue. This solvency condition rules out the possibility of the government running a deficit in its budget for an indefinite period. This assumption is important for the private sector financial behaviour because it provides the signal that all government spending in present value term must be paid for now or later by equivalent tax revenue in the present value terms. Introduction of monetary financing will extend the budget constraint by addition of another term on the left hand side of equation (2), representing the present value of revenue from seignorage. Similarly, the budget constraint of the private sector can be augmented to account for Barro's (1974) intergenerational bequests. In this case the budget constraint of the private sector will include a term representing the amount of bequests desired to be gifted to the future generations in the present value term.[1]

If we assume that the government's future expenditure programme is fairly known to the private sector and this expectation remains unchanged then taxes required to finance government expenditure can be fully anticipated by the forward looking private sector. In that event, the present value of tax liability in the private budget constraint will equal the present value of total expenditure in the government budget constraint. Now substituting equation (2) for taxes in equation (1) we get :

$$C_o+\alpha^p_1 C_1 = (Y_o+\alpha^p_1 Y_1) - (g_o+\alpha^p_1 g_1) \qquad ...(3)$$

Since by assumption $b^g_{-1} = -b^p_{-1}$ and $r^p_o = r^g_o$ the debt terms have dropped out from equation (3). Hence, equation (3) is the intertemporal budget constraint of a perfectly rational agent who is able to fully internalise the government budget constraint into his own. This representative individual will then maximise his life time utility subject to the budget constraint at equation (3). This specification underlines the Ricardian Equivalence Theorem that government debt has no impact on private wealth and what matters for the private sector consumption is the present value of total government expenditure rather than current taxation or the deficit. As long as the present value of government expenditure

1 The restatement of equivalance proposition in terms of intergenerational transfers showed that individuals with finite lives can be regarded as possessing infinite planning horizons [See Barro (1974) for details.]

remains unchanged, the timing of taxes does not affect private sector economic behaviour. The individual's wealth position can undergo a change only if the two right hand terms of equation (3) are revised. This implies that any change in the expectation about the future path of government expenditure and income can generate a wealth effect with implications for national consumption and saving.

A crucial aspect of equation (3) is the assumption that the private and government discount rates are the same. If $\alpha^g_1 > \alpha^p_1$ then discounting of future taxes will be incomplete and deficit will generate a wealth effect. This result will follow if government's planning horizon is different from that of the individual and the capital market is imperfect, in which case, the private sector borrowing rate will differ from that of the government's. Therefore, for the Ricardian proposition to hold $\alpha^p_1 = \alpha^g_1$ and all other assumptions underlying RET must hold true.[2]

The RET and the Fiscal Situation in India

The seriousness of the Indian fiscal situation over the 1980s was reflected on the growing fiscal deficit and its adverse implications for internal and external balances. Not only did public sector fiscal deficit rise from about an average of 3 to 5 per cent of GDP in 1960s and 1970s to around 9 per cent by 1989-90, the structure of government finances also underwent major changes.

As observed from Table 1, the current account of government administration showed deficit of Rs.16.1 bln, for the first time, in 1983-84 and since then dissavings have increased year after year to touch Rs.175 bln or 3.8 per cent of GDP in 1989-90. The Government consumption expenditure showed a clear rising trend, at 11.9 per cent of GDP in 1989-90, it increased by 5.2 percentage points over that in 1960-61. A significant development in the budget is the rising transfer payments, which as a proportion of GDP recorded a little more than five fold increase between 1960-61 and 1989-90; i.e. from 2 per cent of GDP to 10.6 per cent in 1990-91. With this allround deterioration in government finances, the public sector stock of debt rose through the 1980s reaching 65.3 per cent of GDP in 1990-91 as compared with 49.0 per cent in 1980-81.

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2 The important assumptions are individuals are rational and can forsee future accurately, all taxes are lumpsum, the capital market is perfect, individuals and government have same planning horizon, and future income and tax liabilities are known with perfect certainty.

The dwindling public saving and a decline in the saving performance of the private sector in the most part of 1980s brought down the overall saving rate from the peak of 23.2 per cent in 1978-79 to a low of 18.2 per cent in 1984-85. Since then there has been some improvement in the saving ratio, although year to year fluctuations remained large. Against the backdrop of this development several questions could be raised: Could it be that government deficit adversely affected private saving which has shown an unstable tendency in the 1980s? What differential impact the tax and debt financing of government expenditure has on private sector consumption? Is there any evidence on the complimentarity or substitutability between government and private consumption? Some of these questions are addressed in the following section.

SECTION III

The Empirical Evidence

The literature on the Ricardian Equivalence employs two alternative approaches for testing the tax discounting hypothesis; (i) direct test that links government deficit to private consumption and (ii) indirect test which involves empirical examination of each assumption underlying the RET. Under the indirect method, empirical rejection of any one of the assumptions of the RET is a sufficient condition for rejection of the theory, while under direct approach a more rigorous stand is taken, the purpose is to quantify the macro-economic impact of government deficit by exploring various possible ways of interaction between fiscal policy and economic activity. We follow the direct approach to conduct the empirical test of RET in the Indian context. Before formulating the hypothesis in its specific functional form, the first step in this direction would be to draw the functional relationship between consumption and income; this consumption function can then be augmented with fiscal variables to trace the impact of deficit on private consumption.

Table 2 reports regression results of private consumption function in India in various specifications to collect evidence on the permanent income hypothesis, which is an essential feature of RET. The data for consumption and disposable income related to the period 1960-61 to 1989-90. Consumption refers to private final consumption expenditure at 1980-81 prices and private disposable income is given by Net National Product (NNP) **minus** taxes and government property income **plus** transfers. All data are expressed in per capita form. The consumption equations estimated through the partial adjustment framework, one period lag income

and first difference form reveal that consumption is primarily determined by current income. The coefficient of lag income took negative sign in most equations after correcting for first order autocorrelation. This result remained more or less unaltered in case of partial adjustment framework, excepting equation (6), where the partial adjustment showed some significance.

In first difference form, consumption equation shows the characteristics of a random walk process. Here also the coefficient of lag income (in difference form) turned out to be insignificantly negative, a prediction that goes contrary to the theoretical expectations. The conclusion which seems to be emerging from the above result is that the permanent income hypothesis (PIH) does not provide a reasonable explanation for changes in private consumption behaviour in India. PIH as a poor explanation for the consumption behaviour in India was also indicated by several other studies in the past [Lumas and Lumas (1976) and Bhalla (1980)]. On account of this, we propose to omit lagged income and lagged consumption variables in the subsequent estimation of the consumption function augmented with fiscal variables.

Is Government Deficit Neutral ?

The consumption function estimated above provides a convenient ground to test the debt neutrality proposition. If consumers are assumed to be sufficiently forward looking and care for their future generations, then debt financing merely postpones the ultimate tax liability implied by government expenditure. Consequently, permanent income of the private sector would not change and so would their consumption. Therefore, the factor on which consumers are going to base their consumption decision is the amount of government expenditure rather than how the government plans to finance this expenditure. Assuming that private sector has full information on the future plans for government expenditure, the desire for consumption smoothing and bequest over the infinite life horizon implies that private sector would cut down its consumption in the current period by the full amount of deficit in order to keep its permanent wealth intact. Hence, the appropriate disposable income in this case is given by y-t-d, that is national income (y) **minus** taxes net of transfers (t) and deficit (d). Following Kochin (1974) and Buiter and Tobin (1979) the response of the private sector to government deficit can be modeled by the undermentioned equations :

$$C_t = \beta_o + \beta_1 y - \underset{(-)}{\beta_2 t} + \beta_3 d \qquad \ldots (4)$$

$$C_t = \gamma_o + \gamma_1 y \quad + \gamma_2 g \qquad \ldots (5)$$
$$\quad\quad\quad\quad\quad\quad (-)$$
$$C_t = \varnothing_o + \varnothing_1 (y-g) \qquad \ldots (6)$$

Where 'y' denotes per capita real national income, 't' denotes per capita real taxes including government property income net of transfer payments, 'd' is per capita real government deficit which includes both current and capital account balances and 'g' is per capita real government purchases of goods and services (consumption **plus** capital formation). The signs affixed to each of the coefficients over equation 4 to 6 are of special importance to the RET. If private sector views that government deficit is equivalent to taxes then coefficients '$ß_2$' and '$ß_3$' representing the impact of net taxes and deficit, respectively, will take negative signs and will have values equal to $ß_1$, the income coefficient. In other words, for RET to hold $ß_1 = -ß_2 = -ß_3$. This implies that the coefficient γ_2 in equation (5) for government purchases, g will also be negative and must equal γ_1, since by implication of RET the impact of t equals that of d and g. Extending this argument it can be shown that the coefficient $\varnothing_1$ in equation (6) will equal to γ_1 in equation (5) since under full debt neutrality the relevant disposable income is given by (y-g).

We estimated equation 4 to 6 for India by OLS using sample period 1960-61 to 1989-90. The equations were estimated both for total consumption and non-durable consumption, in order to bring out the fact that durable and semi-durable consumption are more of a form of saving than consumption. However, the analysis of non-durable consumption was restricted to the period 1967-68 and 1989-90. Further, the new National Accounts series with base 1980-81 has effected some revision in the classification of consumption into durable and non-durables and as a result a part of the consumer durables is now classified as capital goods depending on their use whether by households or by business sector. This data problem is dealt with by introducing a dummy for years beginning with 1980-81. A time variable is also included to capture the nature of change in the financial and real sectors in the economy, which might have influenced the consumption habits. Data for all variables were drawn from National Accounts Statistics.

The results of equations, after correcting for autocorrelation wherever required are presented on Table 3. From the standpoint of overall statistical performance of the regression, it may be noted that all equations demonstrated good statistical fit. The standard error of estimates are between 1 to 2 per cent of the mean in all the cases. DW statistics for all

the equations after the AR1 correction rules out first order serial correlation among the error terms.

Analysis of Total Consumption Function

As should be expected, the coefficient of net taxes (t) in equation (4a) for total consumption has negative sign, and is statistically significant at the 10 per cent level. On the other hand, the deficit coefficient is nearly zero, although it turned out to be statistically insignificant. The prediction of RET that coefficients on y, t and d are the same is clearly rejected by the evidence presented by equation (4a). This finding is reinforced by results of equation (5a). Though government expenditure has a negative coefficient, it is statistically insignificant and its value, -0.203 is far from being equal to the income coefficient which is 0.496. The results of equation (6a) however, seem to be in favour of RET. The coefficient on (y-g) of 0.471 is significant at 1 per cent level and quite near to that of per capita income in equation (5a).

Overall no definite conclusion seems to have emerged from the total consumption function. This inconclusive picture could be due to the inclusion of durable and semi-durable goods in consumption which might be blurring the true impact of deficit. To this we shall now turn.

Analysis of Non-Durable Consumption

The results of non-durable consumption function generally support the tax discounting hypothesis. Tax and deficit coefficients are negative and both are statistically significant at the accepted level. The deficit coefficient is estimated at -0.333, which implies a negative impact of government's overall deficit on private non-durable consumption (4a). The coefficient on t is also negative and close to unity showing the speed with which non-durable consumption adjusts to taxes. However, since the coefficient on y, t and d are not the same, as should be the case according to RET, there is thus only partial evidence in favour of the equivalence theorem. The estimates of equation (5b) and (6b), however, go to strengthen the evidence in favour of RET or 'direct crowding out' hypothesis.

As may be observed from equation (5b) the coefficient on per capita government purchases is negative (-0.467) and is almost equal to income coefficient (0.421). Further, the coefficient on (y-g) is also almost identical to coefficient on y in equation (5b). This seems to suggest the point

that the private sector disposable income is given by (y-g) rather than (y-t). It may be noted that the negative impacts of d and g though Ricardian in nature might also reflect the 'direct crowding out' effect of government expenditure on private consumption. It is also difficult to draw a firm conclusion regarding the RET from the test based on overall deficit because of several limitations associated with this test, which we discuss below and modify the test through an alternative model based on the current account deficit of the government.

Public Saving and Private Saving : An Alternative Test of the RET

Testing of tax discounting hypothesis through government's overall deficit, though, has been a standard practice in a number of studies, the results of this test might be flawed because of several reasons [Bernheim, (1987) and Corbo and Schmidt-Hebbel, (1991)]. First, the government current account deficit should be the proper determinant of private saving not the overall deficit. This is because public investment adds to real capital stock and can generate a 'net wealth' impact. In the developing countries context, public investment may restrain or reduce private consumption to the extent that the scope of borrowing for consumption is reduced by the government's pre-emption of resources from banking sector for public capital formation. This possibility of 'crowding out' may go unreasonably in favour of the RET. Second, under inflation the impact of interest payments on private consumption could be adverse. Only real interest payments add to private income while the part representing compensation for inflation amortisation of debt is expected to be saved (Tanzi, *et. al.*, 1987). This effect is stronger in case developing countries where administered interest rates are not frequently linked to inflation.

Third, expectations play an important role in consumption decision. The expected change in future income and the anticipation about future changes in tax and expenditure policies may substantially influence the individual's response to current deficit. Current tax cut may signal a permanent reduction in future tax liability and may, therefore, imply a much larger impact on life time wealth than that of a one-time tax cut (Feldstein, 1982). Fourth, wealth is an important variable for life cycle and Ricardian consumption function for collecting evidence on the net wealth impact of government bonds. Fifth, identification of variables is important for obtaining consistent and unbiased parameter estimates. Income as an explanatory variable in consumption function can raise the problem of simultaniety bias in the specification, since income belongs to another equation system where consumption is an independent variable.

Sixth, it is important to separate the effects of deficit and other structural changes on consumption. This is more so in the case of developing countries where structural, financial and exogenous shocks significantly influence consumption and saving.

Finally, the measurement of deficit may also raise problems in reaching any definite conclusion on the RET. Results obtained from econometric studies are generally sensitive to the corrections made to the published deficit figures and adjustments done in respect of taxes, interest payments, transfer payments and inflation (Boskin, 1987). It has been argued by Kotlikoff (1984) that a comprehensive definition of 'economic deficit' should account for unfunded social security payments, investment subsidy and structural switches from consumption to wage taxes. Each of these represents a subtle way for the government to run deficit. Since these factors involve substantial intergenerational transfers their exclusion from the conventional definition of deficit understates the impact of fiscal policy on private economic behaviour.

An Extended Model

In order to account for some of the above factors in the analysis and consolidate evidence on RET, the specifications outlined in the preceding section can be modified along the lines suggested by Modigliani and Sterling (1986) and Modigliani and Jappelli (1987). A new consumption function augmented with government current account deficit, debt and private wealth can be specified as follow:

$$C = \sum_{i=o}^{-n} a_{1i} (Y_i - T_i) + \sum_{i=o}^{-n} a_{2i} S_i + a_3 W + a_4 D \qquad .....(7)$$

where 'y' is national income (NNP), 'T' is taxes (including government property income) net of transfers to private sector, 'W' is stock of private wealth (inclusive of government debt), 'D' is government debt, and 'S' is government current account balance. The variables Y, T and S are expressed in their expectational forms by including the current and past observable values up to -n years. Since current account balance (S) is the difference between current expenditure (E) and taxes (T), the equation (7) can be expanded as:

$$C = \sum_{i=o}^{-n} a_{1i} Y_i - \sum_{i=o}^{-n} (a_{1i} + a_{2i}) Ti + \sum_{i=o}^{-n} a_{2i} E_i + a_3 W + a_4 D \qquad ... (8)$$

Under the assumption of infinite life horizon with full discounting of future taxes, the impact of government expenditure on private consumption will be negative and will equal to the coefficient on income, that is :

$$\sum_{i=o}^{-n} a_{1i} = -\sum_{i=o}^{-n} a_{2i}$$

Consequently the coefficients for T will drop out from (8). Moreover, since government bonds will not be perceived as net wealth by private sector and the future tax liability will be fully capitalised into bond holding the coefficient a_4 for D will be negative and will equal a_3 for wealth. Hence, with Ricardian equivalence, equation (7) will reduce to :

$$C = \sum_{i=o}^{-n} a_{1i} (Y - E) + a_3 (W - D) \qquad \ldots (9)$$

If consumers are, instead, myopic, do not have strong bequest motives, do not care for future taxes and base their consumption on current income then equation (7) will reduce to:

$$\sum_{i=o}^{-n} a_{1i} (Y - T) + a_3 W \qquad \ldots (10)$$

since both a_{2i} for deficit and a_4 for D will be zero. This specification underlines the Keynesian consumption function. Between the two extremes of the RET and the Keynesian specifications lies the life cycle model. This assumes that individuals have a finite horizon so that the coefficient on deficit, that is a_{2i} in (7) will fall between zero and a_{1i} and the debt coefficient will be positive but small compared to zero and negative values assumed by the Keynesian and the RET models, respectively.

To this model we introduce two more changes. First, interest payments are excluded from both net taxes (T) and government current account deficit (S). This is done under the assumption that the whole or a predominant part of the domestic interest payment is saved by the private sector, while interest payments on foreign debt are a net drain on economy's wealth. Ideally, domestic nominal interest payments should be divided into two parts, real interest payments and the payment for compensation towards the erosion of real value of the wealth of the bond-

holders due to inflation. Only the former should form a part of the private disposable income for the purpose of consumption. However, in the Indian context, it is difficult to find a representative interest rate on government borrowing, and secondly, due to financial repression, nominal interest rates are not systematically linked to inflation. Indeed, the erosion of real value of domestic debts due to inflation has been much higher than the actual nominal interest payment on these debts. Consequently, the real interest payments have been continuously negative and adjusting these negative figures to disposable income and government deficit would present an unrealistic picture.

Under these circumstances, a large part of the nominal interest payments can be assumed to be saved by the private sector. Two major reasons may be cited in favour of this presumption. First, a major part of the government interest payments in India is paid to banks, financial institutions and Reserve Bank of India. The propensity to consume out of interest income for these debt holders can be considerably less than individuals. Since these organisations also pay interest on their liabilities to households who are not protected from inflation erosion of their saving, it is reasonable to expect that a large part of the government interest payments might be ploughed back into the economy in the form of savings. Second, the direct interest payments to individual debt holders are concentrated with few rich and middle class households whose propensity to save is high. Assuming that these households do not suffer from inflation illusion, their savings will go up to compensate for the decline in real value of the desired saving. Further, under the provisions of Income Tax Act interest income up to a certain sum is exempted from tax if it is reinvested in approved saving instruments. This might also encourage saving out of government interest payments. We, therefore, add domestic nominal interest payments separately to the consumption function to test its impact on consumption.

Secondly, we introduce a structural variable viz, the proportion of per capita non-agricultural income to per capita agricultural income (pg) in the consumption function to test the impact of the changing structure of the economy on consumption and saving. We retain dummy for the non-durable consumption function to account for the discrepancies introduced by data revision in the case of durable and semi-durable consumption.

The empirical version of the equation (7) can be now written as :

$$C = \beta_0 + \beta_1 y + \beta_2 s + \beta_3 w + \beta_4 d + \beta_5 i + \beta_6 pg + \beta_7 D \quad ...(11)$$

Where :

C = per capita real private consumption;

y = per capita real disposable income represented by NNP **minus** government current receipts **plus** transfers but excluding interest payment;

s = per capita real current account balance of the government administration (positive for surplus and negative for deficit) excluding interest payments;

w = per capita real stock of private wealth, and wealth is represented by private capital stock at 1980-81 prices;

d = per capita real outstanding debt of the government;

i = per capita nominal interest payments to domestic residents;

pg = ratio of per capita non-agricultural income to per capita agricultural income and

D = Dummy, (for non-durable consumption) 1980 and onwards equal 1 and zero for the years prior to 1980-81.

The Empirical Evidence

We estimated equation (11) by two stage least square (2SLS) both for total and non-durable consumption. The preference for 2SLS is to bring consistency to the parameter estimates, especially the income coefficient, where the problems of simultaneity bias could be important. A six set of instruments were used to forecast the disposable income (y_n) in the first stage and in subsequent stage the forecast income was regressed along with other variables to estimate the parameters. The instruments used for private disposable income are : one period lag per capita real capital stock, per capita real net taxes, per capita real exports and imports and per capita real money stock both current and one period lag. In order to improve the efficiency of estimates, we corrected for any possible presence of hetroskedaticity in the error term, which may affect the constant variance property of the OLS estimator. We have applied the White (1980) method of obtaining a consistent estimate of the co-variance matrix, allowing for the hetroskedaticity. The results of equation (11)are given below.

Total Consumption Function

Estimation by 2SLS
Sample period, 1960-61 to 1989-90
(figures in brackets are t statistics)

$$C = \underset{(-1.114)}{-84.682} + \underset{(8.55)}{0.670y} - \underset{(-3.73)}{1.264s} + \underset{(2.69)}{0.0104w}$$

$$+ \underset{(2.61)}{0.167d} - \underset{(-3.94)}{1.631i} + \underset{(2.711)}{77.52pg}$$

$\bar{R}^2 = 0.990,$
Mean Consumption = 1423.30,
SEE = 18.88 and
DW = 2.20.

Non-durable Consumption Function

Estimation by 2SLS
Sample period, 1967-68 to 1989-90
(figures in brackets are t statistics)

$$NC = \underset{(0.54)}{88.911} + \underset{(7.88)}{0.557y} - \underset{(-3.48)}{1.929s} + \underset{(1.55)}{0.096w}$$

$$+ \underset{(1.08)}{0.072\,d} - \underset{(-1.98)}{1.206\,i} - \underset{(-1.15)}{47.23\,pg} + \underset{(5.77)}{121.093\,D}$$

$\bar{R}^2 = 0.990$
Mean Consumption = 1206.45
SEE = 17.63
DW = 2.33

Focussing on the total consumption function it may be noted that the coefficient of government current account balance is negative and significant at 1 per cent level. The negative sign implies that a current account surplus in government budget leads to a reduction in private consumption while a current account deficit leads to its increase [since surplus is defined (+) and deficit (-)]. The coefficient value of -1.264 on current account balance implies that one rupee of government dissaving increases private consumption by more than a rupee in the current year. This re-

sult is very much against the RET. The implications of this result also goes far from the Keynesian and Life Cycle models. A significantly negative coefficient on government current account balance implies that not only does government dissaving increase private consumption through the route of disposable income but also tends to 'crowd in' additional consumption, probably due to the complementary relation of government current account expenditure with private consumption. The wealth coefficient is also positive and statistically significant at 1 per cent level which is perfectly in line with the neo-classical wealth augmented version of the consumption function. Contrary to the RET predictions, the coefficient on government debt is neither negative nor equal to the wealth coefficient. Government bonds seem to have a net wealth effect and their impact on consumption is significantly positive at 0.167. This result confirms the prediction of the life cycle theory that debt coefficient may be positive but small under the finite life horizon.

Interest payment has a large negative coefficient, exceeding one, and this suggests the ultra-rational behaviour on the part of private sector in making up the rapid erosion of real value of their savings caused by inflation. The coefficient of -1.631 on interest payment indicates that private sector saves more than what it receives by way of nominal return on government bond. This might be true when inflation rate is high, real interest rate is negative, and private sector hastens to adjust its consumption to maintain the real value of its desired wealth. The impact is more perhaps due to the inclusion of durable consumption in total consumption because it is most likely that durable assets will fall to compensate for the erosion in the real value of the financial assets in the saving portfolio of the private sector.

The positive impact of ratio of per capita non-agricultural income to per capita agricultural income on consumption goes contrary to the findings in other studies that terms of trade movement in favour of non-agricultural sector promoted saving rather than consumption [Krishnamurty and Saibaba (1981)]. This could be due to the fact that non-agricultural households display higher propensity to consume durable goods than the agricultural households, which is a reasonable assumption in the Indian context as most of the non-agricultural incomes accrue to richer sections of the people and these households are also influenced by rising consumerism habits.

As observed earlier, total consumption function may not provide an accurate explanation of the consumer behaviour because it includes a

component of saving in the form of durable goods. The results of non-durable consumption is, therefore, of special importance to the RET. It can be seen from the presentation that the basic findings from total consumption function stand vindicated by the results of non-durable consumption function. The coefficient on current account balance is negative and higher in value than that of total consumption function, reinforcing the evidence against the RET. As in the case of total consumption function, government debt coefficient is positive though less than that of total consumption function.

The negative impact of interest payments on non-durable consumption is less than that of total consumption and proffers evidence in favour of the thesis that inflation induced erosion in real value of debt is compensated more by fall in durable consumption. In the non-durable consumption function the coefficient of the ratio of non-agricultural income to agricultural income is significantly negative and this agrees with the findings of other studies in this respect. This also supports our earlier contention that relatively faster growth in non-agricultural income increases durable consumption while its impact on non-durable consumption is adverse.

Testing for 'Direct Crowding Out'

In the context of the findings gathered in this paper so far and also to explore the degree of responsiveness of the private consumption to various components of public spending, we present below a rough test of the 'direct crowding out' hypothesis in India. The following augmented version of the equation (11) estimated through OLS is presented for this purpose (a variant of the Kormendi's (1983) model for USA).

$$\begin{aligned} PCON = {} & \underset{(0.78)}{172.451} + \underset{(10.15)}{0.496}\ PNNP + \underset{(1.45)}{0.590}\ PGCON \\ & - \underset{(-1.47)}{0.273}\ PGINV + \underset{(4.57)}{2.357}\ PTP - \underset{(-2.65)}{1.347}\ PDINT \\ & + \underset{(0.98)}{0.078}\ PW - \underset{(-2.59)}{81.285}\ PG \end{aligned}$$

$\bar{R}^2$ = 0.995
SEE = 12.74
Mean Consumption = 1415.87
DW = 1.52, RHO = 0.87
(13.31)

Where PCON and PNNP stand for private consumption and net national product, respectively, both in real per capita terms. PGCON, PGINV, PTP, PDINT are real per capita government consumption, investment, current transfer payments (excluding interest) and per capita domestic interest payments, respectively. PW and PG represent real per capita private wealth and the ratio of per capita non-agricultural income to agricultural income.

In this model the deficit variable is replaced by the major components of government expenditure and the tax factor is kept out of the picture because, following Ricardian tradition, it is assumed that what matters for private consumption is the amount of government expenditure. Consequently, the income variable is represented by the net national income unadjusted for net taxes. We have dropped the government debt variable from the equation to avoid the multicollinearity problem, since debt and expenditure variables are significantly related to each other. In this model, if government consumption and investment expenditures are perfect substitutes for private consumption, the coefficients of PGCON and PGINV will be -1 and 0, respectively. The coefficient of PTP will also tend to -1 if transfer payments are replacing private spending on the activities targeted by the government transfer policy.

The overall fit of the regression is fairly good as may be seen from the $\bar{R}^2$, DW and SEE of the equation. The coefficients on PGCON and PGINV are significant only over 10 per cent level; the wealth coefficient, though retained its sign, has turned out insignificant in this specification. It may be mentioned that all coefficients in the equation are not significant at the acceptable level of significance perhaps due to the presence of some degree of inter-correlation among the variables, especially among the government expenditure variables. This is an unavoidable problem in this specification.

The coefficient on PGCON is positive, the estimated impact of government consumption works out to about three-fifths (0.590). The result is consistent with our findings on the impact of the current account deficit

in the equation (11). This highlights the fact of 'crowding in' impact of government consumption on private consumption and provides evidence against the Ricardian and 'direct crowding out' hypothesis which predict a negative effect.

This extra stimulating impact of the government consumption on the absorption level in the economy may reflect certain special conditions of the Indian economy. One possible explanation is that the principal beneficiaries of government consumption expenditure (mainly through wages and salaries and poverty alleviation programmes) have a higher propensity to consume than the average tax payers who are rich. This propensity differential might get reflected in the coefficient on government consumption. The complementary role of government consumption expenditure may stem from another factor also. It is important to stress that public expenditure on social services with a high component of consumption oriented outlays has been instrumental in making available to a large section of the population the basic social amenities such as education, health, sanitation and social security. These developmental outlays while improving the life conditions of the population in the country could be stimulating private consumption in other areas.

The coefficient on investment is negative and proves the earlier contention that the increased resort by the government to the capital market for financing its growing investment expenditures has a significant 'crowding out' impact on the private consumption. This observation supplements the often cited argument that the massive order of funding of public investment through captive financial markets has both positive and negative implications for the economy. To the extent that it crowds out private consumption the effect is favorable for the national saving and capital formation. A number of empirical studies in the Indian context [see for example Sunderajan and Thakur (1980), Krishnamurty *et al* (1985)] have also found that public investment tends to displace private investment. Therefore, the net impact of public investment on domestic capital formation will depend on the relative importance of both the factors.

Another important effect of the fiscal policy on aggregate demand stems from the government expenditure on transfer payments. The estimated impact of transfer payments on private consumption exceeds two and the coefficient is statistically significant at the 1 per cent level. This reflects the highly expansionary implications of transfer payments such as subsidies, pensions, and other social security expenditures and underlines the importance of these forms of expenditure in the stabilisation

programme. The coefficient on interest payments is negative and confirms our earlier contention on this aspect.

To sum up, the test of the 'direct crowding out' hypothesis in India presented above showed that government consumption and transfer payments have an expansionary outcome on the consumption level in the economy, while public investment and interest payments generally dampen private consumption and contribute to national savings. The net effect of the fiscal policy on the aggregate consumption and saving levels in the economy would, therefore, depend on the relative influence of the various components of government expenditure. However, as far as the deficit in the current account of the budget is concerned, the effect on private saving is clearly adverse and non-Ricardian in nature.

SECTION IV

Concluding Observations

The critical fiscal situation in India has been a concern for many reasons : inflation, threat of government insolvency, and adverse balance of payment consequences of the government fiscal deficit. It was the endeavor of this study to show that, from the long run perspective, structural imbalance in the fiscal system can involve damaging implications through its adverse effect on national savings and capital formation. While doing so, the study underscored the fact that apart from the different modes of financing the government spending, the manner in which the government incurs its expenditure has also significant implications for the private sector consumption and macro economic situation in the country.

The controversy surrounding the neutral impact of tax and debt financing of government expenditure on national saving seems to possess little practical relevance in the context of the Indian economy. The empirical evidence presented in this study rejected the equivalence proposition as a guide to the underlying relation between the government saving and the private saving behaviour in India. Individuals seem to be myopic in their consumption decisions and tend to ignore the future tax burden implied by the government deficit.

In developing countries the short-sighted behaviour of the private sector in relation to the government's fiscal stance can arise from a number of imperfections in the economy which give rise to low perceptibility about the ultimate tax burden. In the Indian context the more visible as-

pects of these imperfections are : the weak correspondence between the tax payers, bond holders and the beneficiaries of the government expenditure; imperfections in the capital markets; uncertainty about the future income and incidence of future tax burden; and the lack of a sufficient rational decision- making behaviour on the part of the individual economic units, which could be stemming from the imperfections in the availability of information.

More importantly, the signaling role of the fiscal regime seems to be an important factor in shaping the individual's assessment about the consequences of the prevailing fiscal situation and his plans for the future. If the current fiscal regime provides sufficient signals that government debts would be ultimately monetised then deficits are more likely to increase private sector's consumption than would otherwise be the case if the signals are in the favour of a future tax increase.

The study also draws attention to the fact that private consumption is sensitive to the government's current account deficit through more than the usual channel of disposable income. The extra stimulating influence of the government dissavings stems from the 'crowding in' impact of the government consumption and transfer payments on private consumption. This fact underlines the relative effectiveness of tax and expenditure policies in the counter-cyclical stabilisation strategy in India. A policy aimed at reducing the aggregate absorption level in the economy through tax increase is less effective in its objective than a policy that places emphasis on the spending cuts in the current account, the latter is likely to cause a more rapid withdrawal of private consumption than the former.

The private sector's savings propensity out of interest income is high in India, which implies that the burden on future generations arising from financing the interest charges on domestic government debt may not be severe since most of these payments are being ploughed back into the economy in the form of productive capital formation-government's external debt servicing would, however, be a burden in this sense. The real burden of the government debt and deficit arises from the rising current account gap in the budget which has reached a significant proportion of the national income in the recent years. Not only do large government dissavings directly absorb capital resources in unproductive use, but they have also a dynamic implication by 'crowding out' private saving, capital formation and growth in the long run, a factor implying substantial burden for future generations from the government's fiscal policy. This underlines the need for removing the structural weakness in the fiscal sys-

tem with the objective of improving government saving performance and thereby stimulating the private sector saving activity in the economy. Towards this end the priority list should include a programme of substantial reduction in expenditure on government consumption and transfer payments along with improvement of direct tax ratio and better cost recovery of expenditure.

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Table 1 : The National Account Measure of Government Financial Operations in India

	1960-61	1970-71	1980.81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-98	1989-90
1 a) Current Receipts (Rs bln)	17.1	56.9	215.5	259.8	299.3	336.2	396.7	478.1	556.0	635.1	737.1	853.0
b) Percentage to GDP	10.5	13.2	15.8	16.3	16.8	16.2	17.1	18.2	19.0	19.1	18.6	18.7
2 a) Current Expenditure (Rs bln)	14.1	49.6	206.0	241.8	293.9	352.3	431.1	514.5	615.8	729.0	862.8	1027.7
b) Percentage to GDP	8.7	11.5	15.1	15.1	16.5	17.0	18.6	19.6	21.0	21.9	21.9	22.5
3 a) Final Consum.ption Expenditure (Rs. bln)	10.9	37.8	130.6	153.4	184.0	212.2	245.0	297.6	354.7	417.1	479.5	542.0
b) Percentage to GDP	6.7	8.8	9.6	9.6	10.3	10.2	10.6	11.3	12.1	12.5	12.2	11.9
4 a) Transfer Payments (Rs bln)	3.2	11.8	75.4	88.4	109.9	140.1	186.1	216.9	261.1	311.9	383.3	484.0
b) Percentage to GDP	2.0	2.7	5.5	5.5	6.2	6.7	8.0	8.3	8.9	9.4	9.7	10.6
5 a) Savings in Current Account (Rs. bln)	3.0	7.3	9.5	17.9	5.5	-16.1	-34.4	-36.4	-59.8	-93.9	-125.7	-174.7
b) Percentage to GDP	1.9	1.7	0.7	1.1	0.3	-0.8	-1.5	-1.4	-2.0	-2.8	-3.2	-3.8
6 a) Gross Capital Formation including Net Captial Transfers (Rs bln)	6.7	14.2	69.6	82.3	93.9	105.4	123.2	145.5	158.2	166.3	198.4	220.2
b) Percentage to GDP	4.1	3.3	5.1	5.2	5.3	5.1	5.3	5.5	5.4	5.0	5.0	4.8
7 a) Total Expenditure (Rs bln)	20.8	63.8	275.6	324.1	387.8	457.7	554.3	660.0	774.0	895.3	1061.2	1247.9
b) Percentage to GDP	12.8	14.8	20.3	20.3	21.8	22.0	24.0	25.2	26.4	26.9	26.9	27.3
8 a) Deficit on all Transactions (Rs. bln)	3.7	6.9	60.1	64.3	88.5	121.5	157.6	181.9	218.0	260.2	324.1	394.9
b) Percentage to GDP	2.3	1.6	4.4	4.0	5.0	5.8	6.8	6.9	7.4	7.8	8.2	8.6

Source : National Accounts Statistics, Central Statistical Organisation, Government of India

Table 2 : Private Consumption Function (1960-1989) : A Test of Permanent Income Hypothesis in India

Eqns.	Constant	Yt	Yt-1	Ct-1	Mean(Ct)	SEE	$\bar{R}^2$	DW	Durbin's 'h'	RHO	Form of Equation
1.	123.246 (3.078)*	0.641 (8.099)*	0.161 (1.781)***		1415.9	27.028	0.979	0.576			Linear
2.	2897.865 (2.767)*	0.517 (13.072)*	-0.026 (-0.647)+		1423.3	14.185	0.994	1.604		0.997 (21.540)*	Linear with AR1 correction
3.	0.411 (2.033)**	0.742 (8.801)*	0.185 (1.977)**		7.247	0.127	0.980	0.597			Non Linear (Double log)
4.	4.065 (4.603)*	0.585 (12.409)*	-0.012 (-0.247)+		7.253	0.126	0.994	1.669		0.995 (21.673)*	Non Linear With AR1 correction
5.	7.432 (2.367)**	0.515 (13.265)*	-0.027 (-0.696)+		23.011	13.887	0.867	1.615			First difference
6.	42.441 (1.184)+	0.478 (7.521)*		0.430 (4.853)*	1415.9	20.737	0.988		2.402		Linear
7.	2395.784 (2.530)*	0.517 (12.988)*		-0.021 (-0.289)+	1423.3	14.280	0.994		5.692	0.996 (19.32)*	Linear with ARI correction
8.	0.100 (0.590)+	0.569 (8.218)*		0.407 (4.979)*	7.247	0.014	0.988		2.506		Non Linear (Double log)
9.	3.404 (3.796)*	0.589 (12.472)*		0.009 (0.118)+	7.253	0.010	0.993		5.705	0.992 (18.909)*	Non Linear With AR1 correction
10.	7.158 (2.139)**	0.516 (13.151)*		-0.024 (-0.346)+	23.011	13.987	0.865		1.237		First difference

Notes : Figures in brackets represent 't' statistics.

* denotes 't' value is significant at 1 percent level of significance
** denotes 't' value is significant at 5 percent level of significance
*** denotes 't' value is significant at 10 percent level of significance
\+ denotes 't' value is not significant

Table 3 : Estimates of Consumption Function for Test of the RET in India

Equation	constant	y	t	d	g	(y-g)	Trend	Dummy	Mean Consum-ption	SEE	R^2	DW	RHO
Total Consumption (1960-61 to 1989-90)													
4a	269 187 (2.65)*	0.513 (10.96)*	-0.442 (-1.89)**	0.006 (0.04)+			16.675 (3.02)*		1415.87	15.12	0.994	1.62	0.90 (10.42)*
5a	283.242 (2.98)*	0.496 (10.59)*			-0.203 (-1.26)+		13.699 (3.13)*		1415.87	15.50	0.993	1.53	0.89 (11.12)*
6a	144.573 (0.88)					0.471 (10.10)*	22.486 (3.97)*		1415.87	16.04	0.993	1.59	0.93 (13.7)*
Non-durable Consumption (1967-68 to 1989-90)													
4b	-294.599 (-1.176)+	0.464 (8.29)*	-1.066 (-3.25)*	-0.333 (-2.02)			33.70 (2.91)*	156.639 (7.99)*	1212.94	15.22	0.993	1.79	0.92 (11.34)*
5b	201.096 (1.69)***	0.421 (7.24)*			-0.467 (-2.26)**		10.50 (1.59)+	180.023 (9.77)*	1212.94	16.60	0.992	2.10	0.86 (7.49)*
6b	214.771 (1.95)**					0.427 (8.04)*	9.118 (2.07)**	180.463 (10.15)*	1212.94	16.12	0.992	2.09	0.85 (7.50)*

Note : Figures in brackets are 't' statistics

Legends : y = per capita real net national product (1980-81 prices)

t = per capita real net government current receipts minus transfers

d = per capita real government deficit (both current and capital account)

g = per capita real government purchases of goods and services (excluding transfers)

* = denotes t statistics are significant at 1 percent level of significance

** & *** = denote t statistics are significant at 5 percent and 10 percent level of significance, respectively

\+ = denotes 't' statistics are not significant

SEE = standard error of estimates

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Modelling Buffer Stock Money: An Indian Experience

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The buffer stock approach to the demand for money studies the behaviour of economic units in response to the unanticipated increase in money supply. There are a variety of buffer stock models, of which shock absorber models are widely used by researchers to study evidence on buffer stock money. There is no systematic study on buffer stock money in the Indian context and to that extent this article fills up a void. The author examines the buffer stock evidence in India and its predictive ability, both historical and *ex post*, and questions the stability property of money demand function in the 1980s. The major findings of the study are as follows : a) There is a clear evidence of buffer stock money in India. About 40 per cent of unanticipated increase in money supply is absorbed by economic agents in the short-run. b) The shock absorber model seems to have outperformed the partial adjustment model and therefore, the former could be used as an alternative paradigm in the study of money demand in India. c) Although, within-sample predictive power of the shock absorber model is very good, the out-of-sample predictive power is weak reflecting on the 'missing money' aspect in the Indian context. d) The stability test performed by using dummies shows an upward shift in the intercept and a downward drift in the slope of the money demand function which are pointers to the general instability in the money demand function since early 1980s. The preliminary evidence presented in the paper make a case for a close relook at the stability aspect of money demand which will have implications for effective conduct of monetary targeting in India.

Introduction

The consensus about the stability property of the money demand function broke down in the mid-1970s. With the publication of Goldfeld's seminal article, "The Case of Missing Money" (1976), the quest for a stable demand for money was vigorously pursued by economists across countries. Fresh evidence of instability were found by several authors with samples from fairly large number of developed and developing countries as well[1]. The empirical investigations in this area proceeded into several

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directions. One of the directions of such efforts was towards investigating the plausible reasons for money demand instability. One reason, which is believed to have caused instability in the money demand function is the misspecification. In a search for appropriate specification, supply shock or unanticipated change in money supply was considered by a number of economists as a useful explanation. Before accepting it, one needs to get satisfactory answers to a number of questions. How does the supply shock affect the money demand function? Whether the people immediately change their spending habit or alternatively keep the unanticipated increase in nominal income as a kind of buffer? Whether buffer stock approach to demand for money has resolved the issue of instability in money demand function? These empirical issues are addressed in the literature under 'buffer stock' approach to the demand for money. The basic idea is whether unanticipated change in money supply can be absorbed by economic agents in the short-run. If so, it can be modelled in the money demand function. More precisely, if it turns out to be positive and significant, it can be considered as one of the explanatory variables of the money demand function. Hence, omission of supply shock from the money demand function may be a misspecification leading to instability in the function. The purpose of this study is to examine the evidence of buffer stock money in India and to consider whether the buffer stock approach is an improvement over the partial adjustment model. Furthermore, the study will examine the out-of-sample predictive power and stability property of the money demand function under buffer stock approach.

The paper is divided into five Sections including the introduction. Section II provides a brief review of the micro-theoretic foundations and model specifications of buffer stock approach. Section III adopts appropriate methodology for the investigation of the buffer stock evidence in India and examines the relative superiority of the buffer stock model over the partial adjustment model. Section IV replicates the estimation procedure by breaking the sample at appropriate point of time and studies the out-of-sample predictive power of the buffer stock model. Concluding remarks are presented in Section V.

SECTION II

Micro-Theoretic Foundations

The intuitive idea behind the buffer stock notion could be traced back to the inventory theoretic contributions of Baumol (1952) and Tobin

(1956). Even the precautionary motive for holding money balances put forward by Keynes (1936) contains the idea of buffer stock. The terms 'buffer' and 'shock absorbers' are probably due to Friedman and Schwartz (1963)[2]. Friedman's permanent income hypothesis also corroborates the idea of buffer stock. Transitory income affecting asset/liability portfolio of a consumer rather than consumption can well be compared with unanticipated part of his income which serves as a buffer. The methodological improvement and the extension of idea of the buffer stock include discussions by Goodhart (1982, 1984), Judd and Scadding (1982), Laidler (1984, 1987), Bain and McGregor (1985), Cuthbertson (1985), Cuthbertson and Taylor (1987), Milbourne (1988). The major empirical works on the buffer stock concept include, *inter alia*, Carr and Darby (1981), Khan and Knight (1982), MacKinnon and Milbourne (1984), Carr, Darby and Thornton (1985), Kanniainen and Tarkka (1986), Swamy and Tavlas (1989), Cuthbertson and Taylor (1987), Boughton and Tavlas (1991).

The buffer stock approach provides an appealing framework to understand the behaviour of individuals as well as firms in an uncertain environment. The cost of marginal adjustment in prices, wages, employment and output levels etc., may be very substantial relative to the interest foregone by holding excess money balances. Unanticipated increase in money supply is, in fact, initially willingly held by economic agents, thus providing a buffer of purchasing power, even if it forces the holders to temporarily go off their short-run demand curves. According to Goodhart (1984), the decisions to change plans entail cost *viz.*, the resale price of a durable asset is usually below its purchase price. Thus, in his view "economic agents may rationally and optimally decide to respond to the continuing stream of developments, `news and shocks', not by a thoroughgoing continuous reconsideration of their full economic dispositions, but by allowing such shocks to impinge initially upon certain assets/liabilities whose characteristics make them suitable to act as buffer." Goodhart concludes "money being the most liquid of all assets, performs the buffer function best". Under buffer stock approach, there is no single-valued demand for money. Rather, there is a band around which money holdings may vary. As soon as holdings of money balances exceed their upper limits, they are slowly used to purchase a broad spectrum of assets - financial as well as real (Jonson, 1976). Goodhart (1984) also observes that "with the passage of time, an individual's reservoir of money balances spills over onto canals of spending on a wide spectrum of assets and goods as real balance effects are set into motion". Thus, the monetary transmission mechanism embedded in buffer stock approach is akin

to that advocated by monetarists[3]. Although, micro foundation of this approach seems logically sound, the validity of this approach is an empirical question. "The case for the buffer stock approach ultimately rests on as much upon its empirical content as upon *a priori* reasoning" (Laidler, 1984).

Before we go over to the survey of empirical literature, it will be proper to mention about at least two conceptual issues relating to buffer stock approach. First, people would like to hold not only currency but also deposit money as well as certain 'near money' as buffer. Thus, "buffer assets are likely to consist of a wider set of assets than transaction balances" (Cuthbertson and Taylor, 1987). For the purpose of modelling buffer stock money, holdings of any assets outside money for the purpose of some returns are treated as investment from the anticipated part of one's income although it is extremely difficult to apportion one's income into anticipated and unanticipated parts. With the progress of the transaction technology and information system, it is relatively less costly to effect transfers as between 'money' and 'near money'. Hence, any return from such holdings may be incidental but not planned as it arises out of unanticipated increase in nominal income. It is important to note that 'buffer money' is willingly held, in the short-run, at the unchanged interest rates. However, the scope of redefining money by including more and more 'near money' from time to time is consistent with buffer stock approach as the adherents were never opposed to this.

Secondly, the idea of holding money as a buffer emanates from the key distinction made between anticipated and unanticipated supply of money which are also made under rational expectation hypothesis advocated by New Classical School. But, the New Classical economists strongly argue for 'market clearing', while buffer stock approach is often termed as 'disequilibrium money'. Nevertheless, certain buffer stock models are not necessarily inconsistent with rational expectation models.

Model Specifications

The partial adjustment model was found inadequate on several grounds and therefore, the buffer stock approach was developed as an alternative paradigm to explain the dynamics of money demand function. To begin with, the typical partial adjustment model specifies the demand for real balance in the following manner:

$$m_t - p_t = b_o + b_1 y_t + b_2 r_t + b_3 (m-p)_{t-1} + b_4 IR_t + u_t \quad .....(1)$$

Where 'm_t' is the logarithm of a measure of money supply, 'p_t' is the logarithm of price index, 'y_t' is the logarithm of a scale variable such as, real income or wealth, 'r_t' is the logarithm of an opportunity cost variable. $(m-p)_{t-1}$ is real money balance lagged by one period. 'IR_t' is inflation rate (i.e., lnP_t-lnP_{t-1}), 'u_t' is the error term.

Model (1) specified above has been found to be troublesome, among others, on the following grounds : first, short-run elasticities for income and interest rate are very low while the coefficient of lagged dependent variable is close to unity implying higher long-run interest and income elasticities. As the long-run interest elasticity is higher than short-run elasticity, over-shooting of interest rate must occur in the short-run [Milbourne (1988), Swamy and Tavlas (1989)]. However, overshooting of interest rate does not seem to be a feature in the real-world money markets (Goodhart, 1984). Secondly, dynamics underlying the move back to long-run equilibrium are complex and unpredictable due to long and variable lags (Boughton and Tavlas, 1990). Thirdly, out-of-sample predictive failure of the partial adjustment model could be attributed to misspecification, arising out of the omission of supply shock as an explanatory variable.

The buffer stock model is designed to effectively deal with each of these problems. Since the role of money is emphasised, *inter alia*, as a shock absorber, it can temporarily smoothen the response of the economy. The innovations in the money supply are specifically modelled by incorporating supply shock as the determinant of money demand. A positive monetary innovation leads to an accumulation of cash balances in the short-run, as economic agents move off their short-run demand curves. Therefore, cash balances rather than interest rate adjust in the short-run implying that overshooting of interest rate may not occur. The transmission mechanism is complex due to long and variable lags. The lag structure is, however, modelled in the buffer stock approach assuming that they are deterministic rather than variable. Inclusion of supply shock in the money demand function helps reduce the specification bias in the parameter estimation under partial adjustment model.

The literature shows at least four broad approaches to modelling buffer stock money. They are : (A) single equation disequilibrium models, (B) forward looking buffer stock models, (C) complete disequilibrium models, and (D) shock absorber models.

Single Equation Disequilibrium Models

The conventional approach to the demand for money makes the basic assumption that demand for money is always equal to its supply. In other words, it is assumed that supply of money is demand-determined. Alternatively, money supply may be assumed to be independent of demand as long as money markets clear within a time period. In the event, a question arises as to whether the conventional functional form estimates demand function or supply function of money. The impact of the exogenous supply of money is studied in the literature by inverting the conventional money demand function within the framework of a single equation disequilibrium model. Precisely, each of the explanatory variables of the conventional money demand function, such as the price level, output and the interest rate are alternatively considered as dependent variables. The exponents of this approach assume that the chosen dependent variable adjusts slowly to its long-run value. If the supply of money is independent of its demand, agents are temporarily forced off their long-run demand function because of slow adjustment in prices, output and interest rate [Artis and Lewis (1976), and Goodhart (1984)]. Artis and Lewis (1976), by using quarterly data for the U.K. up to 1973, found that money demand functions (both narrow and broad) are more stable than those obtained by taking money as the dependent variable. They also found that there is no overshooting in current period interest rates in response to change in the current period money supply.

There are a number of statistical problems associated with single equation disequilibrium buffer stock models. As is well known, the short run (impact) elasticity with respect to interest rate is b_2 in model (1), while its long-run counterpart is $[b_2/(1-b_3)]$. Empirically, $b_2 \leq [b_2/(1-b_3)]$ with equality established if and only if $b_3=0$, which is rarely found. If the equation is inverted with interest rate as dependent variable, then the inequality would be $1/b_2 \geq [(1-b_3)/b_2]$. The latter inequality is referred to as overshooting effect. However, Goodhart (1984) has observed that when interest rates are regressed on movements in money stock, "there is rarely any trace of such apparent overshooting". This, in fact validated the assumption that the arguments in money demand function (interest rate in this case) are subject to slow adjustment. As a natural corollary, it is concluded that excess money supply might have been held as a buffer stock.

Inverted equation may not necessarily produce an exact reciprocal coefficient unless the correlation coefficient between money and interest

rate is unitary. Therefore, it is statistically incorrect to invert equation (1) and deduce that excess money supply is held as buffer stock as interest rate overshooting was not in evidence. In a single equation framework, one cannot preclude the possibility of price adjusting more rapidly to excess money supply in the event of interest rate adjusting relatively slowly. In order to resolve the inconsistency, Laidler (1982) argued that overshooting refers to models in which interest rate is the dependent variable, while buffer stock theory refers to money demand function which cannot be inverted. Cuthbertson and Taylor (1987) observed that "a major problem with this single equation disequilibrium money approach is that only one argument may be chosen as the dependent variable, whereas on *a priori* grounds one might expect all arguments of the demand function to adjust simultaneously." Therefore, single equation disequilibrium model cannot be fully relied upon for the purpose of investigating the buffer stock evidence in an economy.

Forward-Looking Buffer Stock Model.

The conventional money demand models omit future values of the arguments of the demand for money. Past values of the arguments may not be appropriate proxy for future transactions. The adaptive expectations invoked in partial adjustment models are therefore considered inadequate to capture expectation about the future. The forward-looking buffer stock model tries to resolve this problem. In case of the U.K. economy, Cuthbertson (1984) had estimated a forward looking buffer stock model in the following form:

$$m_t = \lambda\, m_{t-1} + (1-\lambda)(1-\lambda D) \sum_{0}^{\infty} (\lambda D)^s\, E_{t-1}\, m^*_{t+s} \quad \text{.....(2)}$$

Where 'D' is the discount factor, 'E' is the expectation parameter at time t-1, $E_{t-1}\, m^*_{t+s}$ are the expected values of future long run money balances. The buffer stock arises when the agents make decisions concerning m_t based on information at period t-1. Any surprise increase in nominal income are partly held as buffer money. The long run money demand function would be as follows :

$$m^*_t = a_0\, p_t + a_1\, y_t - a_2\, r_t \quad \text{.....(3)}$$

In equation (2), m^*_{t+s} would contain an anticipated part and an unanticipated part. The forward-looking demand for money function is esti-

mated using predictions of the 'forcing variables' y^e_{t+s}, p^e_{t+s}, r^e_{t+s} where the superscript 'e' is the expected value of the respective variables.

This version of the buffer stock approach is consistent with rational expectation hypothesis. However, the forward-looking buffer stock models could exhibit instability because of instability in the process of expectation formation. "Also, long-run equilibrium solutions from such models are, generally invalid under rational expectations" (Cuthbertson, 1986). Although, forward-looking buffer stock models appear theoretically sound, further research in this area could not proceed on account of limitations associated with expectations formation for future values of money demand argument.

Complete Disequilibrium Models

The single equation money demand functions cannot fully resolve the issue of simultaneity. Therefore, the best way to handle buffer money is to formulate a simultaneous equation model wherein the variables included in the money demand function are determined simultaneously within the framework of a disequilibrium approach. Generally, the following type of equations frequently appear in case of complete disequilibrium models :

$$DX_t = f(Z_t) + V(L)\ (M^s_t - M^d_t) \qquad .....(4)$$

$$M^d_t = a_o\ p_t + a_1\ R_t + a_2\ Y_t \qquad .....(5)$$

Where 'DX' may be a set of real or nominal variables in their first difference, 'Z_t' is a vector of predetermined equilibrium variables. 'M^d_t' is the long-run demand for money and M^s_t is the actual supply of money, V(L) is a lag polynomial. As the disequilibrium term appears in a number of equations, the model imposes cross-equation restrictions on the parameters of the long-run demand for money function.

These types of models have performed reasonably well for the US (Laidler and Bentley, 1983), and UK (Davidson, 1984). By and large, these models are estimated by 'system methods' such as, three stage least square, full information maximum likelihood etc. However, these models "have not proved as successful in explaining flexible exchange rate open economies as they have in modelling of closed economies" (Cuthbertson and Taylor, 1987). Moreover, the key problem associated with this approach is that the estimated coefficients in the money demand equation are conditional on the correct specification of the whole model

(Cuthbertson, 1988). Particularly, if one is interested to test whether the coefficients are stable over time, the system method is not suitable as it complicates the exercise. However, for macro-modelling, this approach provides opportunity for further research as the various routes of transmission mechanism could be tracked down effectively.

Shock Absorber Models

In modelling buffer stock money, the most widely used approach is perhaps the shock absorber model developed by Carr and Darby (1981). The shock absorber models which have undergone several modifications over time, formulate the demand for money in the following manner:

$$m_t - p_t = b_o + b_1 y_t + b_2 r_t + b_3 (m-p)_{t-1} + b_4 IR_t + a (m_t - m_t^*) + u_t \quad \text{.....(6)}$$

$$m_t^* = \hat{g} z_t + e_t \quad \text{.....(7)}$$

Where 'm_t^*' is the anticipated component of money supply, 'z_t' is vector of variables the agents assume to have systematic influence on the money supply; $\hat{g}$ is a vector of coefficients to be estimated; $(m_t - m_t^*)$ is the difference between actual and anticipated money supply, alternatively called the supply shock, monetary innovations, 'u_t' and 'e_t' are the white noise error terms. *A priori*, the co-efficient of supply shock (i.e., a) is expected to be positive and significant to validate the evidence of buffer stock.

There is no consensus about the process of generating the anticipated money supply series. It can be done through a purely autoregressive process, a distributed lag model, or a combination of the two namely, autoregressive distributed lag model. It can also be generated in a more sophisticated manner through seasonal ARIMA if the frequency of data is either quarterly or monthly, or through polynomial distributed lag model. In all these cases the coefficients of expectations would be constant. But the agents may optimally update the coefficients of their expectations formation process in the light of new information. Therefore, Boughton and Tavlas (1991) have tried a time-varying coefficient of expectation formation by using recursive least square. Carr and Darby (1981) used an unspecified ARIMA model and invoked rational expectation hypothesis to arrive at anticipated money supply; Boughton and Tavlas (1990) have estimated the anticipated part of money supply by regressing the money supply on a polynomial distributed lag (second degree, twelve period) of its past

values. It is better to use the best performing alternative to generate the expected money supply.

Carr-Darby hypothesis postulates that anticipated nominal money supply should not affect the real demand for money. This is a testable hypothesis which could be examined under the following specification.

$$m_t - p_t = b_o + b_1 y_t + b_2 r_t + b_3 (m-p)_{t-1} + b_4 IR_t$$

$$+ a (m_t - m_t^*) + Q m_t^* + u_t \qquad .....(8)$$

MacKinnon and Milbourne (1984) pointed out that the OLS estimation of the Carr-Darby model leads to simultaneous equation bias as 'm_t' component of the money supply shock is related with dependent variable. The MM formulation suggested that C-D model may be transformed to remove 'm_t' from the right hand side of the equation (6) which can be generalised as follows:

$$m_t - p_t = b\ x_t + a (m_t - m_t^*) + Q\ m_t^* + c_t \qquad ...(9)$$

Where 'x_t' is the vector of variables which the economic agents consider to have systematic influence on real balance. By transforming equation (9), MM model is set in the following form:

$$m_t - p_t = b^*\ x_t + a^* (m^*_t - p_t) + Q^*\ m^*_t + c^*_t \qquad ....(10)$$

Where $a^* = -a/(1-a)$, $Q^* = Q/(1-a)$, $b^* = b/(1-a)$,

$c^*_t = (1/(1-a))c_t$

By using the model (10), MacKinnon and Milbourne rejected the buffer stock evidence for the US economy. Boughton and Tavlas (1991) have, however, indicated serious difficulties with the MM model. While 'm_t' in equation (9) has been removed from the right hand side (RHS) through transformation, it is replaced by 'p_t' which may be correlated with the error term. Moreover, 'm^*_t' and $(m^*_t - p_t)$ may be highly correlated making the test statistics difficult to interpret. Boughton and Tavlas further transformed the equation (10) to eliminate 'p_t' from the RHS which is as follows :

$$m_t = b^*\ x_t + \hat{Q}\ m^*_t + \hat{a}\ p_t + c_t^* \qquad .....(11)$$

Where $\hat{Q} = (Q-a)/(1-a)$ and $\hat{a} = 1/(1-a)$

SECTION III

Buffer Stock Evidence in India

There is no systematic study on buffer stock approach to demand for money in India with the exception of an early attempt by Paul and Kulkarni (1987)[4]. Their results are neither robust nor free from econometric problems. Even some of their results are quite contrary to the expectation such as negative sign for scale variable. The methodology adopted here would therefore heavily depend on international experience and is more akin to that used by Carr and Darby (1981) with appropriate modifications to resolve certain econometric problems pointed out by subsequent critics.

Estimation Procedure

We estimate here the demand for money in India by using partial adjustment model (PAM) and shock absorber model (SAM) and present them together for the purpose of comparison. For PAM, a variant of equation (1) is estimated. Buffer stock demand for money for both M_1 and M_3 is estimated in two stages. In the first stage, the anticipated series on money supply is generated by regressing nominal money supply on GDP, Call Money Rate (CMRT) and Wholesale Price Index (WPI) on their log levels and corrected for auto-correlation through AR(1) process[5]. The supply shock series (lnMRES) is derived by deducting lnMEST from the actual values of monetary aggregates (log levels). In the second stage, OLS estimation is made for the real money demand function with respect to both narrow and broad money by estimating a variant of structural equation (6).

Further, the influence of anticipated money supply on real balance is examined by extending the specification under equation (6) to include anticipated money supply term (lnMEST). The out-of-sample predictive power of the shock absorber model is studied by repeating the estimation procedure with a break of sample at 1980-81[6].

In the absence of reliable monthly or quarterly data on the scale variable, *viz.*, national income, annual data are used for empirical exercise on buffer stock money in India. The sample period chosen spans over three decades from 1960-61 to 1993-94. Adjusted data on M_1 and M_3 are used for the period from 1960-61 to 1976-77 following definitional

changes after the submission of the Second Working Group report on money supply in 1977[7].

Model Comparison

Table 1 reports the OLS estimates of partial adjustment model (PAM) and shock absorber model (SAM). As is evident from Table 1, the inclusion of the monetary shock term in the real money demand function is found to be positive and significant at one per cent level in case of both narrow money and broad money (equations 2 and 5). More than 40 per cent of the supply shock is absorbed by the economic agents in the short-run. In order to know if the anticipated supply of money has any impact on real balances, equations 2 and 5 are extended to include the anticipated money supply term as an argument. The result was found to be mixed. In the case of narrow money (equation 3), anticipated money supply is negative and significant at 5 per cent level which is contrary to the theoretical expectation. In the case of broad money (equation 6), anticipated supply of money is found to have a positive impact on real balance, as the relevant coefficient has a positive sign and significant at 5 per cent level. The hypothesis that the anticipated supply of money does not have any significant impact on real balance is perhaps not valid in the case of India. The current inflation rate is found to be significant and negatively related to the real balance implying the possibility of substitution between money and real assets. Test statistics have improved in terms of $\bar{R}^2$, Durbin's 'h' and standard error of regression (S.E.R.) in all cases.

The shock absorber model has seemingly outperformed the partial adjustment model in respect of both narrow money and broad money. The specification bias which seems to have been present in the partial adjustment model, has been reduced considerably as the parameters are now more precise. Moreover, as the test statistics have improved, this shows that the within-sample period predictive power has gone up. Equations 2 and 5 are chosen to study the out-of-sample predictive power of the shock absorber model in the next Section.

SECTION IV

Instability in Money Demand Function

This section examines the stability property of the money demand function under buffer stock approach. The nature of shift in the money

Table 1 : Estimation of the Demand for Money in India : Partial Adjustment Model and Bufffer Stock Model

Sample Period : 1960-61 to 1993-94

Sr. No.	Dependent variable	Explanatory variables							Test Statistics		
		Intercept	lnGDP	lnCMRT	RLM(-1)	IRAT	lnMRES	lnMEST	$\bar{R}^2$	S.E.R.	Durbin's 'h'
1.	RLM1	-1.2531	0.1497** (2.60)	-0.0038 (0.20)	0.9291** (20.32)	-0.7941** (8.37)	-	-	0.997	0.025	1.55
2.	RLM1	-2.2249	0.2958** (7.21)	-0.0254* (2.15)	0.7972** (23.64)	-0.4849** (6.65)	0.4421** (7.02)	-	0.999	0.015	0.85
3.	RLM1	-3.8371	0.4804** (5.31)	-0.0222* (1.99)	0.8176** (24.93)	-0.4363** (6.10)	0.4037** (6.49)	-0.0685* (2.25)	0.999	0.014	1.40
4.	RLM3	-1.6941	0.2011* (2.23)	0.0100 (0.52)	0.9116** (18.19)	-0.8428** (8.36)	-	-	0.998	0.026	2.01
5.	RLM3	-3.9114	0.4765** (5.90)	-0.0189 (1.31)	0.7545** (16.65)	-0.4609** (4.65)	0.4234** (5.53)	-	0.999	0.019	1.52
6.	RLM3	-2.4757	0.3191** (2.97)	-0.0257 (1.84)	0.7187** (15.56)	-0.4911** (5.18)	0.4521** (6.13)	0.0611* (2.08)	0.999	0.017	0.57

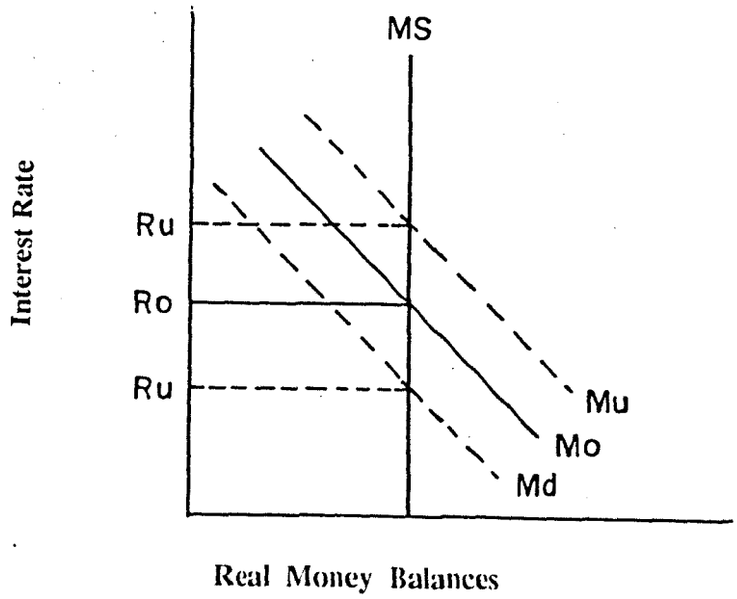
Note : lnMRES is the supply shock generated by lnM-lnMEST and lnMEST is the anticipated supply of money worked out from the equation $\ln M = a_0 + a_1 \ln GDP + a_2 \ln CMRT + a_3 \ln WPI + a_4 AR(1)$, (see notes No. 5).
For other variables, see Appendix I.
Figures in parentheses are 't' values.
* Denotes significance at 5 per cent level.
** Denotes significance at 1 per cent level.

demand function, the out-of-sample predictive power and stability property are examined in that order.

Shift in Money Demand and Monetary Control

Unanticipated shift in money demand function generally attenuates the monetary control. This can be illustrated in the following manner. Let 'Mo' be the central bank's 'best guess' of the true money demand function (Diagram 1). There may be random shifts off the hypothetical money demand curve. If the shifts tend to fluctuate in an offsetting fashion around the true function, the central bank can still pursue the policy of monetary targeting under the presumption that the mean of the short-run money demand function would more or less lie on the hypothetical money demand curve. However, if the magnitude of these shifts is high and persists in one direction for a long time, monetary control becomes increasingly difficult. For example, if money demand shifts upward to say 'Mu', controlling money supply at 'Mo' level may result in recession. On the contrary, if the function shifts downward to 'Md', targeting money supply at 'Mo' level may lead to inflation.

Diagram 1



The shifts in money demand function may be of two types. It can be a one time permanent shift following definite shocks and remain stable

thereafter or there can be general instability after a certain break-point. In case of the former, central bank may commit errors until the shift is identified. In case of the latter, monetary targeting may become difficult.

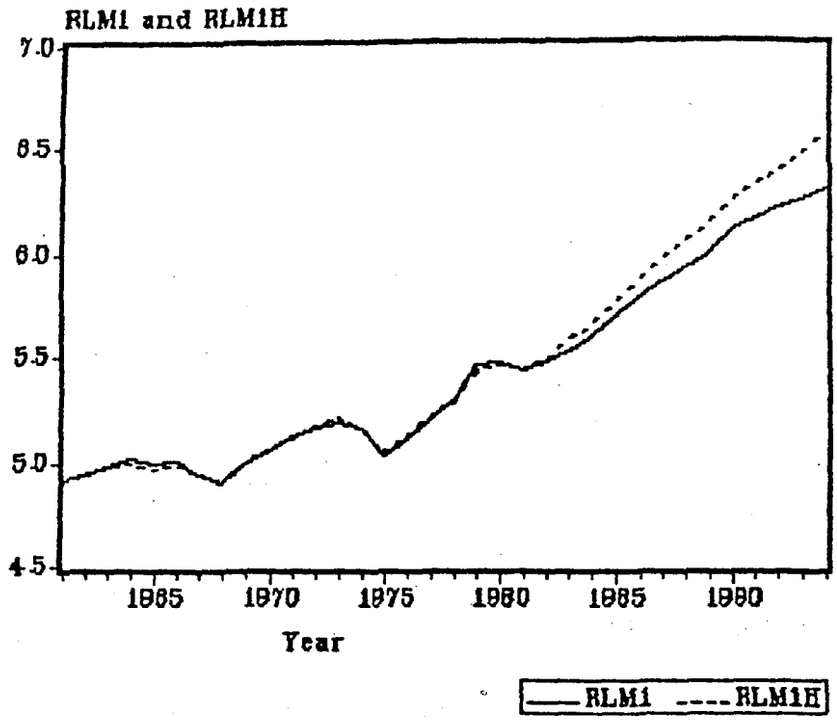
Out of Sample Predictive Power

The preceding section showed that the money demand function estimated under buffer stock approach outperformed that under partial adjustment model. This section examines the out-of-sample predictive power of the buffer stock model. The buffer stock function is re-estimated with the sample truncated at 1980-81. The equation was then simulated to generate *ex post* forecasts for the period 1981-82 to 1993-94. The comparison of the simulated and actual values of real balance is given by the plots in Graphs I and II. While the historical simulation for the period 1960-61 to 1980-81 has turned out quite robust, the ex post forecasting power of equation is not satisfactory which is evident from the consistent overprediction for the out-of- sample period. The predicted values of 'M_1' and 'M_3' persistently exceeded their respective actual values beyond 1981-82 perhaps reflecting the evidence of 'missing money' in the Indian context. There could be two possible explanations in support of the above findings. First, the money demand itself may have undergone a downward drift in the 1980s. Secondly, the dependent variable might have failed to capture certain types of liquidity in the 1980s following financial innovations. The instability arising out of the first possibility is studied in the next sub-section.

Testing the Stability of Buffer Stock Model

Two types of shifts discussed earlier can be pointed out in a straight forward manner. The existence of a one time shift in 1982 can be tested by using intercept and slope dummies that partitions the data at that point of time. The possibility that frequent random shocks to the real sector might have made the money demand function more unstable in the short-run could be examined by using a unique dummy for each observation after the hypothesised break point. If the coefficient of the individual dummy turns out significant by ordinary 't' statistics, the inference of a structural break at that point may be validated. If the sum of the dummies is significant, the inference would be that the short-run shocks have not been offsetting but have had the cumulative effect of shifting the function in one direction. This test is implemented by estimating equations 2 and 5 over the period 1960-61 to 1980-81 and adding each time unique dummy variables for each observation during the subsequent period.

Graph 1 : Prediction of Narrow Money Demand



Graph 2 : Prediction of Broad Money Demand

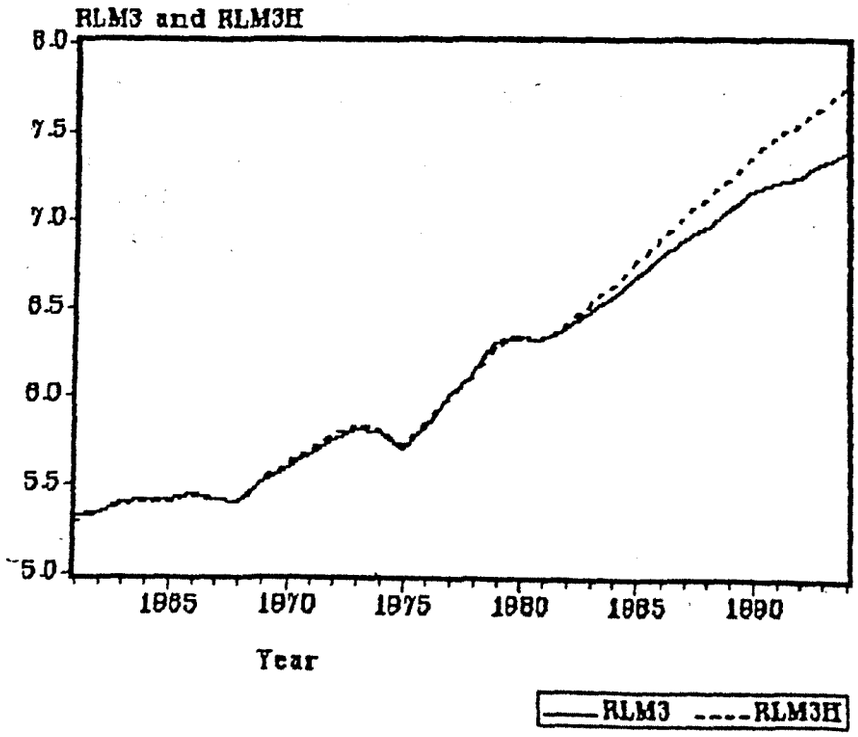


Table 2: Short-run Buffer Stock Money Demand Function for India.

Explanatory variables	RLM1	RLM3
Intercept	-2.2062	-3.4761
ln GDP	0.2816** (5.47)	0.3941** (5.32)
ln CMRT	-0.0240 (1.92)	-0.0202 (1.65)
RLM(-1)	0.8255**(13.18)	0.8454** (17.39)
IRAT	-0.5198**(5.36)	-0.5910** (6.13)
ln MRES	0.4248** (5.91)	0.3297** (4.64)
DUM1	0.2680 (0.45)	1.3440** (3.56)
DUM2	-0.0233 (0.46)	-0.1155** (3.59)
	Test Statistics	
$\bar{R}^2$	0.999	0.999
S.E.R.	0.015	0.016
Durbin's 'h'	0.74	-0.79

Notes:
1. Figures in parenthesis are 't' values.
2. * indicates significance at 5 per cent level.
3. ** indicates significance at 1 per cent level.
4. DUM1 is intercept dummy with'0' up to 1980-81 and '1' thereafter.
5. DUM2 is slope dummy i.e., DUM1 x ln GDP.

There is a *prima facie* evidence for an upward shift in the money demand function in the 1980s as seen from the positive sign of the intercept dummy (Table 2). But, the slope dummy has the reverse sign which is indicative of the downward shift in the income elasticity of the demand for money. It is also evident that both intercept dummy and slope dummy are significant at one per cent level in case of broad money. However, in case of narrow money, they are insignificant. Therefore, it is necessary to examine further if the sum of the unique dummies used for each observation beginning from 1980-81, is significant so that it will validate our hypothesis of a possible structural break of the demand for both M1 and M3 since early 1980s.

Table 3 reports coefficients of intercept and slope dummies of narrow and broad money demand. Intercept dummies used for both M1 and M3

have positive signs in all the years after 1979-80 (except in 1989-90 for M3) signifying possible upward shift. They are significant at one per cent level in two cases (and nearly significant at five per cent level in other two) for M1 and significant in eight cases for M3. While the level of significance has gradually improved for M1, it has moved almost in reverse direction for M3. However, the null hypothesis that 'the sum of the intercept dummies is zero' is rejected at one per cent level in cases of both narrow money and broad money as the 't' values turned out to be significant at one per cent level. Persistent increase in money supply at a relatively high rate in the 1980s and also in the 1990s so far, irrespective of the level of money demand could be the possible reason for an upward shift in the intercept.

Table 3 : Buffer Stock Demand for Money in India: Estimates of Short-Run Instability in Post-1980 period

Break Point	Narrow Money (M1)		Broad Money (M3)	
	Coefficient of Intercept Dummy	Coefficient of Slope Dummy	Coefficient of Intercept Dummy	Coefficient of Slope Dummy
1980-81	0.2680(0.45)	-0.0233(0.46)	1.3439**(3.56)	-0.1155**(3.59)
1981-82	0.2037(0.36)	-0.0178(0.37)	1.2317**(3.18)	-0.1057**(3.23)
1982-83	0.2076(0.37)	-0.0168(0.36)	1.3113**(3.05)	-0.1109**(3.08)
1983-84	0.0233(0.50)	-0.0233(0.49)	1.2601**(2.66)	-0.1065**(2.71)
1984-85	0.2861(0.50)	-0.0240(0.50)	1.3303**(2.46)	-0.1118**(2.50)
1985-86	0.4212(0.66)	-0.0346(0.66)	1.4085**(2.15)	-0.1179**(2.23)
1986-87	0.6738(0.97)	-0.0624(0.97)	1.6543**(2.01)	-0.1377**(2.04)
1987-88	2.4264**(2.09)	-0.1979**(2.08)	2.5486(1.96)	-0.2102*(1.98)
1988-89	4.5425**(2.49)	-0.3703**(2.50)	2.1891(1.04)	-0.1809(1.05)
1989-90	5.8109(1.93)	-0.4737(1.94)	-0.2393(0.06)	0.0166(0.06)
1990-91	7.5718(1.94)	-0.6165(1.95)	0.3458(0.07)	-0.0305(0.07)
1991-92	10.5975(1.46)	-0.8618(1.45)	9.1920(0.97)	-0.7470(0.97)
$\sum_{i=1}^{12} di = 0$	(3.71)	(3.68)	(2.26)	(2.32)

Notes: 1. Figures in brackets are 't' values.
2. * indicates significance at 5 per cent level.
3. ** indicates significance at 1 per cent level.
4. 'd' stands for dummy.

From the policy angle, a central banker is perhaps more interested in the slope of the money demand curve. Unlike intercept dummies, the slope dummies consistently took negative signs for both M1 and M3 (except in 1989-90 for M3) implying a downward adjustment of the money demand function with respect to the growth of real income. The trends with respect to level of significance for M1 and M3 are more or less similar to that of intercept dummy. In case of slope dummies also the null hypothesis that 'the sum of the dummies is zero' is rejected at one per cent level. The stability test shown in Table 3, however, could not justify any unique point of break, rather indicated a kind of general instability since 1981-82.

SECTION V

Concluding Observations

Among the variety of buffer stock models, shock absorber model is widely used by researchers to study the impact of unanticipated changes in money supply on the money demand. The empirical findings on shock absorber model presented above indicate an evidence of buffer stock money in India. About 40 per cent of the unanticipated change in money supply is willingly absorbed in the short-run by the spending units. The hypothesis that anticipated change in money supply does not significantly influence money demand could not be maintained due to mixed result. At least for M3, it was positive and significant implying that anticipated money supply does play a role in influencing money demand. The shock absorber model seemed to have outperformed partial adjustment model in many respects and therefore could be used as an alternative paradigm in the study of money demand function in India. However, the out-of-sample predictive power of the shock absorber model was found to be weak perhaps reflecting on the 'missing money' aspect in the Indian context. Stability test performed by using intercept and slope dummies for the 1980s showed significant changes in the behaviour of money demand in this period. While the intercept of the money demand function seems to have moved upward, the slope might have drifted downward. The findings were further supported by tests based on unique dummies. The result showed that there has been a tendency towards some downward movement in the slope of money demand function, stemming from a decline in the income elasticity during the 1980s - a phenomenon which could be partly attributed to financial innovations. This has happened side by side with an upward shift of the intercept of the demand for real balances. While these evidence give rise to the concern that the money demand

function might have exhibited some degree of instability, further research in this area is needed in terms of time series analysis through co-integration technique. The preliminary evidence presented in this paper make a case for a close relook at the stability aspect of money demand, which will have implications for effective conduct of monetary targeting in India.

Notes

1. For an excellent survey of literature, reference may be made to Judd and Scadding (1982), Akhtar (1983).

2. While discussing portfolio adjustment following monetary innovation, Friedman and Schwartz (1963, P. 63) stated that: "It is this interconnection of stocks and flows that stretches the effects of shocks out in time, produces a diffusion over different economic categories, and gives rise to cyclical reaction mechanisms. The stocks serve as ***buffers*** or ***shock absorbers*** of initial changes in rates of flow by expanding or contracting from their normal or natural or desired state and they slowly alter other flows as holders try to regain that state".

3. Some authors like Bain and McGregor (1985) argue that this approach is an improved version or more precise statement of impact interval analysis of monetarism.

4. Also see Subramanyam (1990) for some comments on buffer stock approach to money demand.

5. The specification assumes rational expectation framework where current values contain all information relevant for expectation formation. The results are:

$$\ln M_1 = -9.0506 + 1.2624 \ln GDP - 0.0307 \ln CMRT + 0.9568 \ln WPI$$
't'value (5.07) (-0.67) (7.24)

$\bar{R}^2$=.99 D.W.=1.88 S.E.R.=0.06.

$$\ln M_3 = -11.9227 + 1.5183 \ln GDP - 0.0469 \ln CMRT + 1.1207 \ln WPI$$
't'value (5.48) (-0.91) (7.63)

$\bar{R}^2$=.99 D.W.=1.86 S.E.R. =0.07.

The nominal money supply was also regressed on the same variable with one period lag together with lagged dependent variable. The results (not reported) are found to be inferior to those used in contemporaneous model with auto-correlation correction.

6. The conventional Chow test is also performed. As Chow 'F' is not significant, it is not reported. One of the limitations of the Chow test is that it does not perform well in case of gradual change in the function. A possible break in the money demand function was anticipated by the author through the use of dummies in one of his earlier studies [see Bhoi (1992)].

7. Adjusted data used here are from Singh et al. (1982).

Appendix I

Definition of Variables Used in the Model

Notation		Definition of the Variables
M1	:	Nominal Narrow Money which comprises currency with the public, demand deposits with banks and 'other' deposits with RBI.
P	:	Index Number of Wholesale Prices (WPI): All commodities, (Average of the weeks), Base: 1981-82 = 100.
RLM1	:	Real Narrow Money which is lnM1-lnWPI.
M3	:	Nominal Broad Money which consists of M1 plus time deposits with banks.
RLM3	:	Real Broad Money which is lnM3-lnWPI.
GDP	:	Gross Domestic Product at factor cost at 1980-81 prices.
CMRT	:	Weighted average of Call Money Rate at Bombay (average of the weeks).
IRAT	:	Inflation rate i.e. lnWPI-lnWPI(-1).
ln	:	The prefix 'ln' refers to natural log of the respective variables.
DUM1	:	Intercept dummy.
DUM2	:	Slope dummy i.e. DUM1 X ln GDP.

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NOTE

Is Economic Growth Export Led?

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The empirical literature on export-led growth shows that there could exist significant relationship between export growth and economic growth, but this relationship is dependent on the world trade environment and the level of development of a country. This paper examines the export-led growth hypothesis and finds that the link between exports and economic growth does not appear to be very significant in the case of low income countries.

Introduction

The achievement of rapid self sustaining economic development is a primary objective of developing countries. While economists agree that "economic policies and institutions are crucial in the process of economic development",[1] they disagree considerably on the set of policies that is best suited for the purpose. This is especially true of trade policies and their role in stimulating economic development. There are two opposing schools of thought. Singer and Prebisch, whose theories on this subject gained widespread ascendancy in the developing countries in the 1950s and 1960s and to some extent even in the 1970s, extolled the virtues of import substitution as a policy option. This, according to them "would allow domestic industry to grow, conserve scarce foreign capital, decrease external dependency, and promote economic development"[2]. In recent years, however, the success story of the newly industrialised countries (NICs) of Southeast Asia, which emphasised export promotion as part of their policy structure as against the lacklustre performance of countries using import substitution strategies, has given rise to a considerable body of literature underscoring the advantages of an export promotion strategy for developing countries.

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1. World Development Report 1991, page 1.

2. Ibid, page 34.

The purpose of this paper is to throw some light on how effective an export led growth strategy could be, by examining whether there exists a link between export growth and economic development, or to put it differently whether exports serve as a source of economic growth. While doing this the main arguments for an export led growth strategy are recapitulated by reviewing some of the empirical work on this issue. This is done in section II. Next, a more recent and broader dataset (in terms of the number of countries included in the sample) is used to empirically verify the general validity of the export promotion hypothesis. The details of the model and estimation procedure used to test the hypothesis are given in section III. Section IV presents the results of the estimation. Finally, section V provides conclusions of the paper.

SECTION II

The Export Promotion Hypothesis : A Review of Literature

Proponents of the export promotion strategy give several reasons why export expansion would lead to more rapid growth than would otherwise be possible. First, production is not constrained by the size of the domestic market which is often small in developing countries. Producers can, therefore, take advantage of the economies of scale and indivisibilities in the production process. The growth of the export sector is ultimately expected to lead to full exploitation of such economies of scale and thereby to facilitate a more rapid rate of growth. Second, export promotion enables a country to take advantage of international division of labor and specialization, exchanging goods in which they have a comparative advantage with those in which they do not have. This results in a relatively efficient resource allocation than would otherwise be possible. Hence, even without changes in factor endowment and production technology, a country can achieve a higher rate of growth by shifting resources into the more productive export sector. Third, international markets expose domestic firms to greater competition. This enhances efficiency by encouraging innovation, risk taking and cost minimization. This not only makes the export sector more efficient, but also leads to improvements in productivity throughout the economy via spread effects and other such externalities. Finally, improvement of technology becomes possible. Increasing the volume of exports allows a country to import a larger amount of capital goods and thus improves the quantum and quality of technology transfer from the rest of the world.

In this paper, we propose to examine the empirical evidence on the export promotion hypothesis. To this end, we start with a review of some of the more recent empirical works on the subject so as to enable us to have a framework for our test. Essentially, two methods have been used to test for the link between export growth and economic growth: (1) estimating the size and significance of the correlation coefficient between export growth and economic growth [e.g.,Tyler (1981) and Kavoussi (1984)] and (2) estimating the sources of growth equation to examine the size and significance of the coefficient of the export variable and the explanatory power of the equation.

Tyler used data on 55 developing countries (i.e., countries having GNP per capita greater than US$300 in 1977) for the period 1960-1977. His measure of for economic growth was annual real rate of growth of GDP, and for export growth, annual real rate of growth of exports. The Pearson correlation coefficient between these two variables was reported as 0.49 and Spearman coefficient as 0.47. Both the coefficients were significant at 1 per cent level of significance. He, therefore, concluded that there was support for the export promotion hypothesis. Kavoussi (ibid) also calculated the Spearman correlation coefficient between export growth and GDP growth for the years 1960-1978. Unlike Tyler, however, he expanded the sample to include both middle and low income countries. He obtained a correlation coefficient of 0.54 (significant at 1 per cent). This according to him, strengthened Tyler's conclusion. The problem with Tyler's and Kavoussi's use of correlation coefficients to test empirical relationships is that it does not determine or validate a cause-effect relationships between these variables. A more rigorous and preferred method is to estimate and evaluate a theoretically derived equation. Such an equation specifies the expected relationship between the economic variables.

Tyler argued in his paper that exports increase the total productivity in the economy. Therefore, it would be appropriate to deem exports as an additional factor of production, along with labor and capital, in the aggregate production function. By differentiating the production function w.r.t. time and then dividing the differentiated function by the original equation, Tyler transformed the production function into the following sources of growth equation:

$$[1] \qquad \dot{Y}/Y = A + B.\dot{K}/K + C.\dot{L}/L + D.\dot{X}/X$$

Where Y=country's total output
A=technological constant
K=country's capital stock services
L=country's labor services
X=country's exports
and the superscript indicating annual increments

Unlike Tyler, Feder (1982) formally derived his sources of growth equation from a two-sector model of the economy, the two sectors being exports and non-exports. He assumed that the export sector had a higher marginal productivity (due to the various reasons discussed earlier in this section), and that there was an externality from the export sector to the non export sector. From this model, he derived and estimated the following sources of growth equation:

$$[2] \qquad \dot{Y}/Y = A + B.\dot{L}/L + C.I/Y + D.(\dot{X}/X).(X/Y)$$

Where X = exports
Y = total output
L = total labor stock
I = total investment

Feder thus introduced a new variable to capture the impact of exports on economic growth, viz., export growth multiplied by the share of exports in GDP.

If we do not accept the hypothesis that exports expansion leads to increased economic growth via the mechanisms postulated by Feder and/or Tyler above, the sources of growth equation is reduced to the traditional form, i.e., output growth is a function of labor growth and capital growth.

$$[3] \qquad \dot{Y}/Y = A + B.\dot{L}/L + C.\dot{K}/K \quad \text{(Tyler's model)}$$

$$\text{or} \qquad \dot{Y}/Y = A + B.\dot{L}/L + C.I/Y \quad \text{(Feder's model)}$$

Table 1 : Estimates of Equations to Test the Export Promotion Hypothesis

Estimate	Equation Number	Time Period	No. of Observations	Value of Co-effiecients					$\bar{R}^2$
				Constant	• K/K or I/y	• L/L	• X/X	• X/X.X/Y	
Tyler	[3]	1960-1977	41	1.991	0.284 (7.077)	1.06 (2.739)	—	—	0.661
	[1]			1.997	0.254 (5.921)	0.986 (2.576)	0.57 (1.694)	—	0.685
Feder	[3]	1964-1973	31	-0.01	0.284 (4.311)	0.739 (1.990)	—	—	0.37
	[2]			0.18	0.178 (3.542)	0.747 (2.862)	—	0.422 (5.422)	0.689
Kavoussi	[3]	1960-1978	73	2.14	0.291 (6.87)	0.44 (1.71)	—	—	0.49
	[1]			2.01	0.241 (5.84)	0.4 (1.69)	0.105 (3.72)	—	0.57
Balassa	[3]	1973-1978	43	-10.007	0.181 (3.458)	1.128 (1.625)			0.213
				-2.094	0.114 (2.013)	0.92 (1.394)	0.182 (2.457)		0.304
				-4.138	0.151 (3.076)	0.775 (1.197)	—	0.691 (2.950)	0.343
Rana	[1]	1960-1973	43	-0.091	0.445 (2.836)	--	0.613 (9.187)	—	0.826
		1973-1981		-0.037	0.452 (2.706)	--	0.508 (9.971)	—	0.783
Kohli and Singh	[2]	1960-1970	31	0.86	0.1222 (2.749)	0.587 (2.945)	0.107 (2.833)	0.328 (4.241)	0.724
Shechey	[1]	1960-1981	53	-0.008	0.086 (1.83)	1.12 (3.56)	0.16 (3.15)	—	0.479
	[1] and export=X/Y			0.02	0.242 (5.01)	1.38 (4.44)	-0.069 (-0.069)	—	0.488
	[1] and export=XC			-0.12	0.141 (3.19)	1.18 (3.55)	0.537 (1.82)	—	0.413

Note: all figures in brackets are t statistics.

Tyler's and Feder's estimates are presented in Table 1. Table 1 also presents the estimates of these equations by Balassa (1985), Kavoussi (1984), Rana (1988), and Kohli and Singh (1989) for different time periods and samples. All of them used World Bank data. As can be seen from the table all of these studies found one or more of the following: (1) $\bar{R}^2$, after inclusion of the export term, was large (2) $\bar{R}^2$ increased when exports were introduced into the sources of growth equation, and (3) the coefficient of the export variable in the growth equation was positive and significant at the accepted level. They, therefore, concluded that there was a strong evidence to validate the export promotion hypothesis.

Sheehey (1990), however, argued that the use of annual average export growth rate as a measure of export orientation was not correct. This is because as GDP/GNP increases, we would expect all its components, including exports, to increase as well. Instead, he suggested using the share of exports in GDP (X/Y) and the rate of change of this share $\partial(X/Y)$ as a measure of export orientation, though he did not present a formal model to justify the use of these alternate variables. He estimated equation [1] following the approach of predecessor studies, and also the same equation after substituting the alternative variables suggested by him to represent exports. He found that the explanatory power of equation increased when X/Y is used but decreased when $\partial(X/Y)$ is used and the dominant influence on growth from exports was the negative impact of export share. However, the positive coefficient of $\partial(X/Y)$ implies that shifting of resources into the export production exerts a positive influence on growth. He also concluded that the evidence on the effect of export promotion on economic growth is inconclusive if alternatives to the rate of growth of exports are used to measure export expansion.

While results to the contrary have been reported in the literature, the weight of empirical evidence is generally in favour of the existence of a link between export growth and economic growth. Some of the studies specifically focus on the strength of this link : whether the export promotion hypothesis is valid for all developing countries, regardless of country - specific economic circumstances, or whether the existence of a particular set of preconditions is necessary for exports to be an engine of economic growth.

One of the preconditions is the achievement of a certain minimum level of economic development for an export-led growth strategy to become economically meaningful. This is because a basic level of development may be necessary to realise the gains in productivity, efficiency and

technology and for such gains to translate into externalities for the rest of the economy. Tyler (ibid) assumed in his paper that, "some basic level of development is necessary for a country to benefit most from export oriented growth," and hence, he did not include low income countries in his sample. He did not, however, empirically verify his contention.

Kavoussi (ibid) also investigated whether the export led growth hypothesis is influenced by the level of development of the economy. He estimated the correlation coefficient between export growth and economic growth and the regression equation for growth for two subsamples of low and middle income developing countries. He found that the correlation coefficient was 0.41 for low income countries and 0.54 for middle income countries (both coefficients were significant at the 1 per cent level); that there was an increase in $\bar{R}^2$ when the export variable was introduced in the growth equation in both subgroups, but the increase was greater for the middle income countries; and that the regression coefficient of the export variable was positive and significant for both the group of countries, but once again, the coefficient for middle income countries was twice that of low income countries. Hence, he concluded that while the impact of exports on economic growth was greater for middle income countries than for low income countries, there was still the evidence of strong linkage from exports to economic growth for all levels of development.

Sheehey (ibid) followed a similar method of dividing his sample into two groups - less and more industrialized countries - and estimated the regressions. His results suggested: "while the negative impact of export share on economic growth was common to countries at different levels of industrial development, the positive effect of growth of export share is only important for industrialized countries." Hence, unlike Kavoussi he concluded that the export promotion hypothesis is dependent on the level of industrial development of a country, i.e., increased exports promote economic growth only for the more industrialized countries.

Kohli and Singh (ibid) followed a different approach. They introduced nonlinearities into the sources of growth equation and estimated the following equation for the period 1970-1980 along with equation [2]

$$[4] \qquad \dot{Y}/Y = A.I/Y + B.\dot{L}/L + C.(\dot{X}/X).(X/Y) + D.((\dot{X}/X).(X/Y))^2$$

They found that, while the coefficient of the export variable in their estimate of equation [2] was not significant, all coefficients in equation

[4] were significant. Also, while the estimate of C was positive, that of D was negative. This was interpreted by them to be evidence of export led growth being subject to diminishing returns, i.e., the significance of exports in stimulating an economy's growth diminishes as the country goes up in the development ladder. Hence they concluded that as exports increase their impact on a country's economic growth decreases.

Kohli and Singh also suggested that the existence of nonlinearities in the growth equation could also be interpreted as the requirement of a critical minimum effort for translating the export led growth. However, this was not rigorously pursued by them.

Another precondition suggested for exports to have a favorable impact on the economy is the existence of a favorable world trade environment. Balassa (1985) tested for whether a deterioration in world trade environment would impact adversely an export promoting country's chances of growth. His estimates covered the period 1973-1978 when the world trade environment was adversely affected by the oil price shock of 1973 and by increasing protectionism. He compared his estimates for this period with those made by him in an earlier paper for the period 1960-1973. He found that the regression coefficients for the export variable were higher in value than the previous sample period for years 1973-1978 (the difference being statistically significant at 1 per cent level); and that the (b) $\bar{R}^2$ was lower for the second period which he conjuctered was due to the smaller sample period covered. He, therefore, concluded that the export expansion hypothesis was valid even in a worsening trade environment.

Rana (1988), however, pointed out that Balassa's comparisons of estimates before and after 1973 were flawed as the estimates were derived from different samples. Hence the improvement found by Balassa in the coefficient of the export variable was probably due to the larger sample size of the second period. Rana's regressions covered the countries in Balassa's second sample for the periods 1960-1973 and 1973-1981. He found a decrease in both the coefficient of the export variable and $\bar{R}^2$ in the second period (and that the decrease was statistically significant). His contention was that the impact of exports on economic growth could have been less when the world trade environment was unfavorable. Kohli and Singh (ibid) too got similar results when comparing coefficients for the periods 1960-1970 and 1970-1980. In their estimates, the impact of the export variable in the second period was statistically insignificant. Sheehey (ibid) also disagreed with Balassa. His estimates for 1960-1970

and 1970-1980 showed a declining impact of exports on growth during the 1970s as compared to the 1960s.

It may be noted that most of the earlier estimates which supported the export led growth hypothesis used data pertaining to the 1960s which witnessed the boom in world trade. The sample of countries used (with the exception of Kavoussi) were fairly small and could not be taken as represantative sample of developing countries. Subsequent estimates (Rana, Kohli, Singh and Sheehey) do not appear to refute the hypothesis as strongly as the earlier estimates corroborate it. It is also possible that the export led growth hypothesis is only valid under a particular set of circumstances. In what follows in section III and IV the relationship between export growth and overall growth is revisited with empirical analysis based on more recent data and wider coverage of countries than the earlier studies. An attempt is also made to test a corollary proportion that a certain set of enabling conditions could be necessary to achieve the export led growth.

SECTION III

Estimation Procedure

For reason of simplicity and efficiency in handling the issue we use Feder's model[1] as the starting point of the empirical analysis. In addition, we propose to study the impact of level of development and the world trade environment on a country's ability to use exports to generate economic growth. In the light of the discussion presented in section II, we propose to break up the sample into subsamples based on time period and level of economic development.

The following two specifications are considered for the purpose:

$$\{5\} \qquad \dot{Y}/Y = A + B.\dot{L}/L + C.I/Y$$

$$\{6\} \qquad \dot{Y}/Y = A + B.\dot{L}/L + C.I/Y + D.X/X.\dot{X}/Y$$

Equation {6} is Feder's equation. This reduces to equation {5} if we assume that there are no externalities from the export sector and no differences in marginal productivities between the export and nonexport sector, implying exports do not act as a source of growth.

1. For a complete derivation of the model, see Feder (1982); pages 60-63.

If the expansion of exports leads to more rapid economic growth, we would expect the coefficient of the export variable to be significantly positive. Similarly, given the role of capital in economic growth, we expect its coefficient to be positive too. The coefficient of labor variable can be zero, negative or positive depending on whether the original situation is one of labor surplus or not.

The paper uses data for the period 1970-1990. All data used are from the World Tables 1992 produced by the World Bank. We used data on 82 countries. This includes 46 middle income countries and 36 low income countries. The World Bank's division of countries into low and middle income was used by us. The World Bank defines a low income country as one having a 1990 GNP per capita of $610 or less and a middle income country as one having a 1990 GNP per capita of $611-$7619 (GNP per capita is calculated using the World Bank Atlas). All countries for which data was available for our sample period are given in the Annexure.

GDP at market prices was used for calculating output growth rate, total exports of goods and non-financial services for calculating the growth of exports and Gross Domestic Investment for calculating investment as a proportion of output. These were worked out in constant prices. Following earlier studies population growth rates were used as a proxy for labor growth rate.

SECTION IV

Results of Estimation

We estimated equation {I} and {II} using Ordinary Least Square Method. Following estimates were obtained:-

$$\{I\}\quad \dot{Y}/Y = -0.6954 + 0.384028\ (\dot{L}/L) + 0.163\ (I/Y)$$
$$t \qquad (-0.663) \qquad (1.4923) \qquad (5.018)^*$$
$$\bar{R}^2 = 0.227 \qquad S.E = 1.938$$

$$\{II\}\quad \dot{Y}/Y = -0.146 + 0.368\ (\dot{L}/L) + 0.102\ (I/Y) + 0.703\ \dot{X}/X.X/Y$$
$$t \qquad (-0.165) \quad (1.706) \qquad (3.507)^* \qquad (5.85462)^*$$
$$\bar{R}^2 = 0.456 \qquad S.E. = 1.625$$

(*: significant at 5 per cent level)

As can be seen from the equations, the introduction of exports as an explanatory variable has increased the explanatory power of the equation. Moreover, the coefficient of the export variable is significant and positive. However, the value of $\bar{R}^2$ obtained in our estimates is much lower than that of earlier studies. This also brings us back to the problem of whether the export-led growth hypothesis is universal or dependent on the existence of certain preconditions.

As discussed earlier, it was avered that the export-led growth hypothesis holds particularly for the countries which have reached a certain minimum level of development as only then changes in productivity and efficiency from increasing exports translate into externalities and spread effects. Our sample included both low amd middle income countries. To test whether the level of development had an impact on the relationship between export growth and economic growth, we disaggregated our data into two subgroups, viz., middle income countries (46) and low income countries (36). Equations {I} and {II} were separately estimated for each of these subset of countries. The results are presented below in table 2.

TABLE 2: Regression Results

	Low income countries		Middle income countries	
	{I}	{II}	{I}	{II}
Constant	0.820	0.808	-1.020	-0.415
t	(0.941)	(0.914)	(-0.690)	(-0.380)
$\dot{L}/L$	0.179	0.144	0.468	0.487
t	(2.930)*	(1.322)	(1.468)	(2.060)*
I/Y	0.101	0.104	0.172	0.080
t	(2.280)*	(2.280)*	(3.368)*	(1.957)*
$(\dot{X}/X.X/Y)$	—	0.130	—	0.945
t		(0.390)		(5.995)*
$\bar{R}^2$	0.320	0.300	0.210	0.560

* : significant at 5 per cent level.

Our results substantiate the hypothesis that the impact of exports as a source of growth is different for countries at different stages of develop-

ment. For low income countries, inclusion of the export variable in the sources of growth equation does not improve the goodness of fit. Moreover, the coefficient of the export growth variable is not significant implying perhaps the relative unimportant role of exports in the growth process. For middle income countries we obtained the opposite results. In this case the explanatory power of the equation improved when export was introduced. The coefficient of the export variable is significant and positive indicating a strong relationship between exports and economic growth.

The results, therfore, appear to indicate that the stage of development of a country is an important consideration in judging whether the export-led growth hypothesis holds or not. On the whole, the results show that while there is a significant relationship between exports and economic growth for the relatively more developed countries, this relationship does not appear to be significant for the relatively less developed countries.

The 1980s was marked by the rise of protectionism in the world trade. In particular, there was a significant increase in Non Tariff Barriers (NTBs). NTBs have especially been put up in areas like textiles, leather etc. where the developing countries appear to have a comparative advantage. This deterioration in the world trading environment could have adversely affected the export performance of developing countries and in turn their growth prospects. The intensity of this affliction would be more for economies which rely on exports as a major source of growth than the countries which adopt an inward looking policy.

To analyse the impact of deteriorating world trade environment on export led growth, we divided our sample period into two subperiods covering the years 1970-1980 and 1980-1990. Equations (I) and (II) were then estimated for each of these subsets. The results are presented below in table 3.

TABLE 3 : Regression Results

	1970-1980		1980-1990	
Equation	{I}	{II}	{I}	{II}
Constant	0.338	0.932	-1.197	-1.280
t	(0.290)	(0.910)	(-1.020)	(-1.160)
$\dot{L}/L$	0.325	0.354	0.404	0.433
t	(1.030)	(1.290)	(1.420)	(1.610)
I/Y	0.167	0.099	0.131	0.117
t	(4.450)*	(2.790)*	(3.720)*	(3.510)*
$\dot{X}/X.X/Y$	—	0.559	—	0.408
t		(5.230)*		(3.300)*
$\bar{R}^2$	0.190	0.400	0.130	0.220

In this case, we find that for both the periods $\bar{R}^2$ increased when we introduced exports into the growth equation. However, the value of the export coefficient is lower in the second period indicating a decline of impact of exports on economic growth. This would suggest that while exports performance was an important source of growth, in a deteriorating economic environment, its impact on economic growth tends to diminish.

As a further test we estimated the equations for middle income countries which had shown strong support for the export-led growth hypothesis for both the time periods. The results are presented in table 4 below.

TABLE 4 : Regression Results

	1970-1980		1980-1990	
Equation	{I}	{II}	{I}	{II}
Constant	0.155	0.969	-2.195	-2.370
t	(0.090)	(0.800)	(-1.350)	(-1.490)
$\dot{L}/L$	0.593	0.740	0.417	0.401
t	(1.620)	(2.640)*	(1.140)	(1.120)
I/Y	0.165	0.068	0.165	0.158
t	(3.020)*	(1.530)	(2.900)*	(2.830)*
$\dot{X}/X.X/Y$	—	0.622	—	0.305
t		(5.640)*		(1.770)
$\bar{R}^2$	0.200	0.540	0.140	0.180

The results in respect of middle income countries reinforce the earlier finding that trade environment should be favorable for exports to be a significant factor of growth. During the period 1970-1980 when protectionism declined somewhat, economic growth was significantly influenced by exports. This is evident from the coefficient on export which is positive and significant. However, in the second period, this does not stand out to be the case.

Conclusion

A review of selected literature on export-led growth showed that there could exist significant relationship between export growth and economic growth, but this relationship is dependent on the world trade environment and the level of development of a country. While studies covering the period till the mid-1970s, when the world trade environment was favourable, show a strong support for the export promotion strategy, those covering the post-1973 period, when the world trade environment began to deteriorate, show less convincing support for the same. Moreover, studies that account for larger and more hetrogenous sample of developing countries show a less significant relationship between exports and economic growth. It was then inferred that export-led growth hypothesis could be varied when certain preconditions were achieved. The empirical analysis conducted in this study also had a similar finding.

The empirical results for the relatively more developed countries indicated the existence of a significant link between exports and economic growth. This, however, is not the case for the low income countries. The results also show that the world trade environment plays an important part in determining how effective an export promotion strategy is for an economy. In a deteriorating world trade environment this linkage could get significantly attenuated. This points to the fact that export promotion strategy might involve some risk to the extent that the exogenous factors, such as world trade environment impinge on the country's export performance and its growth.

Annexure

List of countries used (in alphabetical order)

(A) Low Income countries :-

Bangladesh, Benin, Burkina, Faso, Burundi, Central African Republic, Chad, China, Egypt, Ethiopia, Gambia, Ghana, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Niger, Nigeria, Pakistan, Rwanda, Sierra Leone, Somalia, Sri Lanka, Sudan, Tanzania, Togo, Zaire, and Zambia.

(B) Middle Income countries :-

Algeria, Argentina, Bolivia, Botswana, Brazil, Cameroon, Cape Verde, Chile, Colombia, Congo, Costa Rica, Cote d'Ivoire, Dominican Republic, Ecuador, El Salvador, Fiji, Gabon, Greece, Guatemala, Hungary, Iran, Jamaica, Republic of Korea, Malaysia, Malta, Mauritius, Mexico, Morocco, Nicaragua, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Senegal, Swaziland, Syrian Arab Republic, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uruguay, Venezuela, Yugoslavia, and Zimbabwe.

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Reserve Bank of India Occasional Papers
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BOOK REVIEWS

GATT Accord and India, (ed) K.R. Gupta, Atlantic Publishers and Distributors, New Delhi, 1994, Pp. vi+127, Price Rs. 195

The conclusion of the Eighth Round, the Uruguay Round (UR), of multilateral trade negotiations under the aegis of the General Agreement on Tariffs and Trade (GATT) and the subsequent ratification of the World Trade Organisation (WTO) as the successor of the GATT, has generated a public debate about the possible implications of these developments on the member nations. Issues which have been frequently raised in this context range from the possibility of infringement of national sovereignty by the UR agreements to the impact of specific provisions of particular agreements of the UR on particular sectors/groups in individual countries. While in some cases concerns voiced have been genuine, much of the debate has been speculative and based upon lack of adequate information about the actual provisions of the agreements. Against this background, the book under review, an edited volume, provides an opportunity to get some informed views about the UR agreements and their implications for India.

The volume has ten articles, half of which have given general overviews of the UR and its implication for India (Articles in this category include studies by J. A. Siddiqui, S. K. Bhattacharya, B. Bhattacharyya, N. Datt and R. K. Gupta). There are two articles in the context of UR agreements on Intellectual Property Rights (IPRs) and India (by S. K. Joshi and K. V. Swaminathan). The present volume also contains an article each on the impact of the UR on India's rice exports and the services sector (by V. Katti and K. V. Swaminathan, respectively). Finally, there is a study which tries to gauge the implication of the UR for the economies of the Asia-Pacific region (by T. P. Bhat).

All the articles on the general implications of the UR for India except the one by B. Bhattachatyya, have followed a more or less common pattern. They give a historical perspective to the GATT in general and the UR in particular. Besides, they give overviews of the provisions of the UR agreements and from them they anticipate the possible implications for India. In addition, Siddiqui and Gupta have discussed about the possible future agenda of the WTO and India's strategic response to it.

while S. K. Bhattacharya has quoted several studies carried on in the context of the UR measuring the impact of the UR on the member nations. B. Bhattacharyya, in his article, has tried to identify various interest groups in India, and to find out the impact of the UR on these groups. From that, he has explored their possible strategic responses to the likely changes.

Both Joshi and Swaminathan, in their studies, have elaborated the provisions of the UR in the context of IPRs. Joshi, while welcoming the spirit of these agreements has identified the provisions which might go against India's interest. Swaminathan, on the other hand, discussed the provisions on the IPRs under the UR, the existing Indian system and the one envisaged by the Paris Convention of the World Intellectual Property Organisation.

Katti, in her article, has focused on India's position in the international rice market in the pre as well as post-UR scenario. She has identified the positive and negative factors faced by India in the divergent contexts. The study on the services sector by Swaminathan has compared the pattern and structure of certain segments of the organised tertiary sector of India with their counterparts at the global level. This article has further explored the opportunities, challenges and the resultant course of action for this sector of the country in the post-UR situation. Bhat's article has discussed the implication of the UR on the economies of the Asia-Pacific region. He has tried to identify the particular sectors where individual countries of this region will get most affected.

While the authors have generally welcomed the UR, they, also expressed concern about the possibility of the developed countries introducing protectionist measures within the WTO through social and environmental clauses. Most of the articles have suggested the enhancement of the pace and scope of the ongoing structural adjustment programme in India to make her competitive in the post-UR scenario.

For all the best intentions, the book falls short of expectations because it lacks in analitical rigor. Most of the articles are descriptive, detailing the actual provisions of the various agreements of the UR. With perhaps the exception of the piece by B. Bhattacharyya, none of the articles contained any methodological framework. Many of the articles have picked up empirical results of other studies carried on in the context of the UR, without appreciating the fact that these studies carried different and often mutually conflicting assumptions. Some authors, have tried to

present back-of-the-envelop estimates but they provide little confidance. For example, S. K. Bhattacharya has quoted the result of a study to show that after 2005 A.D. global exports will increase by US $ 200-300 billion per annum due to the UR agreements. From that, keeping the India's present share in the global exports unchanged, he claims that India's yearly gain from the UR agreements in terms of exports will be US $ 1.5 to two billion (p. 21). The UR agreements, on the other hand, should, one would expect, change the pattern, composition and structure of world trade. If this expectation is correct, the aggregate trend-based estimates are likely to be widely off the mark in the changed situation.

The absence of methodology and structured analysis have in certain cases, resulted in sweeping generalisations and unsubstantiated statements. For example, Siddiqui has argued that, "The Indian drug and pharmaceutical industry has grown and flourished under the protection of process patents instead of the *internationally accepted product patents*" (p. 8, emphasis added). In the pre-UR period, most of the developing and many of the developed countries (e.g. Australia) did not accept product patents system for drugs and pharmaceutical industries. Therefore, such a system need not be "internationally accepted". The same author has also asserted that certain provisions of the UR have allowed, "flexibility of sorting out certain issues on a bilateral basis" which he claims to be an "inherent anomaly" of the UR (p. 10). While, as a principle, multilateralism is better than bilateralism, specially for a developing country like India, the unsuccessful experience with the International Trade Organisation (ITO) shows that some amount of flexibility like limited bilateralism is essential to make a multilateral system work. In his article, Joshi has claimed that, "It is an *accepted fact that strong IPR protection and its enforcement are very important for a country to attract foreign investment and flow of technology in to the country*" (Pp 16-17, emphasis added). He has further asserted that, "There is *no conclusive evidence to substantiate that the grant of product protection to drugs will enhance prices of the drugs*" (p. 17, emphasis added). On the one hand, both the theoretical and empirical literature show that positive relationship between a stricter IPR regime and flow of foreign direct investment and technology transfers are, at. best, very doubtful. On the other hand, positive relation between drug prices and a stricter patent regime is well demonstrated by various studies carried on in the context of numerous countries.

The main thrust of the UR has been on the establishment of an efficient, non-discriminatory and market-friendly environment. These objectives are broadly co-terminus with those of India's new economic policy.

However, India's journey in this direction is relatively new. That is why it is difficult to make definite conjecture about the implication of the UR agreements on India on the basis of her past experience. However, the experience of various developing and newly industrialised countries which initiated market-friendly reforms relatively early, can help to draw broad inferences about the possibilities awating India. A cross-country analysis is what is required if such inferences should have a measure of credibility.

It is generally agreed that the UR has made an important move towards the creation of a multilateral and freer trade order. However, there is much more work to be done to actually enforce a fully non-discriminatory trading environment. Further, while the UR has created a conducive environment for the developing countries to benefit from larger integration with the world economy, the extent to which individual countries benefit from it depends largely on how they improve upon their productivity and related conditions. India has much to do for setting her own house in order to face the challenges of this new era and to improve upon her existing position in the global economy. Improvements in infrastructural facilities and modernisation in both agriculture and industry so as to achieve international competitiveness, to name just two aspects, are essential for this purpose. One wishes to see these points discussed in a volume dealing with the GATT accord, but they are conspicuously missing in the book under review.

For those who would like to have information about GATT accord and about the general perceptions about its impact/likely impact on India, the book under review could provide useful clues.

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Analytical Approaches to Stabilization and Adjustment Programs, by Cadman Atta Mills and Raj Nallari, EDI Seminar Paper No. 44, The World Bank, Washington, D.C., 1992. Pp. V+135, Price : Not stated

The monograph under review provides a brief, non-technical but rigorous introduction to the analytical framework and models used by the IMF and the World Bank in formulating stabilization and structural adjustment programmes for developing economies. The various critiques of Fund-Bank models have also been covered in this monograph. The objective is to facilitate a better understanding of the issues involved not so much by professional economists as by policy-makers, policy-analysts and policy practitioners in developing countries. Better communication and a more informed and fruitful discourse between international agencies and national policy makers may help both in the formulation of better reform measures as well as in their effective implementation. The monograph thus fills an important gap in literature and deserves commendation.

The book under review has six chapters, including the introductory chapter. Chapters two and three deal with concepts and identities related to the national accounting framework of a macro-economy. Chapter 2 provides a macro-economic framework for policy analysis in a matrix form - the consistency matrix - specifying the sources and uses of funds among various sectors. It lays down the basic macro-economic identities which form the backbone of most of the Fund and Bank models of structural adjustment. The authors also point out some of the problems in the United Nations' System of National Accounting. The difficulty of incorporating non-market activities in the accounting framework and the importance of taking into account the various external economies and diseconomies in the calculation of Gross National Product is stressed.

Chapter 3 puts forth some of the definitions and concepts in open-economy macroeconomies. The first part of the chapter deals with the various definitions of the exchange rate, the concept of equilibrium real exchange rate and the different exchange rate arrangements practised in individual countries. The authors then proceed to explain the elasticity approach, the absorption approach and the monetary approach to devaluation. The concept of the index of effectiveness of devaluation, trade bias and different measures of protection are also discussed. The chapter also

gives a brief exposition of a number of syndromes that are rampant in different economies - viz. the Dutch disease, the British disease, the European disease and the Indian disease. The concluding section presents an analysis of the short-run adjustment problem in open economies using the definitions and concepts developed throughout the chapter.

Chapters 4, 5 and 6 of the monograph deal with the Fund-Bank models and the critics of these models. The Fund Model (also called the Polak Fund Model) is based on an influential article entitled "Monetary Analysis of Income Formation and Payments Problems" written by J.J. Polak and published in IMF Staff Papers in 1957. This is a short-term model which uses a flow of funds methodology to determine a sustainable balance of payments position while ensuring price stability. The model distinguishes between four sectors - the private, public, external and domestic banking sectors - which together constitute a national macroeconomy. The private sector is assumed to own all the factors of production and the monetary or banking sector is considered only as an intermediary. The sufficient elements of receipts and expenditure (or rather inflows and outflows) in each sector are disaggregated and distinguished in the Polak-Fund Model to conform with the detailed breakdowns in the conventional national income accounting system. As expected, the model concentrates on the consistency conditions in the external and monetary sectors in which change in external reserves appears explicitly. Since,in the Fund Model, the focus is on identifying the sources of balance of payments disequilibria and inflation,it is natural for the model to concentrate on these two sectors with due regard to consistency conditions in all the four sectors. The authors argue that "the spotlight,in Polak's analysis,is on the functioning of the central bank, hence, credit expansion in the economy becomes the focal point of inquiry". Polak's model shows that any increase in domestic credit (with a stable demand for money function) would lead to an equal decline in foreign exchange reserves. Using the framework of the Polak model, the IMF undertakes a process of financial programing to find the values of policy instruments (domestic credit and exchange rate devaluation) needed to achieve the desired targets set for the reserve position and change in inflation.

Another model discussed by Mills and Nallari is the World Bank model. The World Bank uses a planning model to ascertain the resource need of a developing country to enable it to attain a higher growth path. While the Fund model is essentially short-run and monetary in character and takes real income as given or exogenous, the Bank models have a more dynamic and long-run orientation emphasising growth and real fac-

tors contributing to it. These (and other) differences obviously reflect differences in the objectives, functions and target variables of the two Bretton Woods institutions.

The Bank models have evolved through time. Initially, in the 1950s, the Bank used the well-known Harrod-Domar equation to estimate the investment (or savings) requirement of a target rate of growth. Later in the 1960s, the Bank's model incorporated a two-gap accounting framework developed by Chenery and his associates, in which an additional and independent foreign exchange constraint is built into the model. Based on the logic of the "two-gap model", the Bank constructed a Revised Minimum Standard Model (RMSM) in 1973 to provide a consistent model for all developing countries for use in the World Bank's day-to-day operations. For some countries (for which data are available) the RMSM has over 425 variables. The model is primarily used as a thinking tool and can be modified to meet country specifications. As the authors of the book point out, RMSM is still in many respects an incomplete model. Not all policy variables are considered, prices are given, capacity utilization and employment generation are neglected and so also the government and the financial sector.

In the 1980s, the Bank, in addition to project finance, began program lending on a large scale and was thus faced with the task of suggesting appropriate macro-economic policy prescriptions to the developing countries. This required further extensions to the RMSM model and a closer integration of Fund-Bank models and policies. Recent steps in this direction are (a) the extended models RMSM-X and RMSM-XX which are briefly discussed in Chapter 5 and (b) the Merged Bank-Fund Model given in Chapter 6.

With the functional divisions of labour between the Fund and the Bank increasingly disappearing since the early eighties, the need to model "growth oriented adjustment" involving a merger of the Fund's monetary model of balance of payments with the Bank's two-gap approach was urgently felt. The conceptual framework for such a model was designed by Khan and Montiel in an article published in the IMF Staff Papers (1989). With minor modifications of the macro-economic framework used in the Fund and Bank models, the Khan-Montiel model derives four equations which provide solutions for four endogenous variables of the model: inflation, balance of payments, growth of real GDP and real GNP. The other variables included in the equations are either exogenous or predetermined or are given parameters or policy instruments like taxes, govern-

ment spending, exchange rates and domestic credit. This is a simple but potentially useful model which can be fruitfully extended to incorporate other endogenous variables and equations.

The Mills-Nallari monograph has one merit, namely, that it does not ignore the critics of the Polak-Fund model or of the Fund-Bank stabilization programs. The authors classify the critics under several functional heads - the structuralist critique, the heterodox critique, the disequilibrium critique, the post-Keynesian critique, the mainstream critique and the dependency school. Although such a classification, as the authors themselves admit, "is somewhat arbitrary", it is interesting to note that there is virtually no "school" which does not have something critical to say about the Fund's analytical approach and policies! There are considerable overlaps in the arguments of the different "schools", though their major focus may be somewhat different.

In the wake of a new, silent Keynesian revolution taking place in the 1980s spearheaded by such prominent economists as N. Gregory Mankiw, George A. Akerlof and David Romer, the structuralist, heterodox, disequilibrium and post-Keynesian critiques which Mills and Nallari discuss in this monograph acquire a new significance and respectability. For, if an economy is characterised by monopoly, mark-ups, administered prices, indexed wages, staggered wage-bargains, etc., how much reliance can be placed on models which implicitly or explicitly assume perfect competition, flexible prices, high and normal demand and supply elasticities, large substitution effects, quick adjustments and short-run equilibration? Note that these problems are not peculiar to developing economies though they may have a larger share of market imperfections and rigidities. If the macro and institutional specifications are properly made it would be easier to understand why demand deflation may lead to substantial losses in output and employment and result in stagflation while devaluation may lead to a higher inflation rate rather than an improvement of the trade balance or disabsorption. It is not the accounting framework of the Polak-Fund model that is wrong but its inadequate attention to the pricing process and structural-cum-institutional specifications of different national economies.

It is generally well recognised that the IMF stabilization programs surveyed in the Mills-Nallari monograph are characterised by the static nature of the Polak-Fund model, the rudimentary treatment of the financial sector, an excessive reliance on devaluation as a price raising device, and exclusion of important national target variables like income distribu-

tion, real growth rate, unemployment, etc. Edwards (1989) deplored the increasing emphasis on devaluation in Fund stabilization programs. Dombusch has questioned the high substitutability of traded for non-traded goods assumed in most Bank-Fund stabilization programs - since import goods do not compete much with home goods and very little of exportables are consumed at home in most developing economies. For this and other reasons, export supply elasticities are usually low in developing economies - exports responding to price incentives with a long (3 to 5 years) lag.

In view of all these factors, the steady deterioration of the currency values of developing countries brought about through "conditional devaluations" in a situation where exports are demand- or supply- constrained may well contribute to "immiserizing growth" and "unequal exchange" as argued by the dependency school. Viewed thus, the difference between the dependency school and other critics does not appear to be as radical and fundamental as the authors of this monograph suggest.

The Fund policies have a generally anti-debtor stance. The burden of adjustment and of conditionality is placed on deficit countries whereas surplus countries have very little international responsibility in terms of correcting their own disequlibria. It is in this context that the two critical extensions of the Fund-Bank models - the model of reciprocal conditionality and the three gap structural model - explained in the monograph acquire special importance. The reciprocal conditionality approach was developed by Edman Bacha in an article published in World Development (1987). Pointing out that asymmetry is dominant in both Fund and Bank stabilization programs, Bacha shows that "the same model that is used to estimate credit ceilings on public sector borrowing, the rate of devaluation and so on, can also be used to estimate the foreign resource requirement for a given adjustment program". In the context of the integrated Fund-Bank model, Bacha points out that once the Bank has made its two estimates of the requirements of foreign credit needed to sustain a target GDP growth rate (based on its estimates of the "savings gap" and the "trade gap" of a country), the higher of these two estimates should be incorporated as an additional variable into the financial programming exercises of the Fund.

The required foreign resources of a borrowing country may then serve as a "performance criteria for foreign creditors, the violation of which would entitle the program country to an automatic increase in its drawings either from the IMF or from the World Bank, if not to an auto-

matic capitalization of the interest due on its outstanding external debt". Creditor countries often do not meet such obligations as those relating to disbursement of funds committed at the time of loan agreements. In this situation Bacha's recommendation of reciprocal conditionality gains in importance.

In the spirit of enforcing reciprocity in sharing the burdens of development-cum-adjustment, Bacha extends the two-gap model of the World Bank by incorporating a third gap - a fiscal gap between government revenues and expenditure. Public consumption and public investment are distinguished in this model to highlight the role of public investment in developing countries. Bacha uses his model to show how a nominal devaluation by raising the price of imported inputs would lead to a rise in the general price level. This is also acknowledged in the Polak-Fund model but in the context of mark-up pricing in the Bacha model, the once-for-all price rise in the Polak model is converted into a price-wage spiral if workers refuse to accept a real wage cut. If in the context of real wage rigidity, monetary brakes are applied strongly, this may cause considerable unemployment. If, as inflation goes on, money wages are held constant, real wages will fall, profits will rise and inequality in income distribution would increase. Regarding the fiscal gap, this may worsen after devaluation since the domestic currency value of government's external debt-service payments will increase. Foreigners definitely gain as more domestic real resources flow out to service external debt and possibly through an improved terms of trade after devaluation. In Bacha's world some of these gains could be passed on through increased financial aid and/or accommodation so that the burden of adjustment would be easier to bear and short-run stability and longer-run growth do not come in conflict in developing economies.

The Mills-Nallari monograph presents in a relatively few pages and in a remarkably simple and lucid style the various view points on Fund-Bank models and stabilization programs. The treatment is fairly balanced. Bringing together diverse approaches may perhaps help in bringing economists of different schools together so that a consensus of opinion may emerge among them on relatively important issues. The differences of views among professional economists often reflect the clash of interests that prevails at national and international levels. This aggravates confusion and conflicts. But in an ultimate sense, the major constraints on development are national rather than international and suitable domestic strategies rather than more foreign exchange are necessary in most cases.

Short-run balance of payments difficulties are relatively easy to resolve if external balance were the only objective to be achieved, and even if surplus countries are unwilling to accommodate temporarily and/or unconditionally. However, there are different social costs and benefits - redistributive effects - associated with each instrument used and these are by no means confined within the stabilizing country. Other goals of national policy (growth, equity in income distribution etc.) must, therefore, be kept in mind in ranking different balance of payments policies. There is need for a nationally and internationally acceptable social welfare function here without which different economic models would merely reflect differences in social philosophy, though the basic analytical tools and empirical realities underlying the models may not be all that different.

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