SAVINGS, INVESTMENT AND EXTERNAL DEBT:
A Test of the Traditional Nexus for a Small Open Economy

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Presented at the XXIII
Regional Monetary Studies Conference
Belize
November 25 - 29, 1991

NOVEMBER 1991

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The role of external capital or foreign savings in the process of economic development has been the subject of theoretical and empirical studies (e.g. Chenery and Strout (1965); Selowsky et al (1986) and Fry (1989). In the early stages of a country's development, national savings may not be adequate to finance the level of investment necessary to ensure sustained growth. It becomes necessary for foreign savings to supplement domestic savings.

Conventional thinking seeks to explain the rapid build-up of external debt of many developing countries as the net effect of these countries using foreign savings to finance current account deficits. A rising level of foreign savings to finance increasing current account deficits has implications not only for external debt and its servicing but also for domestic savings. When foreign savings are fully available, rather than supplement domestic savings they have the potential to reduce domestic savings, especially in periods of high foreign indebtedness as Fry's (1989) study infers. The possible negative correlation between domestic savings and net capital inflows has received attention by other researchers such as Griffin (1970 and 1986), Weiskopff (1972) and Papanek (1972). It should be interesting to investigate the extent of such substitution in a small open developing country like

Barbados. However the principal objective of this paper is to seek to explain to what extent the external debt build-up of Barbados may be explained through an investigation of the underlying behaviour of the savings investment gap, given the traditional macroeconomic relationship between the non-interest external current account balance and the saving-investment gap.

An assessment of the veracity of this fundamental macro-economic relationship for a small country like Barbados should have important policy implications for the direction of fiscal and monetary policies as well as for external debt management.

The paper begins with an analytical survey of domestic savings and investment from about mid-1960s. This is followed by a discussion of the possible determinants of these variables. Finally, the model is tested, relying on some of the new developments in applied econometric techniques.

Investment and Saving Behaviour in Barbados

Gross domestic investment in Barbados since 1961 falls into three main growth patterns. After a period of modest growth (1961-71) averaging 6.9% per year, gross investment grew rapidly in the late 1960s, achieving an impressive average growth rate of 16% per annum from 1968 to 1981. The ratio of gross capital formation to GDP also averaged 23.3% during this period, from 17.7% for the seven years ending in 1967. This period of strong growth coincides with the

time when there was rapid growth in tourism and manufacturing infrastructure. Capacity in the tourism sector doubled during this period, peaking in 1983 when profitability in the sector fell (Worrell 1990). After 1981, gross capital formation fell in response to declining profitability in the tourism sector. Between 1982 and 1989, average gross investment growth fell to 4.8% per annum and concomitantly the ratio of gross investment to GDP fell to 11.7%.

Private capital played a major role in the investment profile, providing about 80% of the investment in the period (1968-81) when investment grew the fastest. Public sector investment complemented private sector capital, placing strong emphasis on infrastructure, education, health and social services.

Both domestic and foreign savings were important sources of finance for domestic investment. Foreign inflows were markedly significant during the 1970s and early 1980s when gross investment grew very strongly, providing more than one-third of investment finance. From the mid 1960s, gross national savings demonstrated a consistent pattern of growth, expanding steadily at an average annual rate of 14.4% to the mid-1970s. During that period it averaged about 16% of GDP. From that time it grew faster, in line with the rapid growth in economic activity to the early 1980s, averaging 21.6% of GDP. As should be expected, private sector savings provided the

bulk of gross national savings, accounting for more than 90% of domestic savings for most of the period of the analysis.

Theoretical Framework

There is a theoretical support for the fundamental role the savings - investment gap plays in the build-up of debt in a growing economy. As external debt continues to build up, domestic savings and foreign borrowing must be sufficient not only to cover investment but to service the accumulating foreign debt (Selowsky et al 1986). If we assume a situation where domestic savings are insufficient to cover investment and interest payments on foreign debt, then net foreign borrowing becomes

$$B = r_f D + I - S \qquad (1)$$

where B = real net borrowing in a period

r_f = average real interest rate on foreign loans

D = stock of external debt in real terms

I = real gross domestic investment

S = real domestic saving

By definition, the expression $(I - S)$ represents the non-interest current account balance of the balance of payments, recording the difference between total expenditure (net of interest payments) and nationally generated income.

Expression (1) may be re-written as

$$B = r_f D + I - S \qquad (2)$$

$$\text{or} \quad \Delta D - r_f D = I - S \qquad (3)$$

where $B = \Delta D$ is the change in external debt in a period. The expression on the left hand side of (2) represents the net resource transfer from foreigners in a period. Basically, this exercise reduces into verifying equation (2) for Barbados, using estimated relationships for I and S:

Determinants of Domestic Investment

The neoclassical flexible accelerator model has found successful empirical applications in many investment studies on industrial countries, as evidenced by the works of Jorgenson (1967, 1971) and Bischoff (1969). However, apart from data inadequacies, the reliance on key assumptions such as perfect capital markets, with little or no government investment presence, makes the use of accelerator model unsuitable for determining investment demand in developing countries.

Most empirical studies on investment demand in developing countries have proceeded eclectically, identifying some key economic variables that are more likely to influence investment demand. The works of Blejer and Khan (1984) and Greene and Villanueva (1991)

are largely along these lines. These studies identify, inter alia, real output, the user cost of capital, real credit availability to the private sector, public sector investment, long-term private foreign capital inflows and the stock of external debt as some of the important determinants of private investment in developing countries.

In the usual neoclassical framework the real user cost of capital is expected to impact negatively on private investment demand. The stock of external debt outstanding has the tendency to slow investment to the extent that higher proportion of external savings may be used for debt servicing, hence reducing the amount of resources available for investment. On the other hand, real economic activity, an indicator of real demand, real credit available to the private sector, and long-term capital inflows are expected to have a positive impact on real private sector investment demand.

~~Real public sector investment may have a positive impact on real private sector investment demand~~. Real public sector investment may have an ambiguous impact on real private sector investment. In the short run, an increase in public sector investment, especially if financed predominantly from domestic sources, could push interest rates up and crowd out private sector investment demand. On the other hand, the provision of basic infrastructure - roads,

telecommunications and industrial estates - could serve a catalytic role in inducing investment by the private sector.

In Barbados, as in many developing countries, public sector investment activity may not necessarily be determined solely by rational economic considerations. Social and political factors sometimes outweigh economic considerations of profitability, efficiency and linkages of the investment projects with the rest of the economy. As a result, this study concentrates on investigating the determinants of private sector investment activity. The functional specification incorporates most of the variables which, as discussed above, have been demonstrated to influence real private investment in other developing countries.

Our preferred function, therefore takes the form:

$$IP = f_1 (\overset{+}{GDP_{-1}}, \overset{+}{\Delta CRP}, \overset{\pm}{IG}, \overset{+}{PFI}, \overset{-}{UCC}, IP_{-1}, \overset{\pm}{D}) \qquad (4)$$

where IP = real private investment

GDP = real gross domestic product

CRP = credit to the private sector (in real terms)

IG = real public investment

PFI = long-term foreign capital inflows

UCC = the user cost of capital

D = the stock of external debt outstanding

IP_{-1} enters the model in the usual format of investors making only partial adjustment to desired levels in a given period.

Savings

Most works on savings aggregate private and public savings or estimate consumption functions and inferences are made about saving behaviour. One drawback with using aggregate savings data is that public sector saving may respond differently from private sector savings. Consequently, the response of public sector savings could mask the response of private sector savings. Indeed, Giovanni (1985) posits that aggregation of public and private savings is legitimate only under strong neutrality assumptions. In this paper we disaggregate savings into private and public since we believe that aggregation does indeed conceal important policy issues.

In the literature, the main saving or consumption determinants fall into four groups, income and wealth, rate of return, foreign saving and demographic variables. Fry (1989) extended the list to include the domestic and foreign debt of the government, and the terms of trade.

Fry (1980) points out that savings (national) is not only influenced by the level of income but also by income growth, suggesting that whether one chooses the relative income, life cycle hypothesis or any of the other competing hypotheses, the savings function derived invariably includes the rate of growth of income.

Low levels of income compound the problem of the high dependency rates which was addressed by Leff (1969) but made popular in Modigliani's work on the life cycle hypothesis. Leff's finding of an inverse relationship between dependency rates and savings has been challenged by Rossi (1989) and Ram (1982) on grounds of specification error and sample selection bias. Craigwell and Rock (1990) found a positive and significant impact of dependency rates on the savings rate for Trinidad and Tobago.

The real rate of interest is to show to what extent consumption will be postponed i.e. intertemporal rate of return. Fry (1980) suggest that real rates of interest are consistent with financial liberalization intended to generate increases in national savings.

Belassa (1973) found the interest elasticity to be insignificant but Giovannini (1985) disagrees and argues that the rate of growth of consumption to the expected real rate of interest indicate that intertemporal substitutability in consumption is likely to be small implying a small interest elasticity of savings. Writings in Caribbean type economies have generally found the real interest rate to be insignificant. However, a recent study on Trinidad and Tobago indicates that real interest rates do have a significant positive influence on savings (See Watson and Ramlogan, 1990).

A case is made in the literature for the inclusion of the inflation rate as a separate determinant. Inflation exerts two influences on savings [See Juster and Watchels (1972) and Deaton (1977)]. First, inflation encourages holding of real assets as against financial and this leads to a reduction in savings. Second, inflation creates a feeling of uncertainty about future income which will encourage people to save. Rodriquez (1989) argues that the negative impact of inflation on bank deposits is due to the large distortions it creates in the functioning of the financial system and to the uncertainty it brings to the expected returns. In some instances high inflation rates have led to capital flight which would then be reflected in a reduced level of savings. Inflation will also impact on the level of savings through its effect on the growth of national income.

Others argue [Fry (1980)] that if the level of inflation exceeds the expected inflation rate then entrepreneurs see that as reflecting a real increase in demand for their products. They then respond by increasing the rate of capacity utilisation to augment output as well as invest more to increase capacity. This new investment would push up the rate of growth of income and increase savings.

A similar argument is presented for the inclusion of the income terms of trade. It is suggested that as the purchasing power of exports grows, it will lead to increases in profit and rent more so

than wages and since savings from the former is greater than from the latter, saving should increase (Lee 1971). Craigwell and Rock (1990) found evidence to support the view that export growth leads to increased savings moreso than an improvement in the terms of trade. Persson and Svensson (1985) produced evidence to show that changes in the terms of trade can have ambiguous effects on the savings rate.

High levels of government debt may lead the private sector to consume rather than invest (save) for fear of increased taxation. Fry (1980) suggest that higher domestic and or foreign debt raises the probability of higher taxation on assets and so encourages capital flight. He contends that savers may also see the need for government to devalue in an effort to increase exports and as such will shift their assets abroad.

Foreign savings is included as an argument because it is seen as a substitute for national savings, encouraging a higher consumption pattern than would otherwise be the case.

From the above discussion, we posit that private savings will be determined by the level of disposable income, changes in the real output, the real deposit rate of interest, the level of inflation, the dependency ratio, foreign savings, the terms of trade, export

'th and the stock of external debt incurred. Hence we expect to
a mathematical relationship of the form:

$$SP = F_2 (\overset{+}{YD}, \overset{+}{\Delta GDP}, \overset{+}{RDR}, \overset{\pm}{INF}, \overset{-}{DEP}, \overset{\pm}{RFS}, \overset{+}{TT}, \overset{+}{XGR}, \overset{\pm}{D}) \quad (5)$$

re SP = real private savings

YD = disposable income

RDR = real deposit rate

INF = rate of inflation

DEP = dependency ratio

RFS = real foreign savings

TT = terms of trade

XGR = export growth rate

D = stock of external debt (in real terms)

The compiled model becomes:

i. Change in Real External Debt

$$\Delta D = r_f D + I - S$$

ii. Private Investment Demand

$$IP = F_2 (GDP_{-1}, \Delta CRP, IG, PFI, UCC, IP_{-1}, D)$$

iii. Private Savings Function

$$SP = F_3 (YD, \Delta GDP, RDR, INF, DEP, RFS, TT, XGR, D)$$

iv. $I = IP + IG$

v. $S = SP + SG$

Where r_f is the average interest rate on external loans (in real terms)

Methodology

The estimating methodology employed in the paper relies on new developments in cointegration theory which has already found application in econometric studies in the Caribbean (See e.g. Downes et al (1987), Leon (1989) and Craigwell (1989).

Most economic variables used in econometric modelling exhibit non-constant mean and variance, implying that the underlying data processes may not be stationary as required by classical econometric theory. In these circumstances, inferences based on classical theory may not be valid. However, recent developments in econometric theory have demonstrated that valid estimation and inference is possible if there exists a linear combinations of these non-stationary variables that is stationary. If such stationary linear combination of otherwise non-stationary variables exists, then the set of variables is said to be cointegrated. The series can then be regarded as defining a 'long run equilibrium' relationship and can be expected to move so that they do not drift too far apart over time. Thus, cointegration theory permits the separation of the long-run information inherent in the data from the short-run dynamics, about which economic theory usually does not shed much light.

The Granger Representation Theorem (See Engle and Granger (1987) enables the above theoretical discussions to find practical

applications. According to this theorem, if a set of variables are cointegrated, then there exists a corresponding error correcting representation of those variables (ECM) which is capable of estimating the short run dynamics inherent on the data. Additionally, the long-run solution can be recovered.

To adopt this approach it is necessary to determine the order of integration of the variables to be used in the long-run formulation of the model. The order of integration simply means the degree of differencing required to obtain a stationary series. The Dickey-Fuller test for unit roots (See Dickey and Fuller, 1981) is the standard technique used to determine the order of integration in a series. The test is based on the t value of X_{t-1} in the OLS regression of the form:

$$\Delta X_t = \beta X_{t-1} + {}^{k}_{i=1}\Sigma\theta i\Delta X_{t-1} + e_t \qquad (6)$$

where k is chosen to be sufficiently large so that the error form in (6) is empirical white noise. when k = o, the Dickey-Fuller test is defined; k ≠ o specifies the augmented Dickey-Fuller (ADF) test. The null hypothesis that X_t follows a random walk (i.e. X~ I(1)) is rejected in favour of the alternative I~I(O) if $\beta<0$ and significantly different from zero. The appropriate significant test are provided by Fuller (1976, p. 371).

The Dickey-Fuller test may lose power when the identical independent distribution assumption does not hold. (See Phillips (1987). Hence the residuals are further tested for serial independence using the Lagrange multiplier test suggested by Pagan and Hall (1983) and for heteroscedasticity. Once the order of integration is determined, the next stage is to investigate whether the separate equations that make up the model are cointegrated. This is so if the error forms of the regressions of these equations are stationary. Following this, the error correction representation of the two models are specified and tested.

Data and Empirical Results

The data for the analysis spans the period 1965 to 1989. In general, national investment (I), defined as the real gross capital formation, was obtained from the Annual Statistical Digest and other unpublished sources at the Central Bank of Barbados. However, the sub-division into private and government investment relied on data from various IMF and World Bank publications. The foreign savings variable is defined as the net capital inflows on the capital account of the balance of payments and was taken from various issues of the Central Bank publication "Balance of Payments". Gross national savings was derived as the difference between gross capital formation and foreign savings. Government savings is the surplus on the fiscal current account.

The other variables are quite standard and do not need further elaboration, except for the user cost of capital (UCC), the real deposit rate (RDR) and the dependency ratio (DEP). The user cost of capital calculated so that it reflected elements of price, capital gains and depreciation[1]. In defining RDR, we follow the definition by Greene and Villanueva (1991)[2]. The dependency ratio records the proportion in the population of adults aged 65 years or over and of young people less than 15 years old.

Empirical Results

The testing procedures described above were applied in the statistical analysis for the private investment and savings functions. The results of the existing studies on unit roots tests suggest that all the variables are I(1), implying that they need to be differenced once to transform them to stationary series.

The results of the estimated model over the period 1966 to 1989 yielded the following long run relationships for the private investment and savings functions:

$$IP = \underset{(2.922)}{0.052}\ GDP_{-1} + \underset{(6.075)}{1.358}IG + \underset{(4.044)}{0.451}IP_{-1} - \underset{-(3.617)}{69.99}\ D77 \qquad (7)$$

$R^2 = 0.962$ D-W = 1.790 DF = -4.397 $LMN[X^2(2)] = 1.337$

$SC1[F(1,19)] = 0.077$ $RESET\ [F\ (1,19)] = 0.924$

$HT_2\ [X^2(1)] = 0.520$

$$SP = \underset{(1.029)}{133.02} + \underset{(6.139)}{0.241}\ GDP - \underset{(-3.693)}{0.192}\ D - \underset{(-2.101)}{7.125}\ DEP - \underset{(-3.065)}{0.413}\ RFS + \underset{(2.728)}{1.165}\ TT_{-1} - \underset{(-4.349)}{92.281}\ D75 \quad (8)$$

$R^2 = 0.842$ $DW = 2.208$ $DF = -5.137$ $LMN[X^2(2)] = 2.181$

$SC1[F(1,15)] = 0.731$ $RESET\ F(1,15)] = 3.625$

$HT2\ [x^2(1)] = 0.082$

The Dickey-Fuller tests (DF) on the residuals suggest stationarity, indicating that the variables in each equation are cointegrated and that an error correction representation exists for each of the equations. These are reported in appendix (1) but for the purposes of examining the underlying savings investment gap we proceed with the estimated long-run estimates. In expressions (7) and (8), LMN is the Jargue and Bera (1980) normality test; SC1 is a Lagrange multiplier test for first order serial correlation and RESET is Ramsey's (1969) functional specification error test.

In both equations, the Lagrange multiplier test for autocorelation is not significant, satisfying a necessary condition for the residuals to be white noise, the Jargue Bera test suggests that the residuals are normal. The Ramsey RESET test does not indicate any problem with the functional forms.

Based on the series of diagnostic tests, it may be reasonably assumed that equations (7) and (8) are well specified statistically

and hence the estimated parameters may take on their expected economic interpretation.

The main variable driving private investment in Barbados appear to be real public investment, real gross domestic product, lagged one period and the level of real investment in the previous period. All these variables are significant at the conventional 5% level. The coefficient on the lagged real private investment variable suggests that investors generally achieve about 65% of their desired investment levels in a given period. With the public sector investment in Barbados largely concentrated in the provision of infrastructure, factory shells, and general social services, it is not surprising that public investment appear to complement private sector investment.

Although the change in real credit to the private sector, the change in real output, the user cost of capital and the stock of external debt were of the expected signs, none was significant enough to be retained in the final estimates. The results appear to corroborate other studies which suggest that neither lack of financing nor the cost of funds has been a constraint on investment in Barbados (See Worrell (1990).

An examination of the distribution of the error term in an earlier exploratory estimates of the investment equation indicated an outlier position for real private investment in 1977. Real private

investment declined significantly in that year, presumably, a lagged reaction to dramatic fall in private savings in 1975. It may also be attributable to a cautious attitude by the private sector as it awaited what new policies the new government, which came to office in late 1976, would introduce to arrest an uncertain economic environment of declining output and relatively high rates of inflation. A dummy variable (D77), defined as 1 in 1977 and 0 otherwise proved to be negative and significant.[3]

Real private savings appear to be largely determined by real output, the stock of real external debt outstanding, the real foreign savings, the terms of trade and the demographic dependency ratio. The real interest rate, the rate of inflation and the export growth rate were all of the right signs but were not significant. The signs on the coefficients of the real foreign savings and real debt variables appear to corroborate the general view in the literature that foreign savings in developing countries are substitutes for domestic savings.

The private sector appear to have reacted to the relatively high inflation rates in 1974 and 1975 with a dramatic decline in real private savings in 1975. Initial estimates indicated that the error term in that year was a complete outlier. As a result a dummy variable (D75) defined at 1 in 1975 but 0 otherwise was introduced. This was found to be highly significant.

Table 1 (p. 22) summarises the main results when the estimated equations (ii) and (iii) are utilised to verify the savings - investment relationship (i) for Barbados. The identity does not appear to hold for most of the 1975-89 period for which results have been reported. Identified real external inflows, while positive in many instances, have not been adequate enough to cover the gaps between real investment and savings. The results, therefore, appear to confirm the notion that we conventionally expected automatic macroeconomic relationship between savings, investment and the non-interest current account balance may not necessarily hold for developing countries.

Table 1

Net External Resource Inflows and the Savings Investment Gains.

OBS	DRDT	INPNT	EXTF	DIS	CAB
1975	7.283882	-5.538960	-1.7449922	82.79500	-83.80000
1976	3.709530	1.080495	2.629035	33.12070	122.3000
1977	0.739292	-1.320528	2.059820	78.81619	-90.70000
1978	23.09776	1.891470	21.20629	42.77910	-50.50000
1979	47.55682	-1.835732	49.39255	75.07764	-49.00000
1980	18.25000	-11.82099	30.07099	113.8629	-33.70000
1981	53.39661	-17.78722	71.18382	223.5159	-135.7000
1982	90.39700	-14.06235	104.4594	163.8353	-41.30000
1983	59.59210	-0.85209	60.44420	142.2065	-47.20000
1984	15.13239	-2.385008	17.51739	133.8514	9.900000
1985	38.58020	1.065290	37.51491	139.7343	34.70000
1986	32.62869	18.15517	14.47353	161.0351	-13.50000
1987	39.36353	14.64948	24.71405	335.8850	-43.80000
1988	-29.34183	10.53657	-39.87840	297.2617	1.800000
1989	-42.24258	-1.263869	-40.97871	299.5062	-1.900000

Note: DRDT = ΔD

INPUT = $r_f D$

EXTF = $\Delta D - r_f D$

DIS = $I - S$

CAB = the current account balance for Barbados in real 1975 prices.

However, the significant positive differential between real investment and savings gives an indication that nationally generated income has, in general, not been enough to support expenditure. The financing of this gap cannot be attributable only to identifiable net external flows for a number of reasons. In the case of Barbados, unidentifiable flows on the balance of payments have been quite significant. One may need to redefine ΔD in the model to take account of these unidentifiable inflows and other inflows such as foreign direct investment.

Secondly one needs to be explicit in explaining how increased domestic investment, and hence real output, is translated into exports, as domestically generated savings may not easily be translated into exports. Thirdly, the role played by data quality as well as limitations of the statistical analysis needs to be taken into account when interpreting the results.

Conclusions

An attempt has been made in this study to use conventional statistical analysis to investigate the savings - investment gap for a small open economy like Barbados. The results do not appear to corroborate the conventionally held view that the gap between investment and savings may automatically be equated to increases in the identifiable net resource transfers as defined by increases in the real external debt outstanding. Nevertheless, the results do point to the need for effective policies to ease domestic savings

in Barbados. The important role that fiscal policy should play to achieve this goal cannot be overemphasized.

FOOTNOTES

1. The relationship used was expressed as:

$$UCC = r_t q_{t-1} + dq_t - (q_t - q_{t-1})$$

where UCC = user cost of capital

r_t = the opportunity cost of capital (proxied by the yield on Barbados Government Debentures)

q = the capital asset price

d = the depreciation rate.

$(q_t - q_{t-1})$ = capital gains

2. Greene and Villanueva (1991) suggested that the real interest rate be defined as:

$$RINT = \left[\frac{1 + NINT}{1 + RPI_{t+1}} - 1 \right] \times 100$$

where RINT = real interest rate

NINT = nominal interest rate

RPI = retail price index

3. A test for structural stability, using the Chow (1960) test did not give any indication of structural change in 1977. A more rigorous test for parameter stability is envisaged when the paper is revised.

APPENDIX

The error correction representations of models (6) and (7) in the test, using the Granger - Engle (1987) two step procedure over the period 1967 - 1989 are reported below.

Real Private Savings

$$\Delta SP = \underset{(1.926)}{0.125}\Delta GDP - \underset{(-4.390)}{0.388}\Delta RFS + \underset{(3.073)}{1.009}\Delta TT(-1)$$

$$+ \underset{(1.154)}{0.127}\Delta SP(-1) - \underset{(-7.418)}{81.195}\Delta D75 - \underset{(-5.640)}{1.356}ECMSP(-1)$$

$R^2 = 0.908$ DW = 1.649 SE = 14.000
LMN $[X_2(2)] = 1.853$ SCI$[F(1,15)] = 1.527$
RESET $[F(1,15)] = 1.857$ $HT_2[X^2(1)] = 0.101$

Real Private Investment

$$\Delta IP = \underset{(2.539)}{0.203}\Delta GDP + \underset{(5.354)}{0.874}\Delta IP(-1) - \underset{(-2.997)}{47.523}\Delta D77$$

$$- \underset{(-5.456)}{1.531}\ ECMIP(-1)$$

$R^2 = 0.686$ DW = 2.350 SE = 19.8 LMN$[X^2(2)] = 1.642$
SCI$[F(1,18)] = 2.089$ RESET $[F(1,18)] = 1.259$
HT2 $[X^2(1)] = 1.372$

The main points of note are that changes in the dependency ratio and changes in the stock of real external debt do not seem to be significant in explaining short run changes in real private savings, although they form part of the long run equilibrium relationship. Similarly, while real positive investment play an

important part in determining long run real private investment demand, it was not significant in explaining the short run changes.

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