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Saving, Investment, Budget Deficits, and the
External Indebtedness of Developing Countries

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Summary

The paper investigates selected aspects of the external indebtedness of the developing countries. It examines the debt servicing capacity issue from the empirical side, while attempting to provide theoretical underpinnings for the relationships studied. Attention is focused on the role of domestic savings and investments as well as the budget deficits of the public sector in the widening of the current account deficits of the developing countries in recent years. The fundamental point is that when a country's current account deficit widens because of a fall in current income and savings, then the rise in indebtedness implies a fall in future consumption levels, as the debt must be serviced. However, when a current account deficit emerges because of an investment boom, then the economy is trading one asset, the debt instrument, for another, the claim to physical capital. To the extent that borrowed resources have been channeled into productive investments, such investments could be expected--given prudent management of the economy and maintenance of the competitiveness of the external sector--to generate a stream of returns sufficient to repay the original loans.

The first part of the paper considers the investment role of external finance in a growth framework. Brief expositions are provided of two growth-cum-debt models that examine the relationship between the external debt that arises from the current account deficit and the accumulation of physical capital in the economy through investment. The role of the public sector and the fiscal deficit in the widening of the current account deficits is also considered.

The second part of the paper is devoted to an empirical analysis of the relationship between domestic saving, investment and the fiscal deficit, on the one hand, and the current account deficit, on the other. The analysis focuses on 20 non-oil developing countries with the largest debt service payments in 1982 for which the requisite data could be assembled. The analysis uses both cross-section and time series data. The medium-term evolution of these variables in relation to GNP during the 14 years ended in 1981 is analyzed, with average ratios for the periods 1974-77 and 1978-81 compared with those of 1968-72. In addition to examining their associations, the causal links among these variables are also investigated for a small sub-sample of countries using the econometric technique required to address such questions.

The results of the study do not support the proposition that increases in external indebtedness among developing countries reflected overconsumption. Capital inflows did not partly or wholly displace domestic saving for the sample of countries examined. Increases in external deficits can in most cases be accounted for by expansion in investment (relative to total output) rather than by growth of consumption. Further, the results of the causality tests generally identify changes in saving and investment, treated separately, as primarily causes, rather than effects, of changes in current account balances. The data also indicate a close association between fiscal deficits and current account deficits. The basically optimistic conclusions of this paper are qualified in the final section which points out that countries' ability to repay debt depends not only on whether the initial borrowing sustained consumption or investment, but also, if the latter, on the quality of the investment spending.

I.   Introduction

The external debt situation of the non-oil developing world came under increasing pressure in 1981-83. For an unprecedented number of countries, the debt servicing burden reached critical proportions, as reflected in the record number of debt reschedulings, the sharp rise in external payment arrears, and these countries' increasing recourse to the Fund's credit facilities. Although there was a sharp slowdown in the growth rate of outstanding debt, primarily on account of the accumulated weight of past borrowings, the debt servicing burden intensified markedly for three major reasons: first, the disinflationary policies adopted by the industrial countries have entailed historically high nominal and real international interest rates and a consequent rise in borrowing costs; second, the marked hardening of borrowing terms in the mid-1970s, with the average maturity of new medium- and long-term bank loans falling from 10 years in 1973 to five years in 1975, contributed significantly to a "bunching" of amortization payments on medium- and long-term loans; third, owing to the world recession, there was a broad decline in the export earnings of many developing countries. The scale and apparently abrupt emergence of recent debt servicing

difficulties have heightened concern about the capacity of the developing
countries to sustain increasing debt burdens. The resolution of the
present debt servicing difficulties for many countries in the period,
ahead will depend, inter alia, on the degree of economic recovery in the
industrial world, the maintenance of an open trading system, the growth
of world trade, the extent of further progress in reducing international
interest rates and adoption of, or continued adherence to, sound financial
policies in the borrowing countries.

The purpose of this paper is to look at the debt servicing capacity
issue from the empirical side, while attempting to provide theoretical
underpinnings for the relationships studied. At the level of political
economy, it is undoubtedly necessary to analyze factors such as those
mentioned above as well as country-specific factors (e.g., political
stability, the rate of return on capital, the exchange rate, financial
and trade policies) in order to assess the external debt prospects of a
country. The wide range of factors that affects any particular debt
situation tends to rule out any easily applied formulae for judging a
sustainable level of external indebtedness. Indeed, the major short-
coming of the widely used ratio analysis in country risk assessment is
that it allows for only two of the many factors influencing debt servic-
ing capacity. It is generally assumed that a country with a high debt
service ratio--interest plus principal payments due in a given year
divided by the value of exports--is a poor risk because the probability
and the benefit to the debtor of default are greater. Yet developing
countries with high debt service ratios in a particular year may instead
be the best risks because a high ratio may merely reflect other factors
(such as high rates of return to capital and appropriate financial and
exchange rate policies) perceived by lenders as lowering risk and justi-
fying a higher level of debt. Further, the debt service ratio concentrates
only on the costs of debt in one year, and neglects the total obligations
owed by the country. The size of a borrower's debt and its debt service
payments at a point in time must be related to the anticipated growth
rate of exports. The ratio of debt service payments to exports will
tend to decline for a borrower whose exports are growing rapidly, and
such a borrower can afford a much higher level of external debt than one
whose exports are growing more slowly.

The emphasis in this paper is not on the debt situation of a coun-
try at a point in time but rather on the time path of the economy and
the accumulation of external debt and physical capital. Attention is
focused on the role of domestic saving and investment as well as the
budget deficit of the public sector in the widening of the current
account deficits of the developing countries in recent years. In
Section II, the well-known national income accounts identity is used to
decompose the current account deficit into its private and government
components, i.e., the private sector resource gap (surplus or deficit)

and the public sector resource gap (surplus or deficit). A growth-cum-debt model in which foreign borrowing is carried out by the government to assist in financing domestic expenditure plans is also presented in this section. Section III provides an empirical analysis of the role of domestic saving and investment in widening the current account deficits of developing countries, while Section IV contains an analysis of the budget deficit and its relation to the current account deficit. Section V uses the results of the previous two sections to shed some light on the issue of the sustainable level of external indebtedness in developing countries. We also provide in this section certain qualifications that attach to the statistical results of the paper. Finally, Section VI contains some concluding remarks.

II. Conceptual Issues

In this section, we first utilize the national income accounts identity to specify the relationship between the current account of the balance of payments and the saving, investment, and budget deficit variables for an open economy. The relationship between the external debt that arises from the current account deficit and the accumulation of physical capital in the economy via investment is discussed next, where use is made of two growth-cum-debt models. The exposition of these models helps to focus the analysis of the debt servicing difficulties of the developing countries in terms of the use made of the resources acquired through external borrowing in recent years.

In the well-known national income accounts identity, gross national product (GNP) is measured both by expenditure on final product and by the way in which the income that is generated in production is used.

$$C + I_p + I_g + G + (X - M) = GNP = C + S + T + R_f \qquad (1)$$

The left hand side of the identity indicates that expenditure on GNP is divided among private consumption (C); gross private sector investment (I_p); gross government investment (I_g); government spending for consumption-type goods and services (G); and net exports (X - M). The right hand side of (1) indicates that the income earned in production is used up in private consumption (C); saving by consumers and businesses (S); net tax payments (T); and transfer payments to foreigners by private citizens (R_f). Subtracting private consumption (C) from both sides of the identity, and rearranging, we have:

$$(M - X) - R_f = (I_p - S) + (I_g + G - T) \qquad (2)$$

In other words, the current account deficit equals the sum of the excess of private sector investment over private sector saving and the budget deficit of the government. This implies that, other things being equal, the current account deficit will be higher the greater is the accumulation of capital, the smaller is the accumulation of private wealth, and the larger is the budget deficit. But a deficit in the current account means a transfer of resources to the country in that some of the goods and services brought into the country are not paid for by an equivalent export of goods and services, but by a net increase in foreigners' claims on the country. 1/ Other things being equal, if a country's current account deficit widens because of a fall in current income and saving, or of a rise in consumption relative to income, then the rise in indebtedness implies a fall in future consumption levels, as the debt must be serviced out of an at best unchanged level of output. However, if a current account deficit results from increased investment, then the economy is trading one asset, the debt instrument, for another, the claim to physical capital. To the extent that borrowed resources have been channeled into productive investments, such investments could be expected--given prudent management of the economy and maintenance of the competitiveness of the external sector--to generate a stream of returns at least sufficient to repay the associated loans.

Several models have been developed in the literature which put this investment role of external finance in a growth framework. The direct focus of these models has been on describing how debt situations evolve over time, and the analysis of the evolution of debt is used to cast light on the sustainability of different debt situations (e.g., Avramovic (1964), Soloman (1977), and Nowzad and Williams (1981)). In the model developed by Solomon, the debt-output ratio will reach a finite limit only if the rate of growth of output is greater than the real interest rate.

In Solomon's model, all external debt is assumed to finance the gap between investment and domestic saving; changes in reserves and capital inflows other than interest-bearing debt are ignored. All prices are assumed to be constant, and amortization of past loans is ignored on the assumption that scheduled loan repayments are offset by new borrowing. Investment and saving are related to income as follows:

1/ In total, the current account deficit must be reflected by changes in the net asset position, irrespective of whether these take place through a reduction in foreign assets (including international reserves) or through borrowing.

$$I(n) = krY(n) = krY_0 e^{rn} \tag{3}$$

$$S(n) = sY(n) = sY_0 e^{rn} \tag{4}$$

where I and S are investment and saving net of depreciation, Y is net national product, k is the incremental capital-output ratio, r is the growth of real and nominal net national product and income, s is the ratio of domestic saving to net national income, n represents time, and the subscript zero denotes the year before debt began to be incurred.

The debt outstanding, D, at time, T, is the sum of loans taken up to finance the gap between investment and domestic saving from the time the process began, together with the accumulation of interest, i, at a compound rate on each of these loans from the time at which it was incurred to time T:

$$D(t) = \int_0^T (I(n) - S(n))e^{i(T-n)}dn \tag{5}$$

$$= \int_0^T (krY_0 e^{rn} - sY_0 e^{rn})e^{i(T-n)}dn \tag{6}$$

Solomon has shown that the ratio of debt to income in the limit is

$$\lim_{T \to \infty} \frac{D(T)}{Y(T)} = \frac{kr-s}{r-i}, \text{ if } r > i \tag{7}$$

Thus, if the rate of growth of output exceeds the rate of interest on external borrowing, the debt-output ratio levels off ultimately at $(kr - s)/(r - i)$. But if the rate of growth of output is not greater than the rate of interest on external borrowing, then there is no limit to the debt-output ratio, and the country's debt policies are not sustainable. In this Domar-like model, everything depends on the relationship between interest rates and growth rates.

There are, however, certain characteristics of developing countries and their external loans which need to be mentioned as qualifications to the point just made. First, central governments and public agencies are the major borrowers of external funds in developing countries. Second, returns to government investment often accrue to the private sector since a large item in government investment is usually expenditure on social overhead capital. Instead of getting a direct return from its investment expenditures, the government relies on increases in the tax base (national output) to meet its revenue needs for debt servicing requirements. This difference between the agents that benefit from the investment expenditures (the private sector) and the agents that bear

the repayment obligations (the government) distinguishes borrowing by
developing countries from the traditional treatment of optimal foreign
borrowing which yields the rule that the marginal rate of return to
investment should be equated with the marginal cost of funds. Kharas
(1981) has developed a growth-cum-debt model which takes account of
these characteristics, and a brief exposition of his model is provided
below.

The fundamentals of Kharas' model are as follows. Output (Y) is
assumed to be produced according to a fixed-coefficient technology
so that efficiency considerations relate it directly to the domestic
capital stock (K).

$$Y = \beta K \qquad\qquad (8)$$

Aggregate private consumption is based on net-of-tax private income,
and it is assumed that the private sector obtains the returns from all
domestic capital.

$$C_p = C_0 + c(1 - t)Y \qquad\qquad (9)$$

Since it is also assumed that the private sector does not borrow from
abroad, private investment is equal to private domestic saving. The
government obtains revenue from taxes and from borrowing externally, F.
It services its outstanding external debt, D, paying interest at a rate
r and amortization at a rate θ and allocates a fixed proportion, a_2, of
remaining resources to investment.

$$I_g = a_2[tY + F - (r + \theta)D] \qquad\qquad (10)$$

This implies that total investment in the country is the sum of government
investment and private domestic saving (S_p).

$$I = I_g + S_p = aK + a_2 (F - (r + \theta)D) - C_0 \qquad\qquad (11)$$

where $a = \beta [(1 - c)(1 - t) + a_2 t]$

The accounting identity of gross new borrowings less repayment of principal
gives the change in outstanding debt over time.

$$\dot{D} = F - \theta D \qquad\qquad (12)$$

If the capital stock depreciates at a constant rate, δ, the growth-
cum-debt development may be written as a function of the level of capital
inflows and the initial values of domestic capital and outstanding debt.

$$\dot{K} = a_1 K + a_2 [F - (r + \theta)D] - C_o \qquad (13)$$

where $a_1 = a - \delta$

According to this model, the government will set the level of foreign capital inflow in each time period so as to maximize some national income or consumption objective, subject to the constraint that long-run credit-worthiness be maintained (i.e., that tax revenues expand fast enough to cover the interest on the external debt). Kharas has shown that this constraint allows external borrowing to take place only when $a_1 > r$. This is intuitively plausible since the coefficient a_1 reflects the marginal future expansion of the tax base (and tax revenues) when one unit of domestic capital is added to the economy, while r is the marginal future cost of borrowing.

More generally, then, external borrowing permits developing countries to maintain domestic investment at levels beyond those that could be financed through domestic saving alone. It is the gap between domestic saving and investment which generates the external debt, while output and the capital stock grow as the result of the investment process. Provided the rate of return on domestic investments exceeds the cost of borrowed funds, the ensuing growth of output makes it feasible ultimately to close the gap between domestic saving and investment in order to repay the external loans. Thus, the ease with which external loans can be expected to be repaid will depend, in large part, upon the use to which the resources acquired through increased external borrowing have been put. If these resources have been channeled into productive investments, under the conditions hypothesized above, these investments could be expected to generate the stream of returns required to repay the original loans. If, on the other hand, the resources were used, directly or indirectly, to sustain consumption, repayment of the indebtedness must be, at least to some extent, at the expense of future levels of consumption, a far more onerous prospect. It is, therefore, of considerable interest to know whether the increased indebtedness of the non-oil developing countries reflects increased investment or increased consumption, i.e., whether a stream of real resources is likely to be generated which will permit the eventual repayment of the foreign liabilities. In this respect, the Kharas model, among others, points to the often crucial role of the public sector in the widening of the current account deficit.

The relevance of the questions just posed for developments over the next several years varies sharply across countries. Countries in a comparatively advanced stage of development have been in a position to invest in projects that provide relatively quick returns in the form of expanded output. For these countries, the uses to which past borrowings have been put will have a major impact on the speed with which they can reverse their current difficulties. Many other countries, on the other hand, are at a stage of development requiring large-scale infrastructural investments in roads, dams, harbors, education, etc., the returns on which, while likely high, tend to be long delayed and often difficult to appropriate for repayment purposes. For these countries, the particular uses to which past borrowings have been put are less germane to their immediate prospects which depend heavily on the outlook for the world economy and official long-term development assistance. These countries are, therefore, excluded from the analysis to follow which focuses instead on countries which have reached a more commercial footing. Specifically, the analysis covers the 20 non-oil developing countries with the largest debt service payments in 1982 for which the requisite data could be assembled. 1/

III.   Saving, Investment, and the Current Account Deficit

The role of domestic saving and investment in the widening of the current account deficits of the developing countries is analyzed in this section. The data used are the external balance on goods, services, and private transfers as reported in standardized balance of payments statistics, 2/ gross investment, 3/ gross national saving (derived residually as the difference between GNP and the sum of private and public

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1/ Argentina, Brazil, Chile, Colombia, Ecuador, Greece, India, Korea, Malaysia, Mexico, Pakistan, Peru, Philippines, Portugal, Singapore, Sri Lanka, Thailand, Turkey, Yugoslavia, and Zaire.

2/ This balance is equivalent to a comprehensive measure of the net financial flows (inward for most non-oil developing countries) through which it is settled. Apart from receipts of official grants, inflows of private direct investment, and changes in official reserves, the balance on current account is also equivalent to net external borrowing in a literal sense.

3/ It should be emphasized that, even on a conceptual level, the distinction between investment and consumption expenditure is sometimes blurred. Certain components of investment, such as housing and some other types of construction, may be seen as items on which income is spent, that is as consumer durables rather than productive instruments for generating future income. Conversely, some items which are classed

consumption), and GNP. 1/ We first analyze the medium-term evolution of these variables in relation to GNP during the 14 years ended in 1981, with average ratios for the periods 1974-77 and 1978-81 compared with those of 1968-72. The 1968-72 period may be generally characterized as one of rapid growth and sustainable external positions. Results for the 1974-77 period, on the other hand, incorporate some of the effects of and adjustments to the first round of oil price increases and the 1974-75 recession. Similarly, the results for the 1978-81 period reflect the effects of the second round of oil price increases, the rise in nominal and real interest rates on international capital markets, and the renewed slowdown in the growth of the world economy. It should be noted, however, that the four-year averages, while appropriate to the question addressed in this paper, conceal much of the dynamics of the adjustments made by these countries in response to the shocks of the past ten years.

Examination of these data provides scant evidence for the proposition that the increase in indebtedness among the non-oil developing countries accommodated increases in the propensity to consume. Savings as a per cent of GNP increased in three fourths of the countries surveyed over the years from 1968-72 to 1974-77. On a median basis, the propensity to save rose by some 2 1/2 percent of GNP, from 18.0 to 20.7 percent. Savings rates typically increased even further in the ensuing four years, and, on a median basis, reached 21.7 percent of GNP. During those years, (1978-81) all but two of the 20 countries surveyed had savings rates equal to or higher than those of the 1968-72 period. 2/

Despite the movement toward higher savings rates, most countries increased their external deficits in relation to GNP over the periods considered here. This latter shift, however, was not nearly as pronounced as that for saving. Thus the median increase in the external

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3/ cont'd from p. 9. as consumer goods, such as simple tools and maintenance supplies, are similar to capital goods in their effects on increasing output and productivity. Moreover, beyond these difficult conceptual issues, faulty statistical estimation techniques are a problem in many developing countries. Therefore, analytical results based on national income accounting data, such as those presented here, need to be interpreted with due caution.

1/ The basic data were obtained from Research Department data files and IMF, International Financial Statistics.

2/ In a very useful paper, Sachs (1981), has also examined the role of domestic saving and investment in the widening of the current account deficits of the developing countries. The results of this paper are in agreement with those obtained by him. However, he makes an error in his calculation of domestic saving from the GNP identity because he adds on transfer payments to GNP, and since they are already included in GNP, there is double-counting.

deficit from 1968-72 to either 1974-77 or 1978-81 amounted to only about 1 per cent of GNP, i.e., considerably less than the corresponding rise in saving. Further, a significant number of countries (up to one third of the sample group in the first comparison period) registered improvements in their external accounts instead of deteriorations.

A more direct look at the relationship between saving and external balances is provided by the accompanying charts which plot changes in savings rates, on the vertical axis, against changes in current account balances, on the horizontal axis. (Chart 1 depicts changes over the period from 1968-72 to 1974-77 whereas Chart 2 depicts cumulative changes from 1968-72 to 1978-81.) In these charts, the shift toward higher savings rates is apparent from the clustering of the observations in the upper quadrants. Similarly, the (considerably less pronounced) shift toward increased external deficits is indicated by the predominance of the observations in the left hand quadrants.
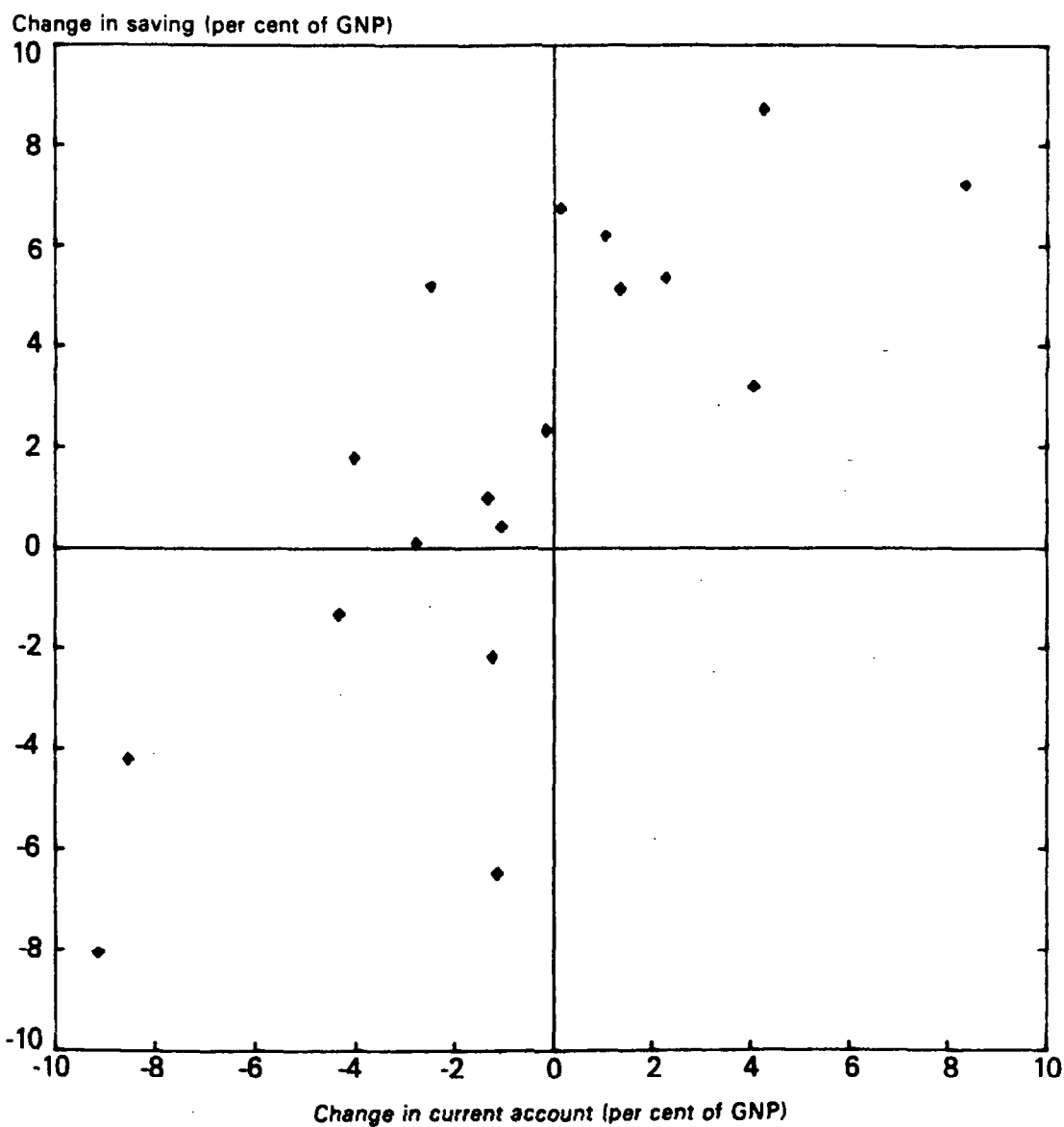
If savings were the only determinant of the current account balance, one would expect a one-to-one relationship between the two. Increases in domestic saving lessen the need for foreign saving and vice versa. In terms of the charts, this means that all observations would fall on a positively sloped 45 degree line running through the central axis of each chart. Clearly, this is not the case, partly because of measurement errors--the current account data are taken from balance of payments rather than national accounts records--but mainly because of the omission of other important factors. Nevertheless, the positive association between changes in saving and changes in current balances that one would expect from the national accounts identities is apparent in the charts, especially the first. That is, increases in savings rates did generally go hand-in-hand with positive shifts in current account balances and vice versa. Of greater moment in the present context, however, is the upward displacement of this positive association so that the locus of points runs through the upper left hand quadrant of the charts instead of through their central axis. Increases in savings rates generally exceeded the corresponding increases in external balances by a considerable margin. Similarly, deteriorations in current account balances typically exceeded the corresponding changes in savings rates, which, most often, were positive rather than negative. The implication of all this, of course, is that increases in savings rates among countries that incurred increased deficits were even larger than suggested earlier once account is taken of the contemporaneous developments in their current account balances. On the face of it, therefore, it seems difficult to argue that the increased external borrowing of the non-oil developing countries was used in any direct way to sustain consumption, i.e., as a substitute for domestic saving.

The counterpart to these large saving shifts--shifts that do not
find their counterpart in corresponding improvements in current account
balances--is of course large contemporaneous increases in domestic
investment. Some 80 per cent of the countries surveyed accelerated
their investment spending in relation to GNP over the periods considered
here (as shown, e.g., by the preponderance of observations in the upper
quadrants of Charts 3 and 4). On a median basis, the propensity to
invest rose from 18.9 per cent of GNP in the 1968-72 period to 21.9 per-
cent in 1974-77 and 23.6 per cent in 1978-81. These upward shifts of
the investment function are, in part, the counterparts to the upward
displacement of the relationship between saving and external balances
noted above. That is, the upward shifts in savings rates were matched
and indeed often exceeded by corresponding shifts in the propensity to
invest. Hence, most countries incurred increased external deficits
despite higher savings rates. The significant point is that, on balance,
the increases in deficits seem much more likely to have been occasioned
by increases in the propensity to invest than in the propensity to consume.

The evidence presented above is of course suggestive rather than
definitive. In the first place, individual country experiences as depic-
ted in the charts are too heterogeneous to accord neatly with any very
simple generalization. More fundamentally, the evidence points only
to associations between variables, and not to the nature of the causal
links among these variables. The latter question has, however, been
investigated for a small sub-sample of countries using the econometric
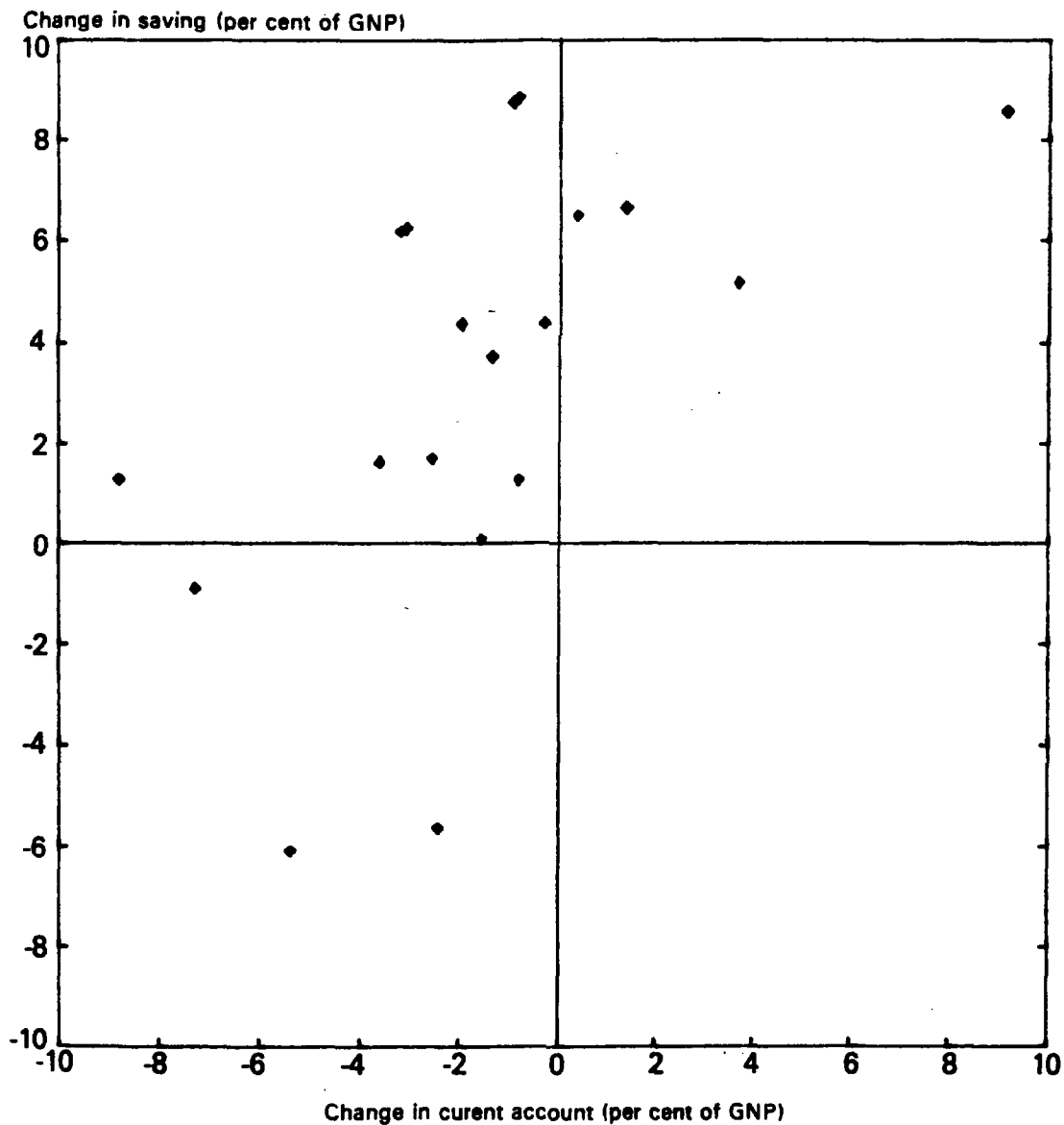techniques developed to address such questions.

The methodology followed to analyze the pairwise relationships
between the current account deficit and domestic saving and investment
is the time series technique developed by Granger (1969) and Sims (1972).
These methods are referred to in the literature as "tests of causality,"
and have been used to analyze relationships between such macroeconomic
variables as the rate of growth of the money supply and the rate of in-
flation (Feige and Pearce, 1976), or the rate of growth of international
reserves and the rate of inflation (Khan, 1979). Such statistical tech-
niques can provide information not only on whether saving or investment
"caused" the current account deficits of the non-oil developing countries,
but also on whether foreign capital inflows had an adverse effect on
domestic saving as has been argued by some researchers. The countries
for which causality tests are reported were selected from the sample of
countries described above on the basis of the availabililty of data
series for 25-30 years for current account balances, domestic saving,
investment, and budget deficits. The definition of causality employed
here is that given by Granger, which is based upon an incremental pre-
dictability criterion. This choice is discussed in detail in the Appendix.

CHART 1

CHANGES IN SAVING AND CURRENT ACCOUNT
BALANCES: FROM 1968-72 TO 1974-77[1]

Change in saving (per cent of GNP)

Change in current account (per cent of GNP)

[1]Not shown in the chart are the plots for two countries that incurred changes in current account balances of ·17 per cent and 1 per cent and changes in savings rates of ·18 per cent and ·11 per cent, respectively.

CHART 2
CHANGES IN SAVING AND CURRENT ACCOUNT
BALANCES: FROM 1968-72 TO 1978-81[1]

Change in saving (per cent of GNP)

Change in curent account (per cent of GNP)

[1]Not shown in the chart is the plot for a country that incurred a change in its current account balance of 12 per cent and in its savings rate of 4 per cent.

CHART 3

CHANGES IN INVESTMENT AND CURRENT ACCOUNT BALANCES: FROM 1968-72 TO 1974-77[1]

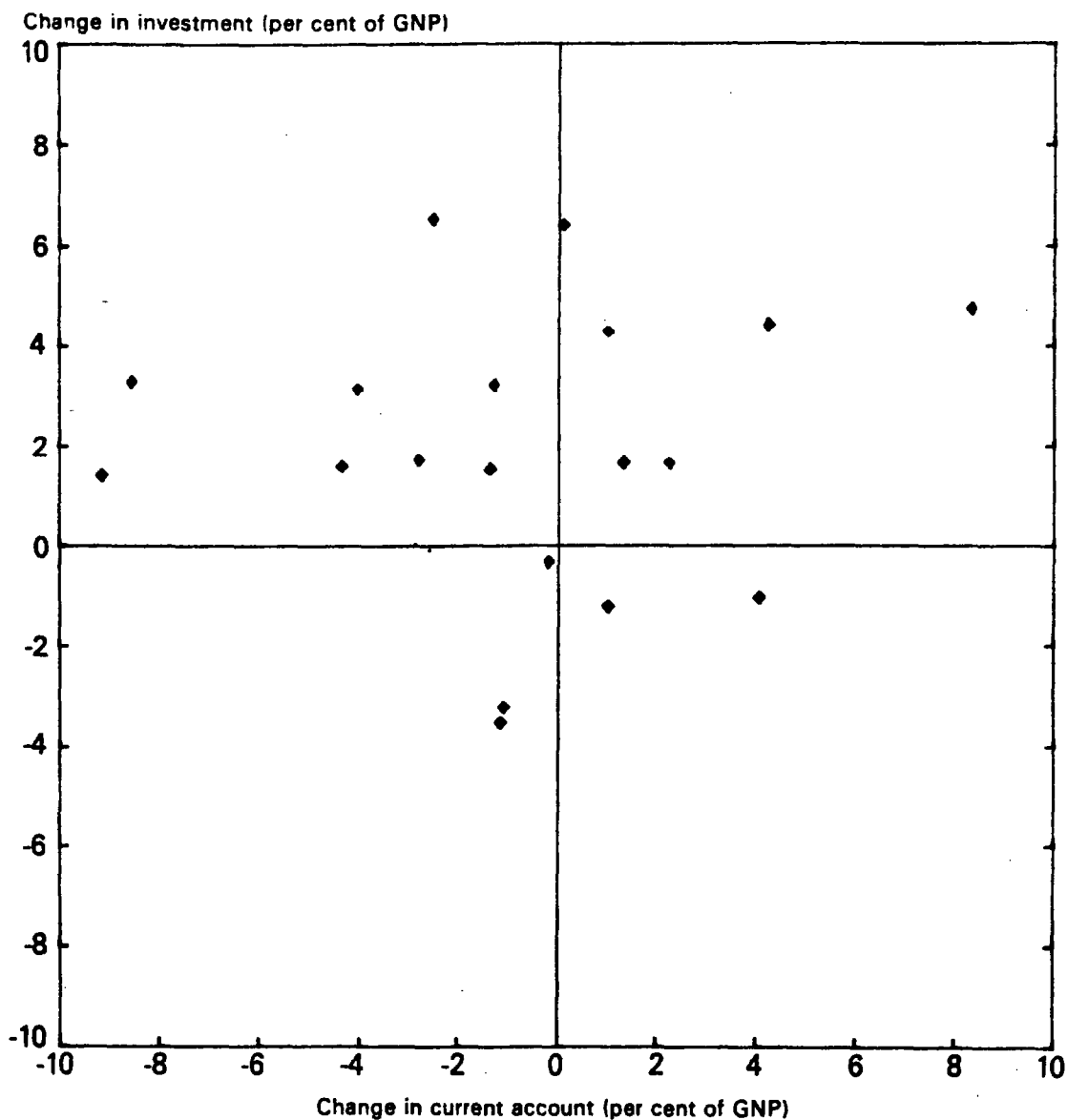Change in investment (per cent of GNP)

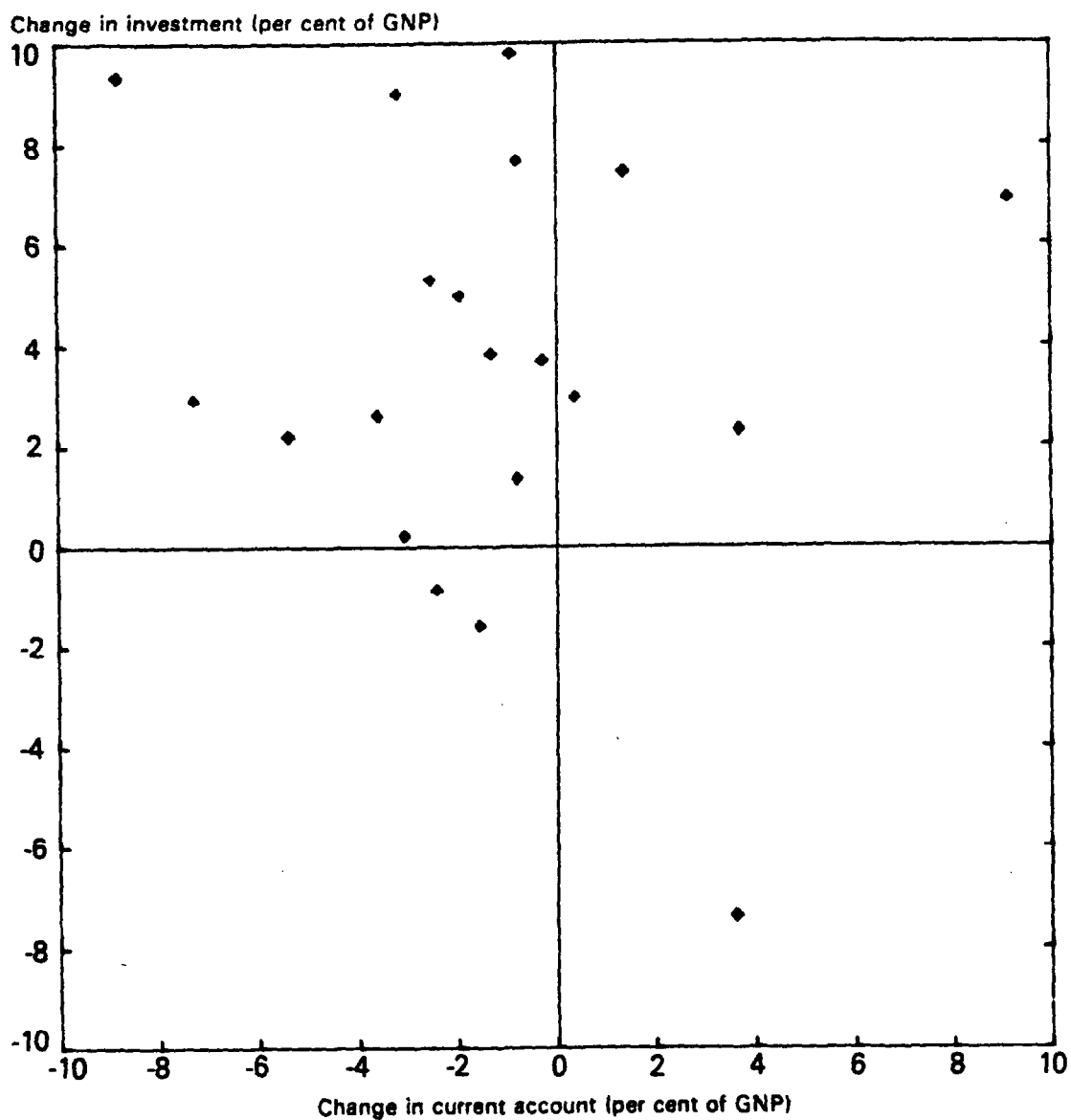
Change in current account (per cent of GNP)

[1]Not shown in the chart is the plot for a country that incurred a change in its current account balance of -17 per cent and a change in its investment ratio of 5 per cent.

CHART 4

CHANGES IN INVESTMENT AND CURRENT ACCOUNT
BALANCES: FROM 1968-72 TO 1978-81

Change in investment (per cent of GNP)

Change in current account (per cent of GNP)

Tables 1 and 2 summarize the results of the causality tests for saving, investment, and the current account deficit for seven developing countries: Argentina, Brazil, Greece, Korea, Mexico, Philippines, and Thailand. The results of the tests support the conclusion drawn from the scatter diagrams above of a discernible association between the current account balance on the one hand and domestic saving and investment on the other. With the exception of Argentina, the countries show some form of causal relationship among the time series.

The results of the causality tests generally point to changes in saving and investment as being primarily the causes rather than the effects of current account changes. Given the large size of the economies in question relative to their international transactions, these results are perhaps not too surprising. Nevertheless, they are reassuring. A finding that savings behavior reflected primarily developments on current account would have implied that capital inflows partly or wholly displaced domestic saving, i.e., implicitly sustained consumption. In fact, the finding is that current account changes typically reflected saving shifts rather than the converse so that there is correspondingly less room for the phenomenon just mentioned. On investment, the proposition that current account changes predominantly reflected changes in investment spending is hardly controversial. However, the opposite relationship is also found in a significant number of cases, i.e., investment seemingly being partly the result of current account changes (as well as vice versa), which suggests that foreign exchange constraints may have inhibited investment spending in these countries.

IV. Budget Deficit and the Current Account Deficit

The foregoing discussion has concentrated on the link between total (private and public) saving and investment on the one hand and the current account deficit on the other. From the national income accounts identity, the current account deficit is equal to the gap between national savings and investment (or the gap between national income and expenditure). But it was shown in Section II that by splitting investment and saving into their private and government components, the current account deficit could also be decomposed into its private and government components, i.e., the private sector resource gap (surplus or deficit) and the public sector resource gap (surplus or deficit). In Section II we also discussed a model which showed the importance of the fiscal deficit in the analysis of the current account deficits and external indebtedness of developing countries. Accordingly, the relationship between budget deficits and the current account deficit is analyzed in this section.

Table 1.   Causality Tests on Saving and the Current Account Balance

Country	Null Hypothesis [1]	F-Statistic [2] (Degrees of Freedom)	Result	Causality
Argentina	H_{cs}	1.19 (1,25)	Accept)	
	H_{sc}	0.28 (1,25)	Accept)	Independent [3]
Brazil	H_{cs}	0.64 (1,26)	Accept)	
	H_{sc}	2.24 (1,26)	Accept)	Independent [3]
Greece	H_{cs}	18.01 (1,22)	Reject)	
	H_{sc}	11.97 (1,22)	Reject)	Saving ↔ current account
Korea	H_{cs}	6.38 (1,35)	Reject)	
	H_{sc}	4.37 (1,35)	Reject)	Saving ↔ current account
Mexico	H_{cs}	0.10 (1,24)	Accept)	
	H_{sc}	9.94 (1,24)	Reject)	Saving → current account
Philippines	H_{cs}	1.22 (1,27)	Accept)	
	H_{sc}	3.90 (1,27)	Reject)	Saving → current account
Thailand	H_{cs}	0.32 (1,25)	Accept)	
	H_{sc}	3.16 (1,25)	Reject)	Saving → current account

[1] H_{cs} is the null hypothesis that current account balance does not cause saving; i.e., the coefficients of past values of the current account balance variable are insignificantly different from zero in the regression equation. H_{sc} is the null hypothesis that saving does not cause the current account balance.   Thus, acceptance of the null hypothesis implies lack of causation.

[2]   The specific F-test is given by equation 2 in the Appendix.   The test was conducted at the 10 per cent significance level.

[3]   The two series are either statistically independent or related contemporaneously but in no other way.

Table 2.   Causality Tests on Investment and the Current Account Balance

Country	Null Hypothesis [1]	F-Statistic [2] (Degrees of Freedom)	Result	Causality
Argentina	H_{ci}	0.02 (1,25)	Accept)	
	H_{ic}	0.85 (1,25)	Accept)) Accept)	Independent [3]
Brazil	H_{ci}	1.52 (1,27)	- Accept)	
	H_{ic}	3.15 (1,27)	) Reject)	Investment ⟶ current account
Greece	H_{ci}	15.82 (1,22)	Reject)	
	H_{ic}	9.52 (1,22)	) Reject)	Investment ⟷ current account
Korea	H_{ci}	6.88 (1,35)	Reject)	
	H_{ic}	5.54 (1,35)	) Reject)	Investment ⟷ current account
Mexico	H_{ci}	7.38 (1,24)	Reject)	
	H_{ic}	9.81 (1,24)	) Reject)	Investment ⟷ current account
Philippines	H_{ci}	1.35 (1,27)	Accept)	
	H_{ic}	4.27 (1,27)	) Reject)	Investment ⟶ current account
Thailand	H_{ci}	5.75 (1,25)	Reject)	
	H_{ic}	3.29 (1,25)	) Reject)	Investment ⟷ current account

[1] H_{ci} is the null hypothesis that current account balance does not cause investment; i.e., the coefficients of past values of the current account balance variable are insignificantly different from zero in the regression equation. H_{ic} is the null hypothesis that investment does not cause the current account balance. Thus, acceptance of the null hypothesis implies lack of causation.

[2] The specific F-test is given by equation 2 in the Appendix. The test was conducted at the 10 per cent significance level.

[3] The two series are either statistically independent or related contemporaneously but in no other way.

Examining first the medium-term evolution of the budget deficit variable in relation to GNP during the 14 years ended in 1981 (with average ratios for the periods 1974-77 and 1978-81 compared with that of 1968-72), the data indicate that the budget deficit for the sample of countries widened during the periods of larger current account deficits. On a median basis, the budget deficit as a per cent of GNP increased from 2.6 per cent in the 1968-72 period to 2.7 per cent in 1974-77 and 3.6 per cent in 1978-81.

A more direct look at the relationship between the fiscal balance and the current account balance is provided in Charts 5 and 6. These charts are scatter plots of changes in the average budget balance/GNP, on the vertical axis, against changes in the average current account balance/GNP, on the horizontal axis. (Chart 5 depicts changes over the period from 1968-72 to 1974-77, whereas Chart 6 shows cumulative changes from 1968-72 to 1978-81.) The scatter diagrams indicate that both the current account deficit and the budget deficit deteriorated for most of the countries in the sample; most of the points are in the southwest quadrant. A positive correlation between improvements in the current account balance and in the fiscal balance is also indicated.

The relationship between the government deficit and the current account deficit was further tested using pooled cross-section time series data for the sample of 20 developing countries. The data for each country comprised nine annual observations for the period 1972-80. 1/ The equation estimated was in linear form: $(CA/GNP) = \alpha_0 + \alpha_1(FB/GNP)$; where (CA/GNP) is the current account balance as a percent of GNP and (FB/GNP) is the fiscal balance as a per cent of GNP. Allowance was made for cross-country differences through the addition of 19 dummy variables to the estimated equation. Slope dummies were not introduced because it was assumed that the parameter α_1 was the same across countries. As a consequence, the estimate of the slope coefficient can be interpreted as that of an "average" or "typical" developing country, rather than that of any specific country.

$$(CA/GNP) = 0.66 \ (FB/GNP) \ \underline{2/} \qquad\qquad (14)$$
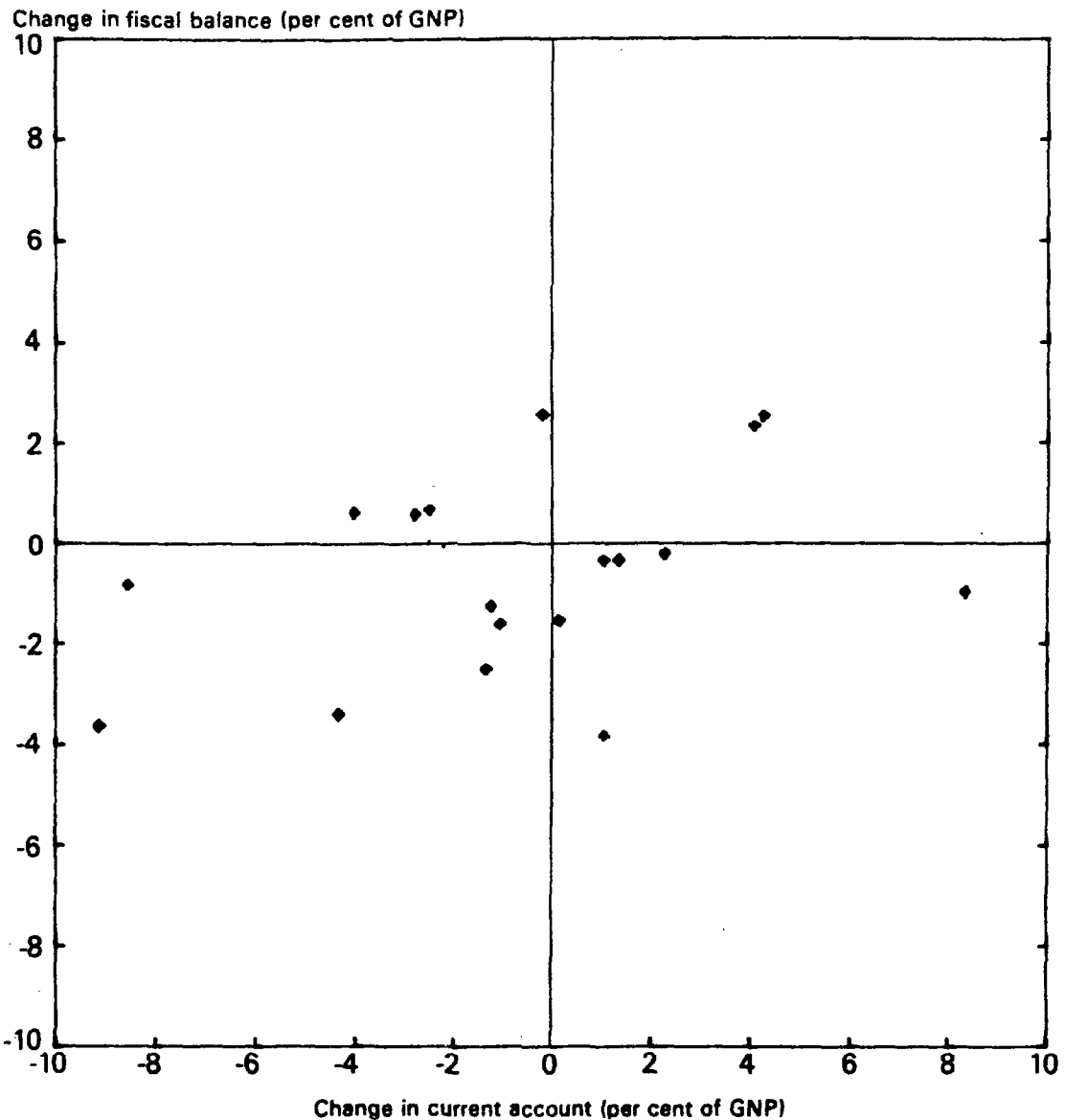$$(5.94)$$

$$\overline{R}^2 = 0.52 \qquad\qquad SEE = 0.038$$

The regression results support the proposition of a positive relationship between the government deficit and the current account deficit, but do not identify the direction of causation.

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1/ This yielded 180 observations for the variables.

2/ Figures in parentheses are t-values.

CHART 5

CHANGES IN FISCAL BALANCES AND CURRENT ACCOUNT BALANCES: FROM 1968-72 TO 1974-77[1]

Change in fiscal balance (per cent of GNP)

Change in current account (per cent of GNP)

[1]Not shown in the chart are the plots of two countries that incurred changes in current account balances of -17 per cent and -1 per cent and changes in fiscal balances of -10 per cent and -12 per cent, respectively.

CHART 6

CHANGES IN FISCAL BALANCES AND CURRENT ACCOUNT BALANCES: FROM 1968-72 TO 1978-81[1]

Change in fiscal balance (per cent of GNP)

Change in current account (per cent of GNP)

[1]Not shown in the chart is the plot for a country that incurred a change in its current account balance of -7 per cent and in its fiscal balance of -17 per cent.

Causality tests were conducted for the budget balance and the current account balance, and the results are reported in Table 3. 1/ The causal linkages between the current account and fiscal balances are quite mixed, with each affecting the other as often as not. For two of the five countries, the results indicate feedback; for Thailand, unidirectional causality exists from the current account deficit to the budget deficit, and, for Greece, unidirectional causality exists from the budget deficit to the current account deficit.

The presence of bidirectional causality between budget and current account balances is not a surprising result. On the one hand, higher commodity prices or export volumes generated by increased world demand will not only raise export earnings and improve the current account but also reduce the fiscal deficit (since taxes on export earnings are a significant source of revenue in many developing countries). Furthermore, an increase in export prices or volumes will raise domestic income and therefore lessen the need for an expansionary or countercyclical fiscal policy. On both of these accounts, an improvement in the current account balance could be expected to be reflected in an improvement in the fiscal balance. On the other hand, governments running large budget deficits have borrowed heavily in international capital markets. Further, even when a budget deficit is financed not by external borrowing but by excessive money creation, there is likely to be an adverse effect on the current account. Excessive monetary expansion in an economy with a fixed exchange rate will cause disequilibrium in the money market and will result in increased import demand and a larger current account deficit, other things being equal. 2/

V.   Perspective on the Debt Situation of Developing Countries

The results of the present study indicate that the developing countries, by and large, borrowed to invest rather than to consume. It was observed that for most of the countries that borrowed heavily in the

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1/   Causality tests for the budget and current account balances were not done for Argentina and Mexico because of a lack of the requisite number of observations.

2/   Even if there are strict controls over imports, large budget deficits financed by money creation will tend to have an adverse effect on the current account. The excess supply of money will be spent on domestic goods, both nontradeables and exportables. This will raise the price of nontradeables and, depending on what assumption is made, either raise or leave unchanged the price of exportables. A rise in the price of exports will reduce foreign demand, unless there is the unlikely, perfectly inelastic foreign demand curve. Alternatively, if the small country assumption is made (i.e., that the price of tradeable goods is

Table 3. Causality Tests on the Budget Balance and the Current Account Balance

Country	Null Hypothesis [1]	F-Statistic [2] (Degrees of Freedom)	Result	Causality
Brazil	H_{cb}	0.25 (1,27)	Accept)	
	H_{bc}	1.46 (1,27)	) Accept)	Independent [3]
Greece	H_{cb}	2.28 (1,22)	Accept)	
	H_{bc}	3.96 (1,22)	) Reject)	Budget → current account
Korea	H_{cb}	3.92 (1,35)	Reject)	
	H_{bc}	5.18 (1,35)	) Reject)	Budget ←→ current account
Philippines	H_{cb}	5.05 (1,20)	Reject)	
	H_{bc}	10.93 (1,20)	) Reject)	Budget ←→ current account
Thailand	H_{cb}	4.24 (1,25)	Reject)	
	H_{bc}	0.11 (1,25)	) Accept)	Current account → budget

[1] H_{cb} is the null hypothesis that the current account balance does not cause the budget balance; i.e., the coefficients of past values of the current account balance variable are insignificantly different from zero in the regression equation. H_{bc} is the null hypothesis that the budget balance does not cause the current account balance. Thus, acceptance of the null hypothesis implies lack of causation.

[2] The specific F-test is given by equation 2 in the Appendix. The test was conducted at the 10 per cent level of significance.

[3] The two series are either statistically independent or related contemporaneously, but in no other way.

preceding decade, the rates of saving and investment increased during
the period of widening current account deficits. However, this con-
clusion does not at all mean that these countries acquired immunity
against difficulties in managing the resultant debt. Indeed, devel-
opments in recent years furnish strong evidence to the contrary. A
number of countries that apparently spent the proceeds of heavy external
borrowing on investment have nevertheless run into serious problems.
The reasons for this are complex, and are to a considerable extent rooted
in global economic developments and the domestic financial policies
followed in these countries. Other reasons, however, tied closely to
certain aspects of investment spending per se, are also important. In
this section, we provide a brief discussion of these issues insofar as
they may serve to qualify unduly optimistic interpretations of the
statistical results that have emerged from the analysis in this paper.

If artificially low interest rates and overvalued exchange rates
lead to excessive use of capital and imported inputs, then the cost of
external borrowing may exceed the return on domestic investment. It
is important, therefore, that incorrect pricing of capital is avoided
in developing countries so that appropriate domestic investments can
be counted on to enhance future consumption possibilities. It is ap-
parent, but perhaps still worth repreating, that accurate measures of
the rate of return to capital should be available before decisions re-
garding investment projects are taken. It is often assumed that because
developing countries have a relatively small capital stock and an abun-
dance of labor, the marginal productivity of capital and the rate of
return to capital must be high, at least in the modern sector of the
economy. The marginal productivity of capital, however, is a function
also of the level of technology, which is likely to be lower in developing
countries than in industrial countries. Furthermore, one must distinguish
between the rate of return to capital and the marginal productivity of
capital. The rate of return to capital includes capital gains and losses.
In developing countries which are modernizing their capital stock with
new capital goods which embody more productive technology, the marginal
productivity of the capital may be high for new investments. But a

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2/ cont'd from p. 17.   determined even in the short run as the product
of the exchange rate and the foreign price of tradeable goods), then
there will be a relative price effect which will reduce the supply of
exports. This is because the price of exportables will remain unchanged
while the price of nontradables increases, inducing a shift in production
away from exportables and in favor of nontradeables. The supply of
exports will also decline as domestic demand for exportables increases.
The reduction in exports will cause a deterioration in the current account
position.

rapid rate of embodied technical progress will place the rate of return
to capital below the marginal productivity of capital because of the
capital losses resulting from obsolescence which the new capital goods
inflict on the older capital stock. Since capital stock modernization
creates a wedge between the marginal productivity of capital and the
rate of return, this disparity should be taken into consideration during
the selection of projects and investment plans.

A related and very important point is the pace and timing of in-
vestment expenditures. Although there may be high returns to certain
projects, notably large-scale investments in major industries and infra-
structures, these returns are often long delayed. Therefore, when
investments in such projects are undertaken, then particular emphasis
should be given to the maturity structure of foreign loans. In order to
avoid liquidity squeeze problems, there has to be a close correspondence
between the stream of returns on investment expenditures and the repayment
structure of external loans.

In addition to the issue regarding the phasing of investment expendi-
tures, there is the question of the way in which domestic industry is
promoted by means of tariffs in developing countries. Tariffs are often
employed to keep the domestic price of output of potential industries
above the world price. But the output of one industry is in many cases
the input of another. Thus, when an industry which has been protected
starts to prepare for the export market, it may well find that the system
which has protected it in the home market, places it at a disadvantage
in the export market. Some of its inputs, which are obtained from other
protected domestic industries, are priced higher than the world prices.
If industrial production is worth special encouragement for reasons such
as the infant industry argument, then production for the export market
is also probably worth special encouragement, not actual discouragement.
This is an especially important when there are foreign loans that have
to be repaid.

It is also the case that in many developing countries different
industries receive different degrees of protection, often for no appar-
ently rational economic reason. Usually, the extensive use of import
quotas is the principal reason for the highly divergent relative gap
between domestic and world prices across industries. Thus, a country
runs into balance of payments problems, and the situation is brought
under control by restricting imports, with the restriction of the "least
essential goods" being most severe. This results in a growth of domestic
industry, behind protective quotas, which bears little relation to the

long-run comparative advantage of the country. When a wrong industry is established, it handicaps any other industry which uses its output. It is for these reasons that many researchers have come to the conclusion that bad management of foreign trade is the principal reason why internal prices get highly distorted, leading to industrial investments which are of little or no benefit to the country concerned. 1/

Apart from incorrect pricing arising from foreign trade restrictions, there often are also distortions resulting from financial repression. Under the imperfect financial market conditions found in most developing countries, artificially low interest rates can be expected to have an adverse effect on the choice of investments. The developing countries that have pursued low interest rate policies have done so for two major reasons. First, selective credit policies have been used to channel credit to priority sectors at a subsidized rate of interest. Second, in order to keep the cost of government borrowing low by making government debt relatively more attractive, measures have been implemented to make private debt relatively less attractive. The most widely used measure for this purpose has been to impose a ceiling on the interest rate payable on private bonds and shares. But the opportunity cost of the scarce resources used by the public sector remains unchanged and cannot be reduced by lowering the interest rate on the loan. Therefore, in addition to the direct impact of the budget deficit on the current account balance that was discussed in Section IV, enlarged budget deficits have an adverse effect on the mobilization of domestic private savings and on the efficient allocation of resources for investment. These adverse effects on domestic saving and investment would, over time, be expected to have an important bearing on the current account balance.

VI. Conclusion

The relationships examined in this paper were between domestic saving, investment, and the government budget deficit on the one hand, and the current account deficit on the other, for the 20 non-oil developing countries with the largest debt service payments in 1982 for which the requisite data could be assembled. It appears that the increases in the indebtedness of these countries have reflected primarily an exchange of debt instruments for additional physical capital. Our findings do not support the proposition that increases in external indebtedness

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1/ The reader is referred to Little and Mirlees, Project Appraisal and Planning for Developing Countries, for an extensive discussion of incorrect prices in developing countries.

among developing countries have reflected overconsumption. Capital
inflows did not partly or wholly displace domestic saving for the sample
of countries examined. The evidence that the expanded indebtedness has
reflected an increase in investment outlays rather than in spending for
consumption offers some assurance that debt servicing problems will
progressively ease, provided that appropriate macroeconomic policies are
pursued. However, this conclusion is premised on a view on the quality
of investment spending, a point which remains to be investigated. In
general, the quality of this spending is likely to have been adversely
affected by various government policies, notably including those with
respect to budget deficits, interest rates, exchange rates, relative
prices and debt management.

Empirical Tests of Causality

There are several test procedures for causality that are used in the literature, e.g., a cross-correlation technique suggested by Haugh (1976) and Pierce (1977): a one-sided distributed lag approach by Granger (1969); and a two-sided distributed lag method due to Sims (1972). The Haugh-Pierce test and the Sims test require pre-filtering of the basic data; Sims suggested prefiltering the time series to be tested before estimating with the hope that this would reduce or eliminate the serial correlation problem. This means that the researcher applying the Sims test is faced not only with the decision regarding the appropriate number of positive and negative lags, but also with the decision of whether the series should be prefiltered, and, if so, what filter is appropriate. It appears from the results obtained by Feige and Pearce (1978) that the empirical results are highly sensitive to the particular filter chosen for prewhitening.

The method suggested by Granger is relatively simpler since the prefiltering step is essentially bypassed. The presence of the lag dependent variable in the regression equation for the Granger test is counted on to purge serial correlation. Sometimes the Box and Jenkins methodology is also employed to make the time series stationary by taking the first differences. This is done to ensure that the series in question do not contain any systematic trends in order to avoid getting biased results from spurious correlation induced by both variables following a common trend. One way of taking the trend out of a nominal variable due to inflation is to express it as a ratio of another nominal variable. All of the time series used in this study were divided by nominal GNP. Further, to ensure a zero mean, each stationery series can be mean corrected by subtracting the appropriate sample mean. This is equivalent to including a constant term in the regression equation, which was done in the present study.

The definition of causality employed in this paper is based upon an incremental predictability criterion. Let $[Y_t \ X_t]$ be the bivariate process of interest, assumed to be jointly covariance stationary, and let

(1) $\overline{Y}_t$ and $\overline{X}_t$ represent all past values of the variables Y and X.

(2) $\sigma^2(X_t | Z)$ represent the minimum predictive error variance

of X_t given Z, where Z may be either $\overline{X}_t$ or $[\overline{X}_t \ \overline{Y}_t]$.

Y "causes" X if $\sigma^2(X_t | \overline{Y}_t \overline{X}_t) < \sigma^2(X_t | \overline{X}_t)$. This says simply that knowledge of past Y reduces the variance of the errors in forecasting X_t

beyond the variance of the errors which would be made from knowledge of past X alone. The roles of X and Y in the above definition may, of course, be reversed so that a similar definition applies to statements about X causing Y. If Y causes X and X does not cause Y, it is said that unidirectional causality exists from Y to X, denoted by $Y_t \longrightarrow X_t$. If Y does not cause X and X does not cause Y, then X and Y are either statistically independent or related contemporaneously but in no other way. If Y causes X and X causes Y, it is said that feedback occurs between the two series, which is denoted by $Y_t \longleftrightarrow X_t$.

The version of the Granger test used here is based on ordinary least squares estimation of an equation of the form:

$$Y_t = \sum_{j=1}^{J} a_j Y(t-j) + \sum_{j=1}^{J} b_j X(t-j) + c + u_t \qquad (1)$$

where u_t is a random error term. The test of the hypothesis that X does not cause Y is a test that $b_j = 0$ for $j=1,2,\ldots,J$. The test statistic is calculated by estimating equation (1) in both constrained ($b_j = 0$, $j = 1,2,\ldots,J$) and unconstrained form. An F test is computed as:

$$F = \frac{(SSE_c - SSE_u)/J}{SSE_u/[T-(2J+1)]} \qquad (2)$$

where SSE_u and SSE_c are the residual sums of squares from the unconstrained and constrained regressions, respectively. The above procedure is repeated reversing the roles of X_t and Y_t to test the hypothesis that Y_t does not cause X_t. A one-period lag for annual data and four period lag for quarterly data were employed in the estimation. [1]

There is the problem of the robustness of substantive inferences concerning the causal relationships when various empirical procedures are employed; different studies of the same relationship but using different test procedures often report results which are inconsistent with one another. Guilkey and Salemi (1982) have done sampling experiments in order to study the small sample performance of various tests for causal ordering. The tests they considered were the Sims test, the modified Sims test, and the Granger test. The Granger test consistently outperforms the other tests in their findings. "Since the Granger test is computationally the least expensive of the three and results in the fewest degrees of freedom lost from formation of lags and leads, we recommend it confidently to the practitioner." [1]

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[1] Quarterly national income accounts data are available for Korea.

[1] Guilkey and Salemi, "Small Sample Properties of Three Tests for Granger-Causal Ordering in a Bivariate Stochastic System," _Review of Economics and Statistics_, November 1982, p. 679.

References

Avramovic, Dragoslav, and others, <u>Economic Growth and External Debt</u>,
Johns Hopkins Press, (Baltimore, 1964).

Eaton, Jonathan, and Mark Gersovitz (1981a), "Debt with Potential
Repudiation: Theoretical and Empirical Analysis," <u>Review of
Economic Studies</u>, Vol. 48 (April 1981), pp. 289-309.

_____, (1981b), <u>Poor-Country Borrowing in Private Financial Markets
and the Repudiation Issue</u>, Princeton Studies in International Finance,
No. 47, International Finance Section, Princeton University
(June 1981).

Feige, Edgar L., and Douglas K. Pearce, "Economically Rational Ex-
pectations: Are Innovations in the Rate of Inflation Independent
of Innovations in Measures of Monetary and Fiscal Policy?"
<u>Journal of Political Economy</u>, Vol. 83 (June 1976), pp. 499-522.

_____, and Douglas K. Pearce, "The Causal Relationship between Money and
Income: Some Caveats for Time Series Analysis," University of
Wisconsin-Madison, Discussion Paper No. 7809, (July 1978).

Granger, C.W.J., "Investigating Causal Relations by Econometric
Models and Cross-Spectral Methods," <u>Econometrica</u>, Vol. 37
(July 1969), pp. 424-38.

_____, and Paul Newbold, "Spurious Regressions in Econometrics," <u>Journal
of Econometrics</u>, Vol. 2 (July 1974), pp. 111-20.

Guilkey, David K, and Michael K. Salemi, "Small Sample Properties of
Three Tests for Granger-Causal Ordering in a Bivariate Stochastic
System," <u>Review of Economics and Statistics</u> (November 1982),
pp. 668-680.

Haugh, Larry D., "Checking the Independence of Two Covariance-Stationary
Time Series: A Univariate Residual Cross Correlation Approach,"
<u>Journal of the American Statistical Association</u> (June 1976),
pp. 378-85.

International Monetary Fund, <u>World Economic Outlook</u>, Occasional
Paper No. 21, (Washington, D.C., May 1983).

Kelly, Margaret R., "Fiscal Adjustment and Fund Supported Programs,
1971-80," <u>Staff Papers</u>, Vol. 29 (December 1982), pp. 561-602.

Khan, Mohsin S., "Inflation and International Reserves: A Time-
Series Analysis," <u>Staff Papers</u>, Vol. 26 (December 1979), pp. 699-724.

Kharas, Homi, "On Structural Change and Debt Service Capacity,"
World Bank Domestic Finance Study No. 74 (August 1981).

Little, I.M.D., and J.A. Mirrlees, <u>Project Appraisal and Planning for Developing Countries</u>, Basic Books, Inc., (New York, 1974).

Nowzad, Bahram, and Richard C. Williams, <u>External Indebtedness of Developing Countries</u>, Occasional Paper No. 3, International Monetary Fund (Washington, May 1981).

Pierce, David, "Relationships--and the Lack Thereof--between Economic Time Series, with Special Reference to Money and Interest Rates," <u>Journal of the American Statistical Association</u> (1977), pp. 11-21.

Sachs, Jeffrey D., "The Current Account and Macroeconomic Adjustment in the 1970s," <u>Brookings Papers on Economic Activity</u> (1981), pp. 201-68.

Salop, Joanne, and Erich Spitäller, "Why Does the Current Account Matter?" <u>Staff Papers</u>, Vol. 27 (March 1980), pp. 101-34.

Sims, Christopher A., "Money, Income, and Causality," <u>American Economic Review</u>, Vol. 72 (September 1972), pp. 540-52

Solomon, Robert, "A Pespective on the Debt of Developing Countries," <u>Brookings Papers on Economic Activity</u> (1977), pp. 479-501.

UNIDO, <u>Guidelines for Project Evaluation</u>, by P.S. Dasgupta, S.A. Marglin, and A.K. Sen, United Nations (New York, 1972).