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ECONOMIC DEVELOPMENT AND EXTERNAL FLOWS: THE SOUTH
AMERICAN EXPERIENCE

City University of New York

Ph.D. 1984

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ECCNOMIC DEVELOPMENT AND EXTERNAL FLCWS:
THE SOUTH AMERICAN EXPERIENCE

by

Theologos Homer Bonitsis

A dissertation submitted to the Graduate Faculty in
Economics in partial fulfillment of the requirements for the
degree of Doctor of Philosophy, The City University of New
York.

May 1984

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THEOLOGOS HOMER BONITSIS

To the memory of my father,

Socrates Demetrios Bonitsis

This manuscript has been read and accepted for the Graduate Faculty in Economics in satisfaction of the dissertation requirement for the degree of Doctor in Philosophy.

5/7/84
date

Herbert Geyer
Chairman of Examining Committee

5/7/84
date

Michael Grossman
Executive Officer

Professor Herbert Geyer

Professor Michael Grossman

Professor Salih Neftci

Supervisory Committee

The City University of New York

ABSTRACT

ECCNOMIC DEVELOPMENT AND EXTERNAL FLOWS:

THE SOUTH AMERICAN EXPERIENCE

by

Theologos Homer Bonitsis

Advisor: Professor Herbert Geyer

The principal theoretical and empirical contribution of this research is the application of a multivariate distributed lag technique to test a hypothesis that continues to concern policymakers in both developed and developing countries. Namely, the hypothesis of exogenously induced economic development. This research departs from other studies in considering that the premise of exogenously induced economic development may in some cases be a non sequitur. That is, a country with a comfortable endogenously determined rate of

development can also attract external flows. Related empirical investigations are a review of the relevant literature, a descriptive overview of the recent economic development, and an analysis of external public indebtedness in South America. South America is defined to include the countries of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, and Venezuela.

A model of causal priority based on the work of Granger and Granger and Newbold is formulated to test the aforementioned hypothesis. Four measures of external flows and two measures of economic development are used. The external flows are disbursements of external public debt, exports f.o.b., direct foreign investment, and unilateral transfers. The two development indicators are gross domestic product and gross fixed capital formation. All variables are measured in terms of real gross per capita units.

The general policy implications of the econometric results are that the null hypothesis of an absence of a causal nexus, either unidirectional or with feedback, between external flows and economic development can be rejected in several countries at conventional levels of statistical significance. Moreover, the statistical significance of the sign of causality is not always the favorable one predicted by neoclassical theory. On the other hand, there is also evidence in some countries for the

acceptance of the alternative hypothesis of causality from economic development to external flows. Therefore, further research is required into the domestic conditions that are requisites for an external flow to make a positive contribution to economic development.

ACKNOWLEDGEMENTS

This dissertation marks the fulfillment of a decision made when I was about seventeen years old to become an economist and to receive a doctorate in the discipline. It was my feeling then and now that economic factors play a dominant role in shaping the course of human events. Needless to say, many people were helpful in my training, but few were instrumental such as Professors Herbert Geyer, Michael Grossman, and Elliot Zupnick. I feel privileged to have had them as my mentors.

Further, if one thing distinguishes the doctoral faculty in economics from other programs is that they take a genuine interest in the needs of the student. It is not uncommon for one to go to great lengths to help a student. I will always remember this humanistic element in the doctoral program in economics.

To Professor Herbert Geyer, I owe a substantial intellectual debt. It was during my second year in the program that I became his research assistant. Our discussions on economic issues were exhaustive and I will remember his attempts to convince me to avoid technical solutions to problems. Hopefully, I now know better. Professor Geyer will always be a mentor and a friend to me.

My dissertation topic evolved from a paper I did for a public finance course. Its development to a thesis, however, was painstaking. My committee, Professors Geyer, Grossman, and Neftci, were all helpful in seeing it through. I thank them for this.

Finally, my years at the Graduate School will be remembered as good years; years where I made many friends to cherish for a lifetime.

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Chapter I

INTRODUCTION

1.1 INTRODUCTION

Research is the tool whereby past, current and proposed economic policies can be analyzed so as to provide insights into their short and long-run implications. This research does just that: it will examine the appropriateness of the international community's policy commitment of externally financing the economic development of the developing countries. Indeed, this study will indicate the productiveness of the aforementioned policy for a subset of developing countries and will recommend either its continuation, reassessment, or abandonment. In particular, the role of external flows in the development and the structure of external public debt of ten South American countries will be investigated. External flows are broadly defined to include external public debt disbursements, export earnings f.o.b., direct foreign investment and unilateral transfers. The two development indicators are gross domestic product and gross fixed capital formation. All variables are measured in gross real units per capita. Put succinctly, the central hypothesis being investigated here is the causal relationship between external flows and economic development. Corollary

investigations include a review of the recent literature on exogenously induced economic development; a descriptive overview of the recent structure and economic development experience in the South American economies; an analysis of external public indebtedness of the ten countries under review; and the use of ratio analysis to determine the burden of external public debt on each country's economy. South America is defined in this study to include the countries of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay and Venezuela; hereon referred to as the group of ten.

From the global viewpoint, the inception and growth of external indebtedness and/or flows to the developing countries resulted from a common commitment of the developed and developing world to augment the productive capacity of the latter's economies. Granted this, the issue at hand can be restated in terms of the international economic policy instrument of externally financing economic development. In viewing the issue from this perspective, one must distinguish between economic assistance for reconstruction and for development. For example, the economic assistance extended to Europe under the Marshall Plan was of the former type, i.e., it was assistance to reconstruct destroyed economies. In direct contrast, assistance to the developing countries is to create a viable economic structure where

previously there was none.¹ In essence, therefore, an historical approach to this issue is needed; for one cannot divorce the debt/external flow issue, together with its multifaceted dimensions, from the economic development issue. This interrelationship is clearly emphasized by the Second United Nations Development Decade objective of .7 per cent of gross national product of the economically advanced countries to be transferred as net official development assistance to the developing world.²

1.2 THE NATURE OF EXTERNAL INFLOWS AND THE DEVELOPMENT PROCESS

External flows in this study fall into one of four categories: external public debt disbursements, export earnings, direct foreign investment, and unilateral transfers. The first category, external public debt disbursements, consists of all loan disbursements with an original or extended maturity exceeding one year which are received or guaranteed by public entities and are repayable to non-residents in foreign currency. Export earnings represent the value of exports f.o.b. The third measure, direct foreign investment, reflects the flow of foreign capital with investor control. Portfolio investment,

¹ Baerwald, Friedrich, History and Structure of Economic Development (Scranton, Pennsylvania: International Textbook Company, 1969), p. 17.

² United Nations, Shaping Accelerated Development and International Changes (New York, New York: United Nations, 1980), p. 3.

consisting of a minority holding in a firm with little or no management involvement, is not considered here. The reason being, unlike direct foreign investment, portfolio investment does not involve a technological input and/or entrepreneurial function that is absent in the host country. The final external flow measure is unilateral transfers; they consist of a real resource or financial flow not requiring repayment. All variables are defined in terms of real per capita measures.

In the case of external public indebtedness we refer to an obligation of one economic agent, the recipient, or debtor, to submit periodic amortization and interest payments to another economic agent, the donor or creditor. There are, however, several important differences between an internal and external public debt. For example, internal public debt is denominated and redeemed by using domestic currency; hence, government can resort to printing money as a method of redemption. That is, redemption of an internal debt can be achieved by the imposition of an "inflation tax." External public debt, on the other hand, is denominated and redeemed in foreign currency. The recipient, therefore, must secure enough foreign exchange availabilities from export earnings, or other sources in the capital account of the balance of payments, to meet amortization, interest, dividend and repatriation of capital payments. In this case printing money is not an option of

redemption open to government. Moreover, since debt represents a claim on productive resources, an internal public debt represents a claim by individuals and/or institutions on their government. Consequently its redemption leads to a change in the distribution of resource ownership in an economy. This process, however, does not result in a change in the aggregate level of economic resources available in an economy. An external public debt, in contrast, is a claim on the debtor country's resources by foreigners; its redemption involves the transfer of financial resources out of the country. As a result, this process may not only affect the aggregate amount of economic resources present in an economy, but additionally the distribution of resource ownership.

Given that an external public debt will eventually involve the transfer of purchasing power from recipient to donor, why then will a developing country embark on this route of financing its economic development? The answer can be found by examining the domestic policy options available to most developing countries for financing their development goals. In this regard, there are two elective methods for procuring these funds:

1. domestic saving, which can be considered as voluntary savings;
2. taxation, which can be viewed as compulsory or involuntary savings.

Both policy instruments, for the most part, do not result in the procurement of sufficient funds in developing countries.

The low level of income in most developing countries results in domestic savings out of income being too small to provide sufficient funds for development financing. Similarly, taxation of income, runs into the same obstacle; namely, the subsistence nature of income in developing countries. Further, much of the economic activity in these countries is conducted outside the monetary nexus, making taxation impractical. Even for the middle income developing countries taxation is not feasible, since they lack effective tax administrations. Conversely, if a developing country has an effective tax administration, high marginal tax rates may discourage market activity for non-market activity, i.e., workers might seek more leisure. We would, in essence, be faced with the work-leisure trade-off of human capital theory. In addition, it may encourage the growth of a subterranean economy. Finally, any bootstrap approach to economic development may have dire political repercussions for the current leaderships of the developing countries, given the phenomenon of rising expectations after the achievement of some degree of economic development. Consequently, external financing, defined broadly, becomes an attractive alternative policy instrument for securing funds for economic development.

We have seen that external financing of economic development is one among several policy instruments by which development targets can be supported. If it is chosen, the relevant question is what level of external flows should a country target for? Traditionally, and in practice, this type of question is analyzed within a cost-benefit framework. The method entails comparing the capitalized value of benefits and costs of a particular activity. Theoretically, however, we seek the intersection of two independent curves; a country should expand its level of external flow until the benefit or productivity of the last dollar at the margin is equated to the cost or burden of servicing the last dollar of external flow at the margin.

In Figure 1, we present a diagrammatic exposition for the determination of the optimal level of external flows. The marginal cost of servicing external flow curve is horizontal up to E_{min} and then rises. E_{min} represents external flows with a zero marginal servicing cost, i.e., unilateral transfers. Beyond point E_{min} an external flow can only be procured at an increasing marginal cost to a country's foreign exchange availabilities. Moreover, at a given point in time, the more unfavorable the terms to attract a given level of external flow the steeper or more inelastic is the marginal cost of external flow curve. The marginal benefit of external flow curve, on the other hand, is downward sloping indicating declining marginal investment

opportunities confronting a nation at a given point in time. If the marginal cost of servicing external flows is zero then a country would expand its level of external flow to its maximum, OE_{max} . In this case all external flows would be in the form of unilateral transfers.

If both curves are known to policymakers then the developing country would seek a level of external flow of OE^* . Where OE^* consists of two components: OE_{min} with zero total cost and $CE^* - OE_{min}$ with total cost of $C(MC^*)EE^*$. The former cost being associated with the level of unilateral transfers; and the latter cost is associated with the level of non-grant flow.³ The net benefit received by the developing country, given OE^* level of external flow, would be $(ME^*)ME$.

The reader can see that any deviation from the optimal or natural level of external flow, OE^* , would set in motion market forces to make the country adjust to its optimal level of external flow. Consider, for example, what happens if a country was to obtain OE_2 , where $OE_2 > OE^*$, level of external flow. In essence, the country has "overborrowed" $OE_2 - OE^*$. This has resulted in an additional cost over benefit at the margin of AB . This is, in short, an unnecessary drain on a country's foreign exchange availabilities. The country will react by contracting her

³ In essence, the upward sloping marginal cost of servicing external flow curve would have a new kink each time a country expands to a different, marginally costlier, external flow.

level of external flow. On the other hand, "underborrowing" of OE^*-OE_1 would result in an additional benefit over cost of CD at the margin: the country will have the incentive to expand its level of external flow. In conclusion, at a given point in time, there is some optimal or natural level of external flow for a country. This is shown graphically by the solid line going through points EE^* .

In practice, the empirical analog to Figure 1 is traditionally presented within a cost-benefit framework. This method entails comparing the discounted value of benefits from a loan to the cost of the loan. If the discounted present value of benefits exceeds the cost of the loan then the loan should be contracted. Conversely, if the capitalized value of benefits is less than the cost of the loan then the project should be abandoned. Mathematically, this can be shown by assuming a loan taken out for n years; the benefits and costs of the project per annum are $B_1, B_2, \dots, B_n$ and $C_1, C_2, \dots, C_n$, respectively; the "market rate of interest," i , is assumed to be stable over the planning horizon.* The capitalized value of benefits is then given by:

* In other words, there is perfect foresight in the marketplace. This is an heroic assumption of most neoclassical approaches; but the discount factor, i , does indeed fluctuate over time. Moreover, other market and non-market forces may decrease or increase the annual benefits or costs of a project.

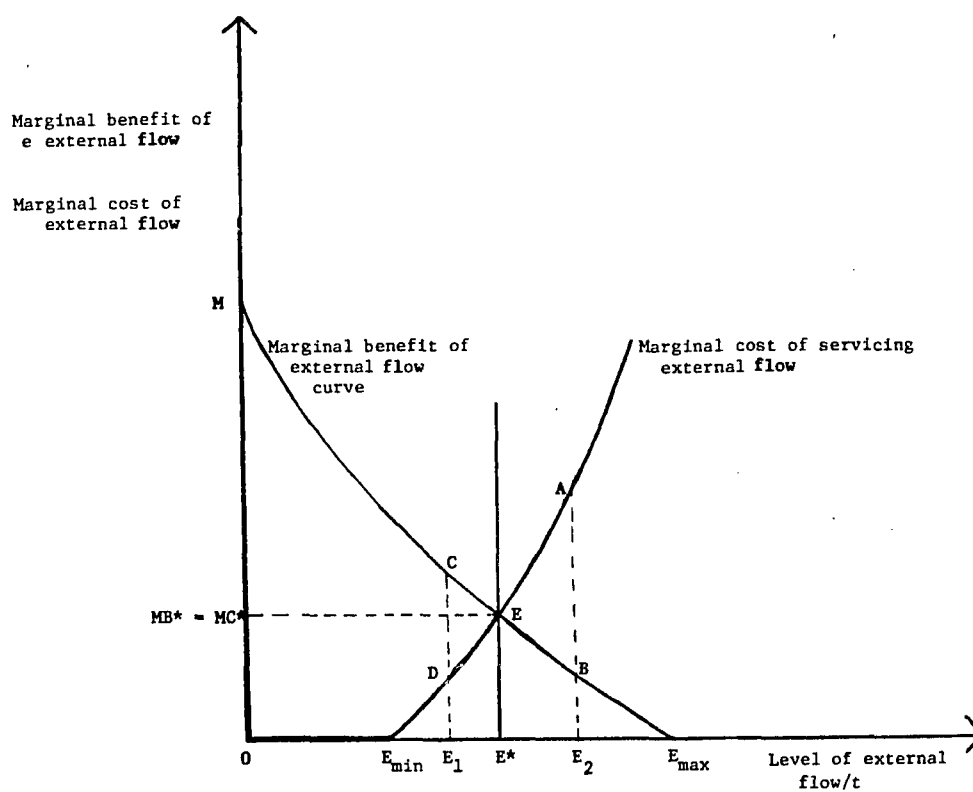


Figure 1: Optimal Level of External Flow.

$$B^* = \frac{B_1 - C_1}{1 + i} + \frac{B_2 - C_2}{(1 + i)^2} + \frac{B_n - C_n}{(1 + i)^n} . \quad (1.2.1)$$

It follows that if $B^* > 0$, the activity should be conducted; if $B^* < 0$, the investment should not be accepted; and if $B^* = 0$, policymakers would be indifferent about the particular venture.

This traditional approach, however, is not applicable to external public debt or, in many instances, to other types of external flows; for the amortization, interest, dividend and repatriation of capital payments which a country must submit are not necessarily directly related to the benefits yielded by a particular investment activity. These payments must be in a currency other than the home country's currency. Moreover, since most development projects deal with social overhead investment, repayment funds must be generated elsewhere in the economy. Social overhead investment consists of projects that create an infrastructure conducive to economic development; the building of roads, airports, educational facilities, telecommunications systems and etceteras. All foment economic activity, but do not guarantee the necessary foreign exchange availabilities to repay an external loan. basically, increasing foreign exchange availabilities can be obtained only if a country's export earnings are growing at a faster rate than its import expenses. To summarize, we find that the developing countries must depend on a source

for repayment of external funds other than those directly generated by the benefits of a development project or other investment activity.⁵

Using the neoclassical model of trade we can show the production and consumption gains experienced from an external flow by an LDC, i.e., a less developed country. Initially, however, we examine in Figure 2 the consumption and production gains from trade realized by a typical LDC which moves from a closed to an open economy. Consider an LDC producing two goods X_L and Y_K , where X_L and Y_K are labor and capital intensive goods, respectively. IT' is the LDC's production transformation and, in the case of a closed economy, consumption possibilities frontier. It is elongated along the horizontal axis reflecting the relatively large labor endowments of many LDCs. Under conditions of a closed economy with domestic terms of trade reflected by TCT_1 , the LDC would come to production and consumption equilibrium at point E on the production transformation curve IT' and indifference curve I_1 . This point of autarchy results in the production and consumption of OA units of X_L and EA units of Y_K with real income given -----

⁵ The only exception to this is when a country obtains a foreign loan to expand an export industry - then the necessary foreign exchange availabilities may be generated by the development project. Most development loans, however, serve to create an economic infrastructure and thus do not directly secure the required foreign exchange for repayment and servicing of debt obligations. Similarly, if direct foreign investment is in the external sector of an economy then dividend and repatriation of capital payments may be self-servicing.

by indifference curve I_1 . A movement towards free trade would result in the country facing the new international terms of trade line TOT_3 ; production would be represented by point B on the production transformation frontier and consumption by point E^{**} on indifference curve I_3 . More specifically, the LDC produces OG, where $OG > OA$, units of X_L and BG, where $BG < EA$, units of Y_K ; however, the LDC now consumes OF, where $OF < OA$, units of X_L and $E^{**}F$, where $E^{**}F > EA$, units of Y_K . Trade has resulted in different production and consumption bundles and a Hicksian improvement in real income as shown by the movement from indifference curve I_1 to I_3 . For the LDC now specializes and exports the commodity it has a comparative advantage and imports the commodity it has a comparative disadvantage. Geometrically, the trade triangle is shown by $E^{**}CE$: the LDC exports CE of X_L in exchange for imports of $E^{**}C$ of Y_K . This new state of international resource allocation results from each country producing a good for export whose production is input-intensive in the country's abundant factor while each country imports the good whose production is intensive in the factor input relatively more scarce in the country. This is the neoclassical approach to international trade known as the Heckscher-Ohlin model.

It should be noted that the movement from production bundle E to B implies mobility of the factors of production. The absence of this condition, however, does not invalidate

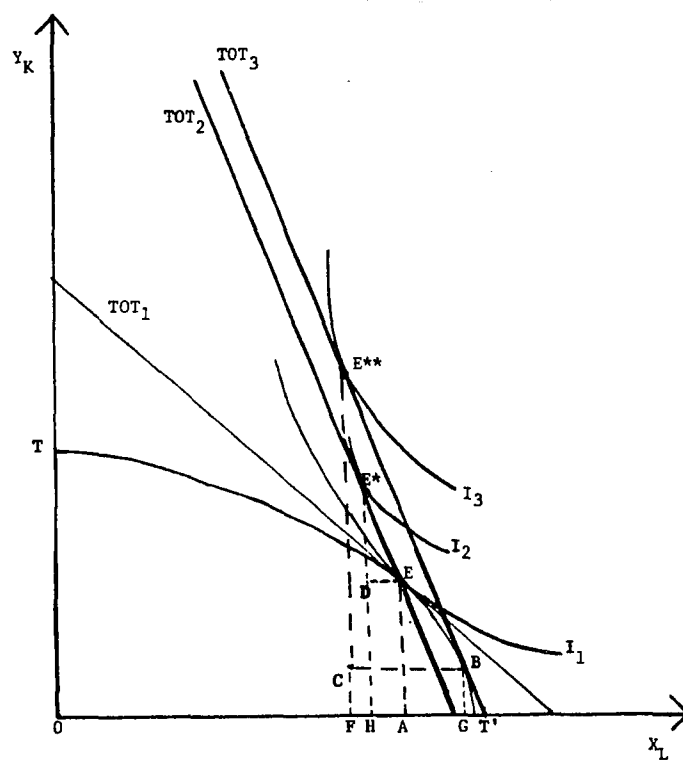


Figure 2: Consumption and Production Gains from Trade.

these results. Consider, for instance, the case where factor inputs are immobile. Then the relevant terms of trade line is given by TOT_2 , where TOT_2 is parallel to TOT_3 . The production equilibrium is similar to the pretrade bundle, i.e., point E on TT' . The consumption bundle, on the other hand, is given by E^* on indifference curve I_2 : the LDC consumes OH , where $OH < OA$, units of X_L and E^*H , where $E^*H > EA$, units of Y_K . The trade triangle is now E^*DE and the country exports DE of X_L in exchange for imports of E^*D of Y_K . The LDC has a higher level of real income as shown by the movement from indifference curve I_1 to I_2 . Albeit, the increase in real income and degree of openness of the economy, as reflected by the new trade triangle, is smaller than it would have been if factor endowments were mobile. Alternatively speaking, we can state from Figure 2 that there are two components to the gains from trade, or market determined international exchange, for a typical LDC. First, the movement from E on I_1 to E^* on I_2 is the gain enjoyed by an LDC consuming at prices different from domestic prices. Second, the movement from E^* on I_2 to E^{**} on I_3 represents the gain from trade resulting from a more internationally efficient allocation of factor resources.

Now in Figure 3, within the context of the neoclassical trade model, we can show the consumption and production gains experienced by an LDC from an external flow. The external flow, for example, can be in the form of a

disbursement of external public debt, direct foreign investment or unilateral transfer. Diagrammatically, an external flow of real resources would shift the production transformation frontier outward from TT' to PP' . The shift is biased towards Y_K , the capital intensive good; capital will flow into an LDC reflecting its relative high marginal productivity in a labor abundant, capital scarce, economy. The economy, consequently, moves from its post-trade pre-external flow equilibrium at E^{**} on indifference curve I_3 to its post-external flow equilibrium at E^{***} on indifference curve I_4 : again the economy has realized a Hicksian improvement in real income. Further, the country now imports $E^{***}K$, where $E^{***}K > E^{**}C$, units of Y_K in exchange for exporting KJ , where $KJ > CB$, units of X_L . The country, in short, has achieved a higher level of real income and a greater degree of openness as a result of the external flow.

The above process can also be conceptualized as a savings-investment-net capital flow relationship between countries. Consider, for example, a neoclassical perfectly competitive world consisting of two composite countries: an MDC (more developed country) and an LDC. This world is presented in Figure 4: r is the rate of interest as well as the marginal efficiency of investment, II' and SS' represent own-country investment and national savings schedules in the MDC and LDC. In the presence of perfect capital mobility,

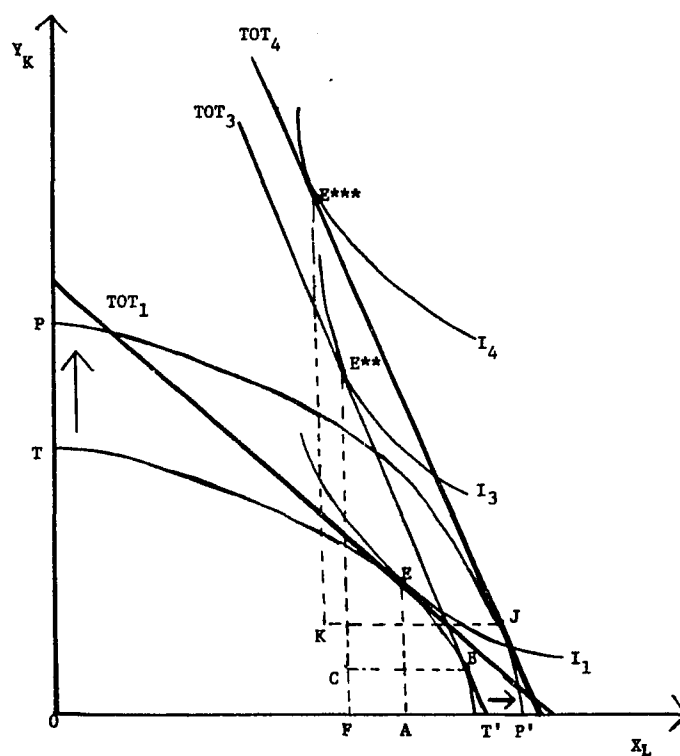


Figure 3: Consumption and Production Gains from an External Flow.

equilibrium will be achieved at an interest rate of $0r^*$ with the MDC "lending" or making a net capital outflow of AB to the LDC. Alternatively stated, the LDC is the recipient of a net capital flow of CD from the MDC, where $CD = AB$. Note that this analysis treats the net capital flow from the MDC as strictly covering the savings gap of the LDC, i.e., the foreign exchange gap is not considered in this exposition.

We now present a more formal model of the role of external flows in economic development, where these two relationships are intricately linked with the surplus savings of the MDCs. This model presents the desired effect of external flows on capital formation and hence on economic development in an LDC.

The literature on externally financing economic development can be summarized with a simple theoretical construction. Specifically, less developed countries can derive financial resources for development either from internal or external sources. At a point in time, however, the policymakers of a developing country, confronted with the small country assumptions of international trade theory, accept as given the country's exogenously determined level of domestic savings. This exogenous level of domestic savings, S , can be decomposed into two components:

1. voluntary savings, S_v ; and
2. involuntary or government savings, S_g .

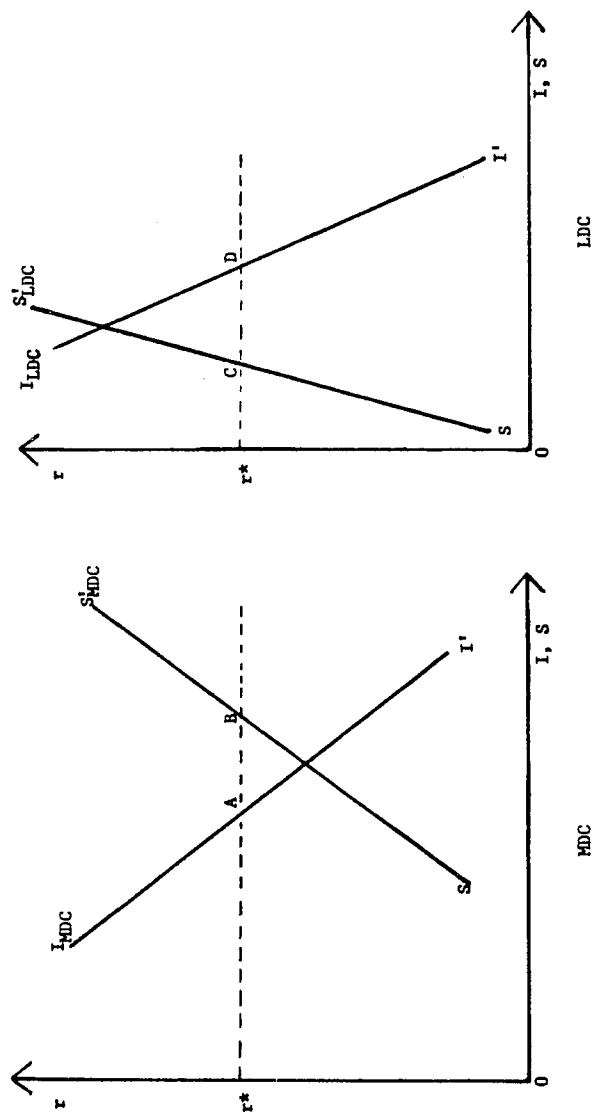


Figure 4: The Savings-Investment-Net Capital Inflow Relationship.

Algebraically, the savings or domestic financial resource function confronted by policymakers may be given as an additive function of these two components:⁶

$$S_t = Sv_t + Sg_t, \quad \text{as } t = 1, \dots, n. \quad (1.2.2)$$

Given the existence of international capital markets, a developing country's development rate need not be constrained by its deficient level of savings or foreign exchange availabilities, i.e., by the savings and/or foreign exchange gap. An LDC, essentially, can supplement her level of domestic savings by obtaining some fraction of the surplus savings, or financial resources, of the more developed countries. The external flow into a developing country can then be expressed as follows:

$$E_t = \alpha \dot{D}_t, \quad \text{as } t = 1, \dots, n. \quad (1.2.3)$$

⁶ More specifically, voluntary savings can be expressed as a function of the level of income:

$$Sv_t = \alpha^* + \beta * Y_t,$$

where $0 < \beta \leq 1$, and involuntary savings is considered as a function of income tax revenues:

$$Sg_t = Sg\{T(Y_t)\}.$$

F_t is the external flow to a developing country in year t . $\dot{D}_t$ is the aggregate surplus savings of all MDCs available to the LDCs. Alternatively, $\dot{D}_t$ is the marginal change in the external indebtedness, defined broadly, in year t of all LDCs.⁷ The coefficient of $\dot{D}_t$, i.e., α , is some fraction taking on values $0 < \alpha \leq 1$.

It follows that the investment-financial resource equilibrium condition for a typical LDC is:

$$I_t = R_t = S_t + \alpha_t \dot{D}_t \quad (1.2.4)$$

Equation (1.2.4) simply relates that desired investment for an LDC in year t must be equal to desired aggregate financial resources for an LDC in year t . Where desired aggregate financial resources, R_t , consists of a domestic, S_t , and foreign, $\alpha \dot{D}_t$, component.

Taking the behavioral relationships of equations (1.2.2)-(1.2.4) as describing an LDC, in Figure 5 we derive a development path for a typical developing country for a given level of domestic savings and surplus savings of the MDCs. Now we assume that S_0 [where $S_0 = S_t$ in equation (1.2.4)] is the exogenously determined level of domestic savings available to policymakers in time period t .

⁷ One can also specify this relationship as:

$$F_t = \gamma^* + \alpha \dot{D}_t,$$

where γ^* represents some level of external flow independent of a country's credit worthiness or political orientation.

Similarly, we assume $\dot{D}_1$ is the level of surplus savings of all MDCs; hence, $\alpha \dot{D}_1$ is the amount of external flow a country can attract in period t . If, however, the savings surplus of the MDCs were $\dot{D}_2$ or $\dot{D}_3$, the external flow available for development financing would be $\alpha \dot{D}_2$ and $\alpha \dot{D}_3$ respectively, where $\alpha \dot{D}_3 > \alpha \dot{D}_2 > \alpha \dot{D}_1$. In short, our model is consistent with contemporary literature in this area, i.e., the economic development of the IDCs is considered intricately linked to the economic growth of the MDCs; more will be stated about this in the following chapter on the review of the literature. Therefore, the financial resource function for a typical LDC may be given as:

$$R_t = S_0 + \alpha \dot{D}_t . \quad (1.2.5)$$

Further analyzing Figure 5, we find that in the absence of any external flow, $\dot{D} = 0$ or $\alpha = 0$, an LDC would be confined to its domestic financial resource constraint for financing its economic development. Therefore, given an exogenous level of domestic savings of S_0 an LDC's marginal change in capital stock and output would be at its minimum - $\dot{k}_{min}$ and $\dot{y}_{min}$ respectively. In contrast, if the MDCs' surplus savings is $\dot{D}_1$ then the level of investment-financial resources for the LDC would be $\dot{K}_1 - K_1$, where S_0 and $\alpha \dot{D}_1$ are the respective domestic and foreign components of total financial resources for development. This level of total resources would result in a $\dot{K}_1$ increment in capital stock.

In turn, real output would change by $\dot{Y}_1$. If $\dot{N}_2$ is the level of surplus savings of the MDCs then $\dot{K}_2$ and $\dot{Y}_2$ are the marginal changes in the levels of capital stock and real output for the economy. A short-run static development path can be derived by connecting the various $\dot{K}$ - $\dot{Y}$ combinations resulting from various levels of domestic savings and surplus savings of the MDCs. This development path, denoted as DP in Figure 5, has the following functional form:⁸

$$\dot{Y}_t = \beta_0 \dot{K}_t, \quad \text{as } t = 1, \dots, n. \quad (1.2.6)$$

The slope of the development path is technologically given and, in economic terms, is the inverse of the incremental capital output ratio (ICOR). In the long-run, e.g., the five year planning horizon adopted by many LDCs,

⁸ One can empirically estimate this development path by using OLS to estimate the regression of GDP on a country's stock of capital:

$$Y_t = \alpha_0 + \beta K_t + \epsilon_t, \quad \text{as } t = 1, \dots, n.$$

Obviously, if equation (1.2.6) holds then this equation holds. Taking, further, the derivative of Y_t with respect to K_t gives us the reciprocal of the incremental capital output ratio:

$$\frac{dY_t}{dK_t} = \beta_t$$

or

$$ICOR = 1/\beta_t.$$

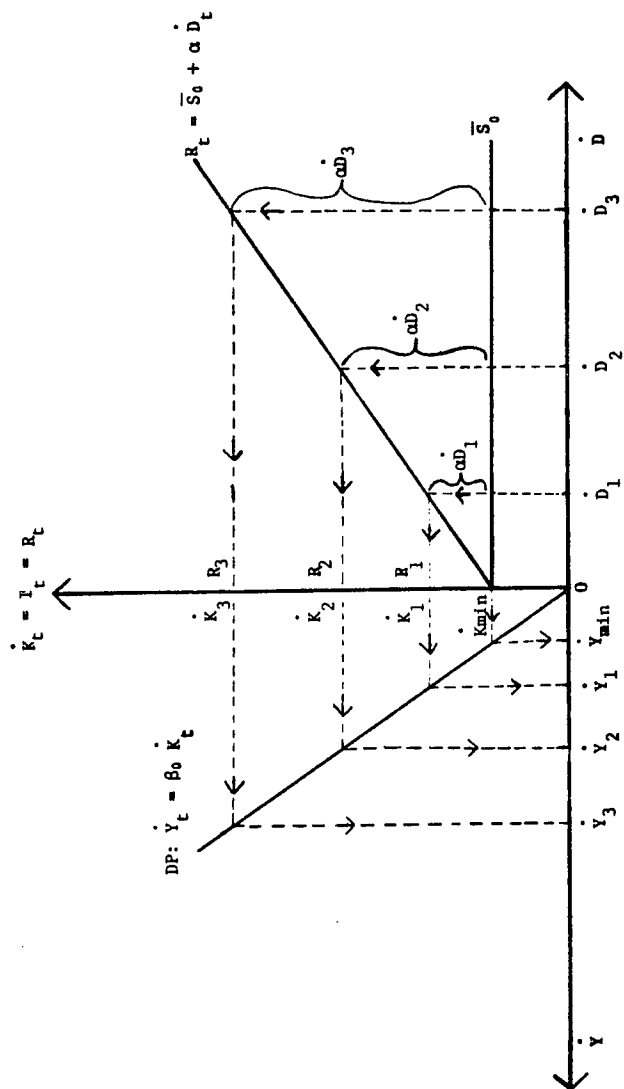
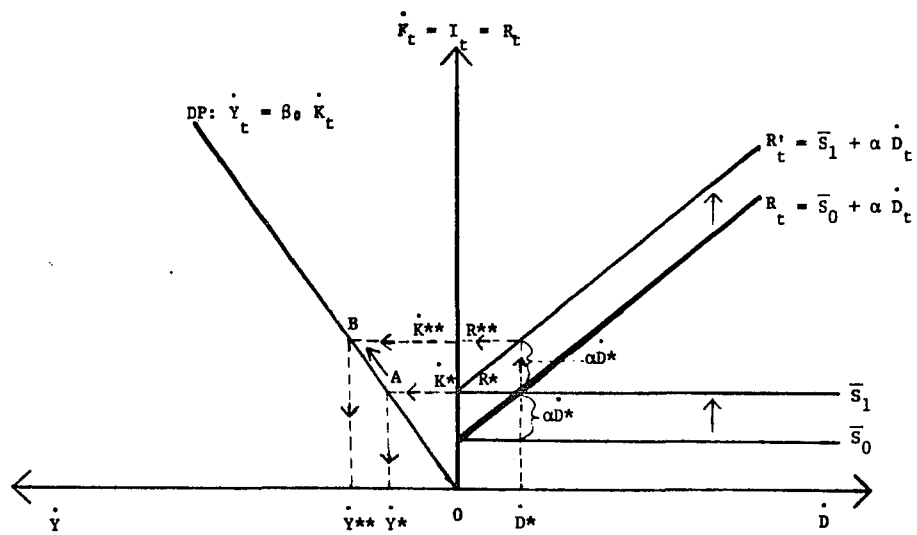


Figure 5: Derivation of the Development Path.

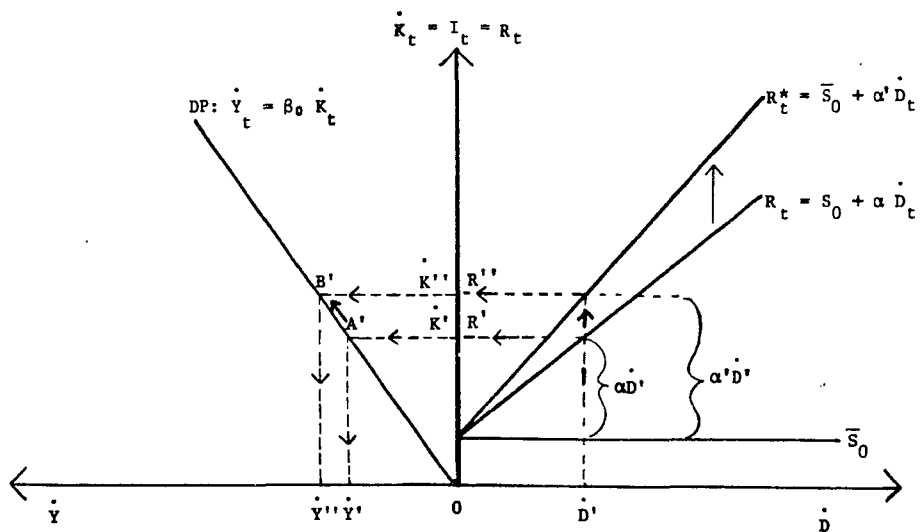
the development path will become progressively flatter, indicating that as a country develops its ICOR increases. Indeed, one can conceptualize a stable short-run development path as having an infinite number of long-run paths intersecting it at every point.

The comparative statics of this model are shown in Figure 6. In the first scenario, shown in Figure 6a, an LDC is able to harness more of her domestic resources for development. This can result from an increase in a country's saving ratio for a given level of national income and/or an increase in a country's national income at an invariant savings ratio. As a result, there is a uniform shift upward of the exogenous savings function from S_0 to S_1 . Now an LDC can achieve an incremental change in output of $\dot{Y}^{**}$ vs. $\dot{Y}^*$ without increasing her external flow above $\alpha \dot{D}^*$. Alternatively stated, given the same level of external flow, an LDC can move from point A to point B on its development path without augmenting its external indebtedness.

Similary, the fraction of surplus savings drawn to an LDC may increase over time. There are two reasons for this. First, foreign investment may increase as a country develops so as to take advantage of its growing real purchasing power. Second, the development process itself may improve a country's external reserve position and the vitality of its private sector, making available a greater share of the surplus savings of the MDCs to a particular country. The



(a)



(b)

Figure 6: Comparative Statics of the Development Path.

final result is an increase in an LDC's international creditability ratio from α to α' , where $\alpha' > \alpha$. It follows that an LDC can now obtain $\alpha' \dot{D}$ of external flows, opposed to the prior lower level of $\alpha \dot{D}$, and achieve greater incremental changes in its capital stock and output. This scenario is shown in Figure 6b by the movement from A' to B' along the development path.

The above discussion of the development path and its derivation, as given by equation (1.2.6), is in the spirit of the development literature known as capital fundamentalism, where a causal relationship from external flows to the stock of capital and economic development is implicitly postulated. Particularly, capital fundamentalism emphasizes the lack of capital in LDCs as the paramount constraint on the economic development process. This position has also been adopted by the proponents of the New International Economic Order.⁹ As noted earlier, in this study the validity of an a priori ordering between external flows and capital formation in particular, and economic development in general, for the subset of LDCs under review will be tested empirically by using and extending a methodology to test for multivariate causality developed by Granger. First, however, let us turn to a review of the literature on externally induced economic development.

⁹ United Nations, General Assembly, Resolutions Adopted by the General Assembly During its Sixth Special Session (New York: United Nations, 1974), p. 8.

Chapter II

REVIEW OF THE RECENT LITERATURE

2.1 INTRODUCTION

There is an extensive body of theoretical and empirical economic literature that has as its focal point exogenously induced economic development.¹⁰ This chapter makes a modest attempt to review some of the more salient works of this literature; readers preferring further detail should review the bibliographies and references of the cited material. The general conclusion of this review is that most neoclassical approaches of the role of external flows in the development process surmise that, for the most part, external flows unidirectionally augment economic development. There are, however, dissenters who dispute this conclusion and consider this result half forecast and half hope.

¹⁰ Indeed, one can argue that its roots go back to the classical political economists.

2.2 UNILATERAL TRANSFERS AND EXTERNAL DEBT

Bhagwati and Eckaus (1970) in the introduction to their book describe the ambivalence pervading the literature on foreign economic assistance in the development process. They note that in some countries aid was important to their development, e.g., Greece and Israel; while other countries that had refused aid programs "stagnated,"¹¹ e.g., Indonesia and Burma. They also argue that the real value of aid flows to some countries may have been substantially less than their nominal values, this being a consequence of source-tying and/or project tying of aid. In principle, aid may have failed in some countries because it was too little to produce the desired outcome. Bhagwati and Eckaus also emphasize the disincentive effects on savings patterns, national psychology, and, in particular, on a country's resolution to achieve economic development.

Ohlin (1956) reviews and attempts to clarify the existence of an aid doctrine that guides the MDCs in their foreign aid programs. In addition, he discusses the inherent contradictions of these programs. Ohlin's inquiry leads him to the conclusion that foreign economic assistance has multiple objectives and that often non-economic motives supersede development considerations when a donor decides on the quantity, distribution, and allocation of aid. For

¹¹ Bhagwati, Jagdish and Richard S. Eckaus, editors, Foreign Aid: Selected Readings (Middlesex, England: Penguin Books Ltd., 1970), p. 14.

example, he points out that in many cases there is "confusion about the nature and purpose of foreign aid"¹² and that "foreign aid policy is in the nature of political action."¹³

Continuing his analysis, Ohlin notes that support for foreign economic assistance by international agencies and organizations, such as the United Nations and the World Bank, rests on a normative approach to solving underdevelopment. They reason that the MDCs have a moral responsibility to help the LDCs. In contrast, Ohlin states, the United States has a threefold objective in giving foreign assistance: charitable, economic, and strategic. Further, U.S. government studies support the idea that absorptive capacity should be the criterion for the allocation of development assistance and that aid should maximize the recipient nation's effort by increasing its marginal savings rate and by capturing marginal increments in income for investment. In practice, however, foreign aid became a tool of American foreign policy. Some experts, Ohlin asserts, view development assistance as a way to expand export markets for American goods and by extension maintain U.S. economic growth. Further emphasizing this political dimension to development assistance, he points out

¹² Ohlin, Goran, "The Evolution of Aid Doctrine," in Bhagwati, Jagdish and Richard S. Eckaus, editors, Foreign Aid: Selected Readings, (Middlesex, England: Penguin Ltd., 1970), p. 21.

¹³ Ibid., p. 22.

that most MDCs tend to give substantial amounts of aid to their former colonies.

The OECD (1980) comments on the pros and cons of development assistance, but predictably it concludes the essentiality of aid to achieve economic development. The Brandt Commission (1980) makes a stronger case for aid on normative grounds. Wall (1973), on the other hand, concludes that foreign economic assistance is simply a redistribution scheme to transfer income from the developed to the developing world; however, he stresses that the burden on the former countries exceeds the gain in welfare of the latter group of countries. Alternatively stated, foreign economic assistance is Pareto inefficient.

In what is considered a classic rebuttal to the aid-cum-development literature, Friedman (1958) forcefully argues that foreign economic assistance programs have confused the objectives with the means of achieving economic development. He notes that most economic assistance requires the recipient nation to make an additional effort to achieve development. This usually implies an all encompassing development program and implementation of measures to secure a good fraction of increases in income for investment. Friedman bluntly states that today's MDCs developed without such conditionality.¹⁴

¹⁴ Similarly, Meier (1968) notes that "the present role of foreign capital in poor countries cannot be examined apart from development planning." p. 97.

Capital, Friedman underscores, would be forthcoming from the private sector if the preconditions for development were ripe; otherwise capital made available by aid is simply wasted. More importantly, he argues that such economic aid promotes monument building and strengthens the public sector at the expense of the private sector. Alternatively stated, economic development can be effected by the "strengthening of free market domestic economies in the less-developed nations, the removal of obstacles to private international trade, and the fostering of a climate favorable to private international investment."¹⁵

On a more technical level, other neoclassical approaches apply the economic criteria of efficiency to determine the level of economic assistance a nation should receive. This is known as the "demand determined" approach as opposed to the "supply determined" approach adopted by the United Nations, and the Pearson and Brandt Commissions. The advantage of the former approach is that it acknowledges absorptive capacity as an important ingredient to the determination of aid flows. First, however, note that Eckaus (1969) attempts to develop economic criteria for foreign aid and emphasizes that aid disbursements should be made within the context of the development path of the recipient nation. Eckaus also notes the implicit normative

¹⁵ Friedman, Milton, "Foreign Economic Aid: Means and Objectives," in Bhagwati, Jagdish and Richard S. Eckaus, editors, Foreign Aid: Selected Readings, (Middlesex, England: Penguin Books Ltd., 1970), p. 64.

and political considerations in aid allocation, however. Singer (1965) debates if such assistance should be targeted for economic planning or projects without resolving the issue. Schmidt (1964), in contrast, compares loans versus grants as catalysts for development. Schmidt then argues that the conventional outlook on this issue ignores the relative costs of each type of financial flow in achieving a given level of benefit to the recipient nation. Furthermore, Rosenstein-Rodan (1961) formulated a model indicating the required level of external flows to achieve specific development targets. The Rosenstein-Rodan model calculates the external capital flow as being a function of a country's average and marginal savings rates, the capital-output ratio, and the rate of growth in real output (assumed based on estimated absorptive capacity). The somewhat more technical approaches are those of Chenery and Bruno (1962), Chenery and Strout (1966) and McKinnon (1964) in which models were formulated where external flows are viewed as fomenting economic development. In the latter two articles of the twofold role of foreign capital, one of complementing domestic savings and one of covering the foreign exchange gap, there is no provision for the subsequent transfer of interest and amortization payments. In essence, external flows in toto are incorrectly treated as unilateral transfers. Hawkins (1970), however, observes in his study that "developing countries receive more and

more aid in the form of loans, rather than grants ¹⁶

The dimensions of external debt as a policy instrument for development were systematically analyzed by Avramovic (1958), Avramovic and Ravi (1960), and Avramovic et al. (1964); the last study was one of the first comprehensive analysis of economic growth and external debt. As this work states:

Foreign capital supplements natural resources and this helps raise the rate of capital formation. By making possible a higher rate of investment than would otherwise be feasible, foreign capital raises the rate of growth.¹⁷

In all these studies the growth of external debt is considered a natural extension of the aid-cum-development doctrine. At the policy implementation level, the creation and evolution of The World Bank confirms this thesis. A recent study, specifically, notes the following: External debt . . . has always been an instrument with . . . positive potential for economic development.¹⁸ Another study, in contrast, notes that "large amounts of debt contracted . . . did not result in faster growth of real GNP."¹⁹

¹⁶ Hawkins, E. K., The Principles of Development Aid (Middlesex, England: Penguin Books Ltd., 1970), p. 55.

¹⁷ Avramovic, Dragoslav, et al., Economic Growth and External Debt (Baltimore, Maryland: The Johns Hopkins Press, 1964), p.10.

¹⁸ Cline, William R., International Debt and the Stability of the World Economy (Washington, D.C.: Institute for International Economics, September 1983), p. 9.

¹⁹ International Monetary Fund, External Indebtedness of Developing Countries (Washington, D.C.: International Monetary Fund, May 1981), p. 19.

Regarding the theoretical approaches, Bade (1972) developed a model of optimal growth and external borrowing with immobile foreign capital. McCabe and Sibley (1976) also formulated a static and dynamic approach to optimal foreign debt accumulation with export revenue uncertainty. Vanek (1967) formulates a structural model for an economy which incorporates external debt and its concomitant service payments. The model is then used to estimate foreign resource requirements for development in the case of Colombia; results are then subjected to sensitivity analysis. Similarly, Feder (1978) develops a structural model of economic growth explicitly allowing for foreign loans and debt servicing capacity. One important finding of Feder's cross country simulations is that there is a range for the GDP target growth rate to be reduced so as to decrease external debt and the probability of debt servicing problems. However, he also finds that a reduction in the GNP growth rate beyond some critical point will impair debt servicing capacity. Areskoug (1969), regressing certain macroeconomic variables on external public borrowing and other regressors, concludes that international borrowing to achieve development has not been as productive as believed. He notes that the contribution of external borrowing to enhance economic development has indeed been overestimated. It appears, Areskoug observes, that external borrowing has been used more so for intertemporal reallocation of

consumption than for investment. The related issue of debt-cum-development policy, namely the debt servicing capacity of nations, has also been extensively examined in the literature. Notable examples are Alter (1961), Frank and Cline (1971), Saini and Bates (1978); McDonald (1982) presents an exhaustive overview of this literature.

2.3 EXPORTS AND DIRECT FOREIGN INVESTMENT

The literature on export-led development can probably be traced in its origins to Adam Smith. Specifically, he wrote:

When the produce of any particular branch of industry exceeds what the demand of the country requires, the surplus must be sent abroad, and exchanged for something for which there is a demand at home. Without such exportation, a part of the productive labour of the country must cease, and the value of its annual produce diminish.²⁰

Using contemporary economic jargon, Smith considered exports as a vehicle for a country to move from an inferior production bundle within her production transformation frontier to a superior production bundle towards or on her production transformation frontier.

Myint (1958) reconsiders the classical theory of international trade and notes its greater relevance to the developing countries than the comparative cost doctrine of trade. He emphasizes that the classical theory of trade can

²⁰ Smith, Adam, An Inquiry into the Nature and Causes of the Wealth of Nations (New York, New York: The Modern Library, 1937), p. 353.

be viewed as a two sided coin. We have, on the obverse side, the vent for surplus theory whereby trade overcomes the smallness of the domestic market by providing an alternative outlet for products in excess of domestic needs. On the reverse side, we have the productivity theory of international trade. This theory states, given the initial benefit of increasing the extent of the market, trade augments the division of labor and raises the level of productivity. Trade or exports, in essence, are viewed favorable as a policy instrument for economic development. In addition, Myint links export-led development with direct foreign investment by stating that "the existence of suitable surplus natural resources in an underdeveloped country is a pre-condition of attracting foreign investment into it."²¹

The contemporary theory of international trade has as its cornerstone specialization resulting from comparative costs advantages based on relative factor endowments. This result, a product of the Heckscher-Ohlin theorem, predicts Hicksian improvements in national welfare from unfettered international trade. Mundell (1957) shows that even if factor endowments are not mobile, an assumption contrary to the Heckscher-Ohlin model, product movements are a

²¹ Myint, Hla, "The 'Classical Theory' of International Trade and the Underdeveloped Countries," in Caves, Richard E. and Johnson, Harry G., editors, Readings in International Economics (Homewood, Illinois: Richard D. Irwin, Inc., 1968), p. 327.

substitute for factor movements; hence, commodity price equalization gives impetus to a tendency of factor price equalization. Lewis (1980), in his Nobel Prize lecture, takes a locomotive approach when he expresses concern that stagflationary pressures in the MDCs may result in the slowing of the engine of development in the LDCs, for "[T]he main link between the MDC and LDC economies has been the MDC demand for LDC primary commodities."²² Moreover, traditional orthodox textbooks accept these results unequivocally, e.g., Caves and Jones (1977), while others do not, e.g., Todaro (1977).

The most articulate argument opposing the export-direct-foreign-investment-cum-development hypothesis is the Singer-Prebisch thesis. The foundation of their position rests on the asymmetrical relationship between the MDCs and LDCs. Singer (1950) states that direct foreign investments in developing countries are simply extensions of the economies of the MDCs. This investment activity, he stresses, is conducted mainly to provide food and primary materials to the developed world. Therefore, the export sector never becomes an integral part of the host nation's economy. As Singer puts it:

[T]he multiplier effect in the form of cumulative additions to income, employment, capital, technical knowledge, and growth of external economies . . . should in fact be considered as

²² Lewis, Arthur W., "The Slowing Down of the Engine of Growth," The American Economic Review (September, 1980), Vol. LXX, No. 4, p. 559.

domestic investment on the part of the industrialized countries."²³

A corollary conclusion of his analysis is that the LDCs are experiencing a secular decline in their terms of trade. This has resulted, Singer postulates, from the fact that technological innovations in the production of food and raw materials results in falling prices for these goods. On the other hand, he states that technical progress in manufactures tends to increase income in the MDCs. Singer also observes that during commodity booms developing countries do not industrialize because times are favorable and during commodity slumps they lack the revenues to industrialize.

Prebisch (1959) also emphasizes the unequal relationship in trading arrangements between the developing and developed world. He theorizes two major asymmetries. First, the ability of the MDCs to influence the rate of growth in the LDCs through trade and investment. The LDCs, Prebisch says, do not have this ability and hence are unable to increase the MDCs demand for their primary commodities. Second, the LDCs, being primary producers, are experiencing a secular decline in their terms of trade; the MDCs, producers of manufactures, are realizing secular improvements in their terms of trade.

²³ Singer Hans W., "The Distribution of Gains Between Investing and Borrowing Countries," in Caves, Richard E., and Harry G. Johnson, editors, Readings in International Economics (Homewood, Illinois: Richard D. Irwin, Inc., 1968). P 308.

Needless to say, there are studies confirming and contradicting the Singer-Prebisch thesis of the undesirable results of the export direct foreign investment cum development process. For example, Findlay (1979) constructs a rigorous neo-classical model to show the Singer-Prebisch world, but emphasizes that the existence of an asymmetrical economic relationship between the MDCs and LDCs has not been unambiguously proven. Diaz-Alejandro (1978), however, notes that the argument that the world trading system displays asymmetries detrimental to the developing world is not completely without merit. Brecher and Bhagwati (1981), similarly, show in their study that the conventional welfare gains of international trade do not always hold when national and aggregate income differ and there is foreign ownership of capital in an economy. Indeed, they note that under some conditions a nation can experience gains in national welfare if foreign ownership were not present and that free trade may be inferior to subsidized trade and to no trade. Bairoch (1975), in his classic study of economic development in the Third World, however, finds no evidence for a secular decline in the terms of trade of developing countries.

Turning more specifically to direct foreign investment, we can note that Biersteker (1981) criticizes the pattern of direct foreign investment in developing economies. He asserts that multinational corporations promote a net

outflow of capital, displace indigenous production, introduce inappropriate production technologies and consumption patterns, limit technology transfers, and increase income inequality. In the same study, it is important to note, Biersteker also presents the opposing view; namely, multinational corporations augment the capital stock and hence the rate of growth of productivity and national income in developing countries. Hymer (1970) also emphasizes that the conclusion of the optimality of free trade and free factor movements so as to achieve allocative efficiency "does not apply to direct foreign investment because of the anticompetitive effect inherently associated with it."²⁴ The World Bank in her World Development Report 1981, in contrast, emphasizes both external finance and trade as vehicles for economic development.

McKinnon (1973) concludes that some countries that are considered to have developed because of export and/or direct foreign investment actually developed because of market liberalization policies. He asserts that these policies increased exports and foreign investment. In fact, McKinnon's empirical findings support Friedman's (1958) contention that only a market determined allocation of resources, domestically and internationally, will foment economic development.

²⁴ Hymer, Stephen, "The Efficiency (Contradictions) of Multinational Corporations," The American Economic Review (May, 1970), Vol. LX, No. 2, p. 443.

2.4 CONCLUSIONS

The confluence of neoclassical approaches to exogenously motivated economic development surmise a hypothesis of external flows favorably influencing economic development. However, there are, and in particular in more recent years, departures from this conventional wisdom. Some neoclassical economists have, in essence, indicated the unfavorable or counter-developing effects of external flows.

It is, moreover, the author's view that the well known neoclassical assumption of external flows unidirectionally augmenting economic development is a non sequitur. To be more specific, an endogenous process of self-sustained development may effect an increase in external flows and not necessarily vice-versa. A developing country, for example, with a comfortable endogenously determined rate of development may:

1. be considered a good credit risk and thus permit her to borrow funds on the international money and capital markets;
2. be able to attract direct foreign investment whose purpose is to procure more of the host country's expanding domestic market or to produce goods for the foreign entrepreneur's own market;
3. be capable to enhance her capacity to export goods and services because of country specific factors.

As such, it is suggested that a cogent argument for a current or distributed feedback relationship between economic development and external flows can be made. Granted this, an attempt is made to test for both a unidirectional and feedback relationship among external flows and two economic development indicators in this study. First, however, a study like this one requires a structural overview of the economies under review. This is done in the following chapter.

Chapter III

STRUCTURE OF THE SOUTH AMERICAN ECONOMIES

3.1 INTRODUCTION

Admittedly, since a study into the role of external flows in developing countries is fundamentally an inquiry into the external financing of economic development, we begin our empirical investigation with a comparative analysis of a group of selective economic aggregates and their growth rates. More specifically, per capita income is used as a proxy for economic development and the recent growth and structure of the group of ten South American countries are analyzed. Then we discuss the sectoral distribution of the labor force, the structure of demand, the growth of consumption and investment and the adequacy of gross national savings to finance domestic investment. Finally, the external sector of each country is examined to determine the following: the share of international trade in GDP, the export/import ratio, the growth and structure of trade, the changes in the terms of trade - both the net barter and income terms of trade are considered, and then the international reserves position is reviewed. Since this chapter, by virtue of its objectives, is a statistical review discussion is kept brief and limited only to interpreting the relevant statistics and providing insights

into the recent economic development of the ten South American countries under review.

3.2 SELECTED INDICATORS OF ECONOMIC DEVELOPMENT

We define the concept of economic development here as growth in material goods available to people. Concomitant with this increase in output there are implied changes in the technical and institutional structure by which output is produced and distributed. Further, this process also assumes structural changes in the allocation of inputs to various sectors in the economy as well as changes in the composition of output.²⁵

We can, therefore, use per capita income, together with other economic indicators, to measure the level and structure of economic development for the ten countries under discussion. There are, however, difficulties involved in using per capita income as a measure of economic development. This measure, for instance, ignores the fact that in most developing countries many transactions occur outside the monetary nexus and hence are not reflected in GNP figures. Further, per capita income figures do not relate information about the real purchasing power of income nor of its distribution. However, it is the author's view, that for a set of geographically and historically similar

²⁵ For further detail on the measurement of economic development see Kindleburger, Charles P. and Bruce Herrick, Economic Development, Third Edition (New York, New York: McGraw-Hill Book Company, 1977), pp. 1-19.

countries, such as the South American countries, per capita income does give an indication of the relative strengths of their economies.

Referring to Table 1, we find all the South American countries, having a per capita income of over \$410 in 1980, fall into the World Bank's definition of middle income developing economies: Bolivia, Ecuador, Peru and Venezuela are oil exporters; Argentina, Brazil, Chile, Colombia, Paraguay and Uruguay are oil importers. However, the South American economies appear to be under performers. This result follows from a comparison of each country's average growth rate of per capita GNP to its respective average income group for the period 1960-1980. The notable exceptions being Ecuador with 4.5% vs. 3.3% and Brazil with 5.1% vs. 4.1%. In terms of per capita GNP level in 1980, Ecuador with \$1,270 and Venezuela with \$3,630 exceeded the average per capita income level for oil exporters of \$1,160. For the oil importers, in contrast, only Colombia and Paraguay with \$1,180 and \$1,300 per capita income respectively did not exceed the weighted average for their income group of \$1,560.

Table 2 further indicates the relative robustness of the group of ten by dissecting each country's growth of production, GDP, by major sectors of economic activity: agriculture, industry, and services. The agricultural sector consists of agriculture, forestry, hunting and

TABLE 1
GROSS DOMESTIC PRODUCT PER CAPITA

U.S. dollars		Average annual growth rate			
1980a,b		1950-60	1960-65	1965-70	1960-80b
Middle income oil exporters					
Bolivia	570	...	2.5	2.1	2.1
Ecuador	1270	...	...	2.7	4.5c
Peru	930	2.2	4.1	1.4	1.1
Venezuela	3630	3.6	3.7	1.6	2.6
Middle income oil importers					
Argentina	2390	.9	2.0	3.1	2.2
Brazil	2050	3.7	1.1	5.0	5.1
Chile	2150	1.8	2.6	1.7	1.6
Colombia	1180	1.5	1.4	2.9	3.0
Paraguay	1300	.1	1.9	1.6	3.2
Uruguay	2810	.3	-0.6	1.0	1.4
United States	11360d	1.5	3.2	2.1	2.3
Middle income economies					
Oil exporters	1160w	...	...	...	3.3w
Oil importers	1560w	...	...	...	4.1w

a Dichotomy of countries is the one used by The World Bank.
 Middle income developing economies have a per capita income of over \$410 in 1980. See second source for further detail.
 b Data is for GNP per capita, see second source.
 c Because of the unavailability of data for the early 1960s, figure is for period other than specified. See second source for further detail.
 d United States is categorized as an industrial economy.
 w Indicates the summary measure is a weighted average.

Source: The World Bank, World Tables, The Second Edition (Baltimore and London: The John Hopkins University Press, 1980), p. 374 and p. 376.

The World Bank, World Development Report 1982 (New York: Oxford University Press, 1982), pp. 110-111.

fishing. The industrial sector comprises of mining, manufacturing, construction, and electricity, water and gas. All remaining economic activity is considered as services. Manufacturing, while part of the industrial sector, is shown separately here; for it is the most dynamic segment of industrial activity. Returning to Table 2, for the period 1970-80, we observe the following: only half of the countries under consideration achieved a typical LDC growth rate in GDP, i.e., 5% or more; only Bolivia, Venezuela, Brazil, Colombia, Paraguay and Uruguay had a growth rate in agricultural production exceeding the medium growth rate for their respective income groups; growth rates in industrial production were impressive, exceeding 5%, in half of the countries, however, only in Ecuador, Brazil and Paraguay did industrial growth rates exceed medium values; in manufacturing, a segment of the industrial sector, we find only forty percent of the group of ten, Ecuador, Brazil, Colombia and Paraguay, had growth rates exceeding the medium values of their respective income groups. The pattern of growth rates in the services across countries is similar to the experience in manufacturing.

A good indicator of the direction and magnitude of economic development achieved by the group of ten can be obtained by examining the structure, and changes in structure, of the components of GDP. This is done in Table 3. We find, for the most part, inter and intra-country

TABLE 2

GROWTH OF PRODUCTION

Country	GDP		Average annual growth rate (percent)							
	1960-70	1970-80	Agriculture		Industry		Manufacturing		Services	
			1960-70	1970-80	1960-70	1970-80	1960-70	1970-80	1960-70	1970-80
Argentina	4.2	2.2	2.2	2.6	5.9	1.8	5.7	1.0	3.4	2.6
Bolivia	5.2	4.8	3.0	3.1	6.2	4.3	5.4	6.0	5.4	5.7
Brazil	5.4	8.4	...	4.9	...	9.3	...	10.3	...	8.4
Chile	4.5	2.4	2.6	2.3	4.8	0.2	5.5	-0.5	4.6	4.1
Colombia	5.1	5.9	3.5	4.9	6.0	4.9	5.7	6.3	5.7	7.0
Ecuador	...	8.8	...	2.4	...	12.1	...	9.8	...	9.4
Paraguay	4.2	8.6	...	6.9	...	10.6	...	7.9	...	8.9
Peru	4.9	3.0	3.7	(.)	5.0	3.7	5.7	3.2	5.3	3.5
Uruguay	1.2	3.5	1.9	0.2	1.1	5.2	1.5	4.1	1.0	3.6
Venezuela	6.0	5.0	5.8	3.8	4.6	3.0	6.4	5.7	7.3	6.5
U.S.A.	4.3	3.0	0.3	1.2	4.9	1.2	5.3	2.9	4.2	3.2
Middle income economies										
Oil exp.	6.2w	5.5w	3.0m	2.9m	6.2m	7.4m	6.8m	8.0m	5.1m	7.2m
Oil imp.	5.8w	5.6w	3.5m	2.8m	7.8m	6.6m	7.5m	6.2m	5.7m	5.7m

wIndicates figure is a weighted average.

mIndicates figure is a median value.

Note: The notation (.) implies the figure is less than half the unit shown.

Source: The World Bank, World Development Report 1982 (New York: Oxford University Press, 1982), pp. 112 - 113.

structural transformations for the historical period under review. The development process, historically speaking, requires an absolute increase in agricultural production together with a decline in the relative share of agriculture in total output. This structural change releases labor to the incipient industrial sector. We find important structural changes from 1960 to 1970 and few changes in structure from 1970 to 1980. First, agriculture's share remained stable only in Argentina, Chile and Venezuela; for the remaining countries it declined meaningfully. Simultaneously, industry's share showed a marked increase, Chile being the exception. For example, industry's share in Argentina went from 38% in 1960 to 45% in 1980, in Ecuador from 19% in 1960 to 38% in 1980, in Peru from 33% in 1960 to 45% in 1980. Manufacturing, the dynamic segment of industrial production, however, remained relatively stable for all ten countries. The services sector's share exhibited a similar stability; Chile and Venezuela being the exceptions. Specifically, in Chile the share of services in total output increased from 39% in 1960 to 56% in 1980; in Venezuela it declined dramatically from 72% in 1960 to 47% in 1980.

The sectoral percentage distribution of the labor force in economic activity is presented in Table 4. We conclude, even though there has been a dramatic decrease from 1960 to 1980, that a high percentage of the labor force in many

TABLE 3

STRUCTURE OF PRODUCTION

Country	Agriculture			Distribution of gross domestic product (percent)						Services		
	1960a	1970b	1980a	Industry			Manufacturing			1960a	1970b	1980a
				1960a	1970b	1980a	1960a	1970b	1980a			
Argentina	16	13	13c	38	40	45c	32	30	37c	46	47	42c
Bolivia	26	18	18	25	30	29	15	14	14	49	52	53
Brazil	16	10	10	35	36	37	26	27	28c	49	54	53
Chile	10	7	7	51	43	37	29	27	21	39	50	56
Colombia	34	29	28	26	27	30	17	18	22	40	45	42
Ecuador	29	28	13	19	22	38	13	16	8	48	49	49
Paraguay	36	32	30	20	21	25	17	17	17	44	47	45
Peru	18	20	8	33	31	45	24	19	27	49	48	47
Uruguay	19	13	10	28	29	33	21	24	25	53	58	57
Venezuela	6	7	6	22	40	47	...	16	16	72	53	47
U.S.A.	4	3	3	38	35	34	29	26	24	58	62	63
Middle income economies												
Oil exp.	28w	...	14w	24w	...	43w	13w	...	16w	48w	...	43w
Oil imp.	23w	...	15w	32w	...	37w	23w	...	23w	45w	...	48w

aData from second source.

bData from first source.

cIndicates figure is for 1977, from first source.

wFigure is a weighted average.

Note: Data for Bolivia, Chile, Ecuador, Paraguay, and Venezuela for the years of 1960 and 1970 are GDP at market prices. Data for Brazil for the years of 1960 and 1970 are net domestic product at factor cost. Data for Peru for the years of 1960 and 1970 are net national product at factor cost.

Source: The World Bank, World Tables, The Second Edition (Baltimore and London: The John Hopkins University Press, 1980), pp. 392 - 394.

The World Bank, World Development Report 1982 (New York: Oxford University Press, 1982), pp.114 - 115.

South American countries continue to be engaged in agriculture. This observation is consistent with empirical development processes. In essence, this structural change, the decline in the percentage of the labor force in agricultural activities, increases labor's productivity in the agricultural sector, since the capital/labor ratio rises. Labor is then freed only to be harnessed by a growing industrial sector. In short, many of the South American economies have a large pool of labor in their agricultural sector that can be tapped to serve an expanding industrial sector without fear of real wages retarding the industrialization process. The crux here is that labor from the subsistence agricultural sector can be enticed to the expanding industrial sector by offering labor a wage not equal to the value of its marginal product, but to labor's agricultural subsistence wage plus a small premium.²⁶ Finally, we note that the share of labor engaged in industry remained relatively stable for most countries during this historical period.

In Tables 5 and 6 the structure of demand and the growth of consumption and investment are presented. Referring to the structure of demand we can conclude the following: Argentina had the most drastic change in public

²⁶ This is consistent with Arthur Lewis' thesis in "Economic Development with Unlimited Supplies of Labor," in Agarwala, A. N. and S.P. Singh, editors, The Economics of Underdevelopment (Delhi, India: Oxford University Press, 1977), pp. 400-449.

TABLE 4
SECTORAL PERCENTAGE DISTRIBUTION OF LABOR FORCE

Country	Agriculture		Industry		Services	
	1960	1980	1960	1980	1960	1980
Argentina	20	13	36	28	44	59
Bolivia	61	50	18	24	21	26
Brazil	52	30	15	24	33	46
Chile	30	19	20	19	50	62
Colombia	51	26	19	21	30	53
Ecuador	58	52	19	17	23	31
Paraguay	56	49	19	19	25	32
Peru	52	40	20	19	28	41
Uruguay	21	11	29	32	50	57
Venezuela	35	18	22	27	43	55
United States	7	2	36	32	57	66
Middle income economies						
Oil exporters	65w	47w	13w	21w	22w	32w
Oil importers	59w	42w	16w	22w	25w	36w

wFigures are a weighted average.

Source: The World Bank, World Development Report 1982
(New York: Oxford University Press, 1982)
pp. 146-147.

consumption's share, 9% in 1960 to 24% in 1979 with private consumption's share declining from 70% in 1960 to 41% in 1980; ninety percent of the countries experienced a decline in the share of private consumption in GDP from 1960 to 1980; the share of gross domestic investment in GDP increased markedly from 17% in 1960 to 29% in 1980 for Paraguay, while in Chile it declined from 27% in 1960 to 18% in 1980, in Peru the decline was from 25% in 1960 to 16% in

1980; gross domestic savings exhibited a similar relationship. The share of goods and nonfactor services in demand increased in eight of the ten countries from 1960 to 1980; while the resource balance, the current account balance excluding unilateral transfers and factor payments, as a percentage of GDP improved in only three countries.

In Table 6 for the period 1970-80 we observe the following: the average annual growth rate in public and private consumption for most of the South American countries was around the medium growth rates for their respective income groups; gross domestic investment during 1960-70 was strong for Bolivia (9.6%), Brazil (7.0%) and Venezuela (7.6%), while for the period 1970-80 Brazil, Peru, Uruguay and Venezuela had a high growth rate in gross domestic investment of 9.7%, 18.7%, 9.3% and 10.2% respectively.

As discussed in Chapter 1, domestic savings provide a *modus operandi* to finance economic development: however, only through net qualitative and quantitative increases in physical and human capital can the economic development process be sustained and vigorous. That is, sufficient savings, in and of themselves do not insure economic development. Savings foment the development process only if they are used by risk-oriented entrepreneurs for net physical and human capital accumulation. One can envision an economy where the ratio of savings to national income is high, but where investments are non-productive, i.e., they

TABLE 5

STRUCTURE OF DEMAND

Country	Distribution of gross domestic product (percent)											
	Public consumption		Private consumption		Gross domestic investment		Gross domestic savings		Exports of goods and nonfactor services		Resource balance	
	1960	1980	1960	1980	1960	1980	1960	1980	1960	1980	1960	1980
Argentina	9	24a	70	41a	22	26a	21	35a	10	13a	-1	9a
Bolivia	7	10	86	75	14	13	7	15	13	17	-7	2
Brazil	12	b	67	80	22	22	21	20	5	9	-1	-2
Chile	12	12	63	72	27	18	25	16	17	21	-2	-2
Colombia	6	8	73	67	21	25	21	25	16	17	(.)	(.)
Ecuador	10	14	75	63	15	25	15	23	18	24	(.)	-2
Paraguay	8	6	76	74	17	29	16	20	18	10	-1	-9
Peru	9	13	64	68	25	16	27	19	20	24	2	3
Uruguay	9	14	79	74	18	19	12	12	14	9	-6	-7
Venezuela	14	13	53	55	21	25	33	32	32	33	12	7
U.S.A.	17	18	64	65	18	18	19	17	5	10	1	-1
Middle income economies												
Oil exp.	11w	13w	70w	58w	18w	27w	19w	30w	21w	29w	1w	3
Oil imp.	12w	14w	69w	68w	21w	27w	19w	21w	14w	22w	-2w	6

aFigures are 1979, from first source.

bSeparate public consumption figures are not available; therefore, they are included in private consumption.

wIndicates figure is a weighted average.

Note: The notation (.) implies the figure is less than half the unit shown.

Source: The World Bank, World Development Report 1981 and 1982 (New York: Oxford University Press, 1981 and 1982), pp. 142-143 and pp. 118-119.

TABLE 6
GROWTH OF CONSUMPTION AND INVESTMENT

Country	Average annual growth rate (percent)					
	Public consumption		Private consumption		Gross domestic investment	
	1960-70	1970-80	1960-70	1970-80	1960-70	1970-80
Argentina	1.2	12.1a	4.1	-2.0a	4.1	2.9a
Bolivia	8.9	7.3	4.1	6.4	9.6	2.9
Brazil	3.5	8.1a	5.1	8.5a	7.0	9.7a
Chile	4.7	0.9	4.9	2.6	4.2	-1.8
Colombia	5.5	4.9	5.5	5.8	4.5	5.4
Ecuador	...	13.5	...	9.8	...	8.8
Paraguay	6.9	5.6	5.3	7.7	6.8	18.7
Peru	6.3	6.2	7.1	3.0	1.0	2.3
Uruguay	4.4	3.6	0.7	0.9	-1.8	9.3
Venezuela	6.3	8.2b	5.0	11.0b	7.6	10.2b
U.S.A.	4.1	1.8	4.4	3.4	4.8	1.6
Middle income countries						
Oil exp.	7.3m	9.9m	4.2m	6.9m	4.6m	11.0m
Oil imp.	6.1m	6.4m	5.5m	5.1m	7.9m	6.6m

aFigures are for 1970-79.

bFigures are for 1970-79, from first source.

mFigure is a median value.

Source: The World Bank, World Development Report 1981 and 1982 (New York: Oxford University Press, 1981 and 1982), pp. 140-141 and pp. 116-117 respectively.

do not augment the productive capability of the economy. Hoarding gold or silver sovereigns, land speculation and conspicuous consumption are all examples of non-productive investments which do occur in developing countries. Savings, in short, is a necessary, but not a sufficient condition for development. In Table 7, we find most

countries in South America, Venezuela being the exception, have for the recent historical period, insufficient savings to cover domestic investment requirements, making a capital inflow necessary. Further, this "savings gap" appears to be widening across countries over time. Consider, for instance, that for the period 1950-1960 10%, 60% and 0% of the countries under review had ratios in excess of 100%, 90% and 80%. While for the period 1960-1970 10%, 30% and 40% of the group of ten had ratios exceeding 100%, 90% and 80%; and by 1970-1977 only 20%, 10% and 30% of these countries had ratios in excess of 100%, 90% and 80%.

Another ratio of interest in analyzing the relative economic strengths of the South American economies is the percentage of international trade in GDP, Table 8. This ratio is calculated by dividing the sum of exports and imports by GDP. In actuality, this ratio gives a measure of a country's economic dependence on the international economy. This ratio, by extension, also relates the susceptibility of an economy to an international shock. Table 8 relates that, except for Argentina and Brazil, over a quarter of GDP for the South American countries is generated in the international economy. Moreover, we find in Ecuador, Peru, and Venezuela that half of their income is generated in the international sector. Venezuela, in addition, is the only country in the group of ten that had a persistent favorable export/import ratio (see Table 9), for

TABLE 7

GROSS NATIONAL SAVINGS AS A PERCENTAGE
OF GROSS DOMESTIC INVESTMENT

Country	1950-1960	1960-1970	1970-1977
Argentina	93.1	99.0	110.4
Bolivia	49.3 ^b	66.3	84.5
Brazil	93.9	96.2	84.6
Chile	73.8	88.6	67.6
Colombia	93.1	84.8	94.6
Ecuador	99.0	80.9	87.6
Paraguay	97.0	75.6	80.7
Peru	90.1	89.1	61.0
Uruguay	68.8	97.4	77.1
Venezuela	110.3	114.5	126.5
United States	105.4	105.2	102.5

aGross national savings is defined to exclude net current transfers from abroad.

bFigure is for 1960.

Source: The World Bank, World Tables, The Second Edition (Baltimore and London: The John Hopkins University Press, 1980), pp. country pages.

the years under review. Needless to say, an export/import ratio that exceeds unity is considered favorable, for it implies an inflow of funds in excess of import requirements that may be used to finance capital accumulation needs of the development process. Argentina and Peru had export/import ratios that exceeded unity in three of the four years under review, while Bolivia, Colombia and Peru had a favorable ratio for only two out of four years.

TABLE 8
PERCENTAGE OF INTERNATIONAL TRADE IN GDP

Country	1955	1960	1970	1980
Argentina	40a	21a	18	20
Exports	36a	10a	9	12b
Imports	4a	11a	9	8b
Bolivia	11	40	40	37
Exports	5	16	20	19
Imports	6	24	20	18
Brazil	...	14	13	20
Exports	...	7	6	9
Imports	...	7	7	11
Chile	...	...	20	45
Exports	...	...	10	21
Imports	...	...	10	24
Colombia	36	32	30	32
Exports	12	16	14	16
Imports	14	16	16	16
Ecuador	38	36	33	50
Exports	19	18	14	24
Imports	19	18	19	26
Paraguay	27	36	31	29
Exports	13	18	15	10
Imports	14	18	16	19
Peru	44	48	36	50
Exports	20	24	20	27
Imports	24	24	16	23
Uruguay	...	35	25	36
Exports	...	14	12	15
Imports	...	21	13	21
Venezuela	55	52	42	58
Exports	23	32	23	30
Imports	22	20	19	28
United States	8	9	11	21
Exports	4	5	5	10
Imports	4	4	6	11

aFigures are from 1980 Yearbook.

bFigures are for 1978.

Source: International Monetary Fund, International Financial Statistics 1980, 1981 and 1982 Yearbooks, Volumes XXXIII, XXXIV and XXXV (Washington, D.C.: International Monetary Fund 1980, 1981 and 1982), pp. country pages.

TABLE 9
EXPORT/IMPORT RATIO

Country	1955	1960	1970	1980
Argentina	9.00	.91	1.00	1.50
Bolivia	.83	.67	1.00	1.06
Brazil	...	1.00	.86	.82
Chile	...	...	1.00	.88
Colombia	.86	1.00	.88	1.00
Ecuador	1.00	1.00	.74	.92
Paraguay	.93	1.00	.94	.53
Peru	.83	1.00	1.25	1.17
Uruguay	...	.67	.92	.71
Venezuela	1.50	1.60	1.21	1.07
United States	1.00	1.25	.83	.91

Source: Table 8.

Turning to the growth of merchandise trade in Table 10, we find that Ecuador, Peru, and Argentina, Brazil, Chile, Paraguay and Uruguay experienced average annual growth rates in exports for the period 1970-80 exceeding that of their medium income groups. Further, seventy percent of the countries had higher average export growth rates in 1970-80 relative to 1960-70. Similarly, Bolivia, Ecuador, and Brazil, Colombia, Paraguay and Uruguay had a higher average annual growth rate in imports for 1970-80 relative to the medium growth rates for their income groups. Finally, the terms of trade deteriorated in over half the countries from 1960 to 1980.

TABLE 10
GROWTH OF MERCHANDISE TRADE

Country	Average annual growth rate (percent)				Terms of Trade (1975 = 100)	
	Exports		Imports		1960	1980
	1960-70	1970-80	1960-70	1970-80		
Argentina	3.4	9.3	0.3	2.1	109	73
Bolivia	9.8	-1.6	8.2	8.9	56	159
Brazil	5.1	7.5	4.9	4.2	114	72
Chile	0.6	10.9	4.7	2.8	126	73
Colombia	2.2	1.9	2.5	5.7	96	132
Ecuador	2.9	7.5	11.5	9.9	89	147
Paraguay	5.4	7.1	7.3	7.4	116	76
Peru	2.0	3.9	3.6	0.2	89	87
Uruguay	2.2	4.8	-2.9	3.8	132	92
Venezuela	1.6	-6.7	4.2	-10.9	46	160
U.S.A.	6.0	6.9	9.8	4.8	115	82
Middle income countries						
Oil exp.	4.5m	2.6m	3.2m	8.9m	69m	135m
Oil imp.	7.1m	4.1m	7.3m	3.8m	109m	83m

mIndicates the summary measure is a median value.

Source: The World Bank, World Development Report 1982
(New York: Oxford University Press 1982),
pp. 124-125.

We further analyze the export and import sectors in Tables 11 and 12 by studying their structure. Regarding the import structure, we find roughly half of all imports for all countries consist of machinery, transport equipment and other manufactures, while fuels account for less than a quarter of all imports in ninety percent of the countries. The structure of merchandise exports, on the other hand, is strongly biased towards fuels, minerals, and metals and

other primary commodities. Specifically, the figures are 76% for Argentina, 97% for Bolivia, 61% for Brazil, 80% for Chile, 78% for Colombia, 97% for Ecuador, 89% for Paraguay and Peru, 52% for Uruguay and 99% for Venezuela. Noteworthy structural changes in merchandise exports occurred in Brazil; in particular, machinery's and transport equipment's share went from a negligible amount in 1960 to 16% in 1979. Further, from 1960 to 1979 other manufactures increased 11, 15, 15, 11, 11 and 16 percentage points in Argentina, Brazil, Chile, Colombia, Paraguay and Uruguay, respectively.

An analysis of recent trends in the terms of trade is also instrumental in any discussion of economic development. Two measures of the terms of trade are used here. The first measure is the net barter terms of trade (TOT) defined as the ratio of the export unit value index to the import unit value index (P_x/P_m). An improvement in this standard of the terms of trade can result from either an increase in the relative price of exports or a decrease in the relative price of imports. The income terms of trade (ITOT), is defined as the product of the ratio of the export unit value index to the import unit value index and the quantity of exports $[(P_x/P_m)(Q_x)]$. In Table 13, rather than relating index values, we report the percentage changes in the index values of the two measures of the terms of trade for four time periods. For the period 1970-1980 six countries, Argentina, Brazil, Chile, Paraguay, Peru and Venezuela

TABLE 11

STRUCTURE OF MERCHANDISE IMPORTS

Country	Food		Percentage share of merchandise imports				Machinery and transport equipment		Other manufactures	
	1960	1979	Fuels 1960	1979	Other primary commodities 1960	1979	1960	1979	1960	1979
Argentina	3	7	13	17	11	9	44	33	29	34
Bolivia	...	10	...	1	...	1	...	44	...	44
Brazil	14	12	19	37	13	7	36	21	18	23
Chile	...	14	...	21	...	4	...	27	...	34
Colombia	8	10	3	10	15	7	43	37	31	36
Ecuador	13	8a	3	1a	9	4a	33	51a	42	37a
Paraguay	...	13	...	24	...	1	...	36	...	26
Peru	16	16a	5	19a	5	4a	37	33a	37	28a
Uruguay	5	10	24	24	46	9	17	26	8	31
Venezuela	18	12	1	1	10	5	36	46	35	36
U.S.A.	24	9	10	29	25	8	10	26	31	28
Middle income economies										
Oil exp.	19w	14w	7w	5w	8w	5w	27w	42w	39w	34w
Oil imp.	14w	10w	10w	20w	16w	8w	29w	29w	31w	33w

aFigure is for 1978.

wIndicates figure is a weighted average.

Source: The World Bank, World Development Report 1982 (New York: Oxford University Press, 1982), pp. 128-129.

TABLE 12

STRUCTURE OF MERCHANDISE EXPORTS

Country	Fuels, minerals, and metals		Percentage share of merchandise exports				Machinery transport equipment		Other manufactures	
	1960	1979	Other primary commodities	Textiles and clothing	1960	1979	1960	1979	1960	1979
Argentina	1	2	95	74	0	3	(.)	6	4	15
Bolivia	...	86	...	11	...	(.)	...	1	...	2
Brazil	8	11	89	50	0	5	(.)	16	3	18
Chile	92	59	4	21	0	(.)	0	1	4	19
Colombia	19	4	79	74	0	7	(.)	2	2	13
Ecuador	0	46a	99	51a	0	1a	0	1a	1	1a
Paraguay	0	1	100	88	0	(.)	0	(.)	0	11
Peru	49	46a	50	43a	0	3a	0	1a	1	7a
Uruguay	...	1	71	51	21	19	...	5	8	24
Venezuela	74	98	26	1	0	(.)	0	(.)	(.)	1
U.S.A.	10	7	27	25	3	2	35	41	25	25
Middle income economies										
Oil exp.	48w	78w	48w	15w	1w	2w	(.)w	3w	3w	2w
Oil imp.	15w	14w	68w	35w	5w	12w	2w	12w	10w	26w

aFigure is for 1978

wIndicates figure is a weighted average.

Note: The notation (.) implies the figure is less than half the unit shown.

Source: The World Bank, World Development Report 1982 (New York: Oxford University Press, 1982), pp. 126 - 127.

experienced major declines in their net barter terms of trade. This compares to moderate declines in three countries, Argentina, Ecuador and Venezuela, for the previous decade. However, for the five year period 1975-1980 only Argentina experienced a decline in her terms of trade. Regarding the income terms of trade we observe the following: for the decade 1970-1980, Chile, Peru and Uruguay had declines in excess of twenty percent - all other countries showed improvements from 15% to 264%; during the period 1960-1970 all countries had improvements; during 1975-1980 the improvements ranged from 4% for Brazil to 83% for Paraguay.

In Table 14 we present a comprehensive review of the international reserves position for the countries under review. The first line presents for each country the nominal level of the country's gross aggregate international reserves, i.e., SDRs, reserve position at the International Monetary Fund, foreign exchange and gold holdings at London end of period market valuation. The second line, RR, relates a country's real level of reserves; it is calculated by deflating the nominal level of reserves by the finished goods index of the United States. Finally, RMCR represents the reserves/imports coverage ratio expressed in months. We find, for the most part, during 1970 and 1975-1980 increasing nominal and real levels of reserves for the countries under consideration. Moreover, the

TABLE 13
PERCENTAGE CHANGE IN THE TERMS OF TRADE

Country	1975-80	1960-80	1960-70	1970-80
Argentina				
TOT	-27	-36	-1	-36
ITOT	45	71	48	15
Bolivia				
TOT	58	204	46	108
ITOT	39	434	227	64
Brazil				
TOT	28	-33	14	-41
ITOT	4	160	92	35
Chile				
TOT	29	38	90	-67
ITOT	35	73	124	-23
Colombia				
TOT	29	37	12	23
ITOT	64	141	43	69
Ecuador				
TOT	44	109	-10	132
ITOT	60	332	19	264
Paraguay				
TOT	76	-40	10	-45
ITOT	83	113	108	2
Peru				
TOT	78	-6	59	-40
ITOT	32	71	119	-22
Uruguay				
TOT	8	28	1	-29
ITOT	20	25	62	-23
Venezuela				
TOT	58	259	-9	295
ITOT	41	143	19	104

Note: All calculations are simple percentage changes.
 TOT is the net barter terms of trade defined as the ratio of the export and import value indexes.
 ITOT is the income terms of trade or purchasing power of exports defined as the ratio of the value index of

exports deflated by the import unit value index.

Source: United Nations, Handbook of International Trade and Development Statistics 1981 Supplement (New York: United Nations, 1982), pp. 434-455, Table 7.2, Tentative terms of trade estimates for individual developing countries.

reserves/imports coverage ratio appears to have been maintained above the minimum, rule of thumb, level of three months for most countries during this period.

TABLE 14
INTERNATIONAL RESERVES POSITION

(In millions of U.S. dollars.)

	1970	1975	1977	1978	1979	1980
Argentina	682	849	3844	5933	11625	9295
RR	1010	849	3478	4986	8794	6209
RMCR	5.5m	2.9m	12.2m	20.4m	23.2m	11.9m
Bolivia	46	197	310	316	528	554
RR	69	197	281	265	399	370
RMCR	4.1m	5.0m	6.4m	5.2m	7.8m	9.8m
Brazil	1190	4167	7443	12190	9836	6877
RR	1763	4167	6736	10244	7440	4594
RMCR	5.7m	4.2m	7.4m	10.7	6.6m	3.6
Chile	392	238	652	1404	2719	4128
RR	580	238	590	1180	2057	2757
RMCR	5.4m	1.6m	3.6m	5.8m	7.8	9.3
Colombia	207	633	2032	2809	5030	6474
RR	307	633	1839	2361	3805	4325
RMCR	3.1m	5.5m	12.3m	13.2m	19.0m	20.2m
Ecuador	76	307	689	728	934	1257
RR	112	307	624	612	707	840
RMCR	3.6m	3.7m	6.1m	5.1m	5.3	57.0m
Paraguay	18	115	269	451	627	782
RR	26	115	243	379	474	523
RMCR	2.8m	6.1m	9.0m	12.5m	13.0m	13.9m
Peru	339	566	522	617	2114	2803
RR	501	566	473	518	1599	1872
RMCR	5.8m	2.8m	2.9m	4.6m	12.3m	8.7m
Uruguay	186	569	897	1110	2330	2798
RR	276	569	812	932	1762	1869
RMCR	11.0m	13.8m	15.8m	18.8m	24.8m	19.9m
Venezuela	1047	9971	9591	8609	13188	13360
RR	1551	9971	8679	7235	9975	8924
RMCR	7.3m	21.9m	11.3m	9.2m	14.6m	14.2m

mFigure represents months.

Note: i. The first line for each country is the nominal

level of the country's gross total international reserves, i.e., SDRs, reserve position in the Fund, foreign exchange and gold holding at London end of period market valuation.

ii. RK represents a country's real level of reserves. It is calculated by deflating the nominal level of reserves by the finished goods index of the U.S.

iii. RMCR is the reserves/imports coverage ratio expressed in months.

Source: International Monetary Fund, International Financial Statistics 1981 and 1982 Yearbooks, Volumes XXXIV and XXXV (Washington, D.C.: International Monetary Fund: 1981 and 1982), pp. country pages.

3.3 CONCLUSIONS

An overview of the development process was conducted in this chapter. The South American countries were analyzed among themselves and relative to their income groups to avoid faulty comparisons made in other studies. Per capita income together with other measures were used to indicate the degree, structure, and direction of recent economic development for the ten countries under review. It was found that all the South American countries are middle income developing countries as defined by The World Bank; with forty percent being middle income oil exporters and the remaining sixty percent falling into the category of middle income oil importers. However, eighty percent of the countries were underperformers for the period 1960-1980 in that their average growth rates of per capita GNP were lower relative to the weighted average of their respective income groups. Moreover, in terms of per capita income level in 1980, six out of ten countries exceeded the weighted average level for their respective income groups.

To examine the relative strengths of the group of ten, we looked at each country's total output and its components for the period 1970-1980. First, we observed that half of the countries achieved an average or above average LDC growth rate in GDP. Second, six countries experienced a growth rate in agricultural production above their medium values in five countries; in the manufacturing segment four countries

had above medium value growth rates. Fourth, the services sector in most countries had a growth rate similar to their manufacturing segment of their industrial sector.

Further, we examined the structure and changes in structure of the components of GNP to obtain a portrait of the direction and magnitude of economic development. We found, in general, little change in structure for the period 1970-1980. In contrast, for the period 1960-1970 important structural changes occurred. In seven countries there were significant declines in agriculture's share in total output. As a byproduct of this structural change, industry's share showed a marked increase. The dynamic segment of industrial production, manufacturing, however, was stable for all countries. A similar relative stability was exhibited in the services sector for most countries. Concomitant with the aforementioned sectoral changes, we found in many cases a relatively high percentage of the labor force engaged in agricultural activities; an indication of continued underdevelopment.

With regard to the structure of demand, we found a decline in the share of private consumption in GNP from 1960 to 1980 in nine countries; the share of gross domestic investment in six countries exceeded their respective weighted income group values in 1960, while this is true for only one country in 1980; the share of gross domestic savings in 1960 exceeded weighted income group values in six

countries, in 1980 this held for only four countries; in eight countries the share of goods and nonfactor services in demand increased from 1960 to 1980; the resource balance, on the other hand, improved in only three countries from 1960 to 1980. The growth of consumption and investment for the period 1970-1980, in contrast, had the following characteristics: for most countries the average annual growth rates in public and private consumption exceeded the medium growth rates of their respective income groups, the average annual growth rate in gross domestic investment was strong in four countries and the savings gap seems to be widening across countries over time.

By analyzing the external sector for the group of ten we found for eighty percent of the countries that roughly a quarter of GDP is generated in the international economy; for three countries half of national income was procured in the international sector. Only one country, moreover, had a persistent favorable export/import ratio. In addition, seven countries had higher average export growth rates in 1970-80 relative to 1960-70; while six countries had a higher average annual growth rate in imports for 1970-1980 relative to their income groups medium growth rates. Also noteworthy is that the terms of trade deteriorated in over half the countries from 1960 to 1980. The import/export structure of these countries were found to be typical of developing economies: namely, imports are capital intensive,

machinery, transport equipment, manufactures and exports consist of extractive minerals and/or primary commodities. Further, the two observable patterns for the terms of trade for the period 1970-80 were: first, sixty percent of the countries had major declines in their net barter terms of trade; second, the income terms of trade improved from 15% to 264% in seventy percent of the countries. Finally, the period 1975-1980 was characterized by raising nominal and real levels of international reserves as well as comfortable reserves/imports coverage ratios.

Chapter IV

ANALYSIS OF EXTERNAL PUBLIC INDEBTEDNESS IN SOUTH AMERICA

4.1 INTRODUCTION

This chapter has several objectives. First, we will extensively examine the composition of one external flow indicator that, as discussed in the chapter on the review of the literature, has only recently been considered and widely used as a tool to achieve economic development. This external flow is, of course, disbursements of external public debt. The analysis examines total external public borrowing by source and country. In this regard, total external public debt is dichotomized into its major subdivisions: official and private credits. The former division is composed of governmental and international organization loans. The latter group, private credits, is divided into suppliers, financial market, and other private credits. Further, the absolute and relative magnitudes of these credit categories are studied for the recent historical period; in most cases this means for the five year period 1975-1980. Second, in section 4.3, we will look at the net transfer of financial resources on public account. As such, we examine the importance of a net transfer in the development process and discuss its structural transformation on an aggregate and country

specific level. Also the ratio of the net transfer to GNP is calculated and presented as a crude measure of the contribution of the net transfer to GNP.

In section 4.4 of this chapter we continue our descriptive analysis with an examination of a selective group of indicators on external public debt. We present, specifically, the absolute and relative magnitudes of external public debt and its concomitant service payments and credit structure. Then we calculate several ratios to measure the burden of external debt. Finally, this section closes with an analysis of the shortcomings of the traditional debt service ratio as a measure of current debt service capacity and suggests an alternative, i.e., adjusted, ratio. Then to summarize our observations and results, section 4.5 recapitulates the findings of this chapter.

4.2 STRUCTURE OF EXTERNAL PUBLIC INDEBTEDNESS

This section examines total external public borrowing by country and source. In general, total external public borrowing can be divided into two extensive creditor categories: total official creditors and total private creditors.²⁷ The former group of creditors consist of governments and international organizations. Loans from

²⁷ The definitions of total official creditors and total private creditors and their respective subdivisions are those of The World Bank.

governments are broadly defined to include loans from governments, government agencies - including central banks, and loans from autonomous public bodies. Similarly, loans from international organizations are broadly defined to include loans and credits from The World Bank, regional development banks, and various other inter-government and multilateral agencies.

On the other hand, total private creditors are divided into three subcategories: suppliers' credits, financial market credits, and other private creditors. Suppliers' credits are composed of credits from exporters, manufacturers and other suppliers of goods. Credits from financial markets consist of loans from private banks, various other private financial institutions, and publicly issued and privately placed bonds. The last component of total private creditors, other private credits, encompasses unclassified debts to private creditors and debt on account of nationalized properties.

Turning to Table 15, we find that total external public debt for the region went from \$15,466.8 million in 1970 to \$105,489.9 million in 1980, indicating an increase of 582.0%. Further analyzing this substantial increase, we notice that total official credits were \$8,773.9 million in 1970 compared to \$30,526.4 million in 1980; representing a 247.9% increase in total official credits. Total private credits, in contrast, went from \$6,692.9 million in 1970 to

\$74,763.5 million in 1980, indicating an increase of 1,017.1%. We also observe a radical change in the structure of total external public debt for the region. Note, in particular, that total official credits declined from 56.7% in 1970 to 28.9% of total public debt and that total private credits went from a 43.3% share in 1970 to a 70.9% share of total public debt in 1980.

TABLE 15

TOTAL EXTERNAL PUBLIC INDEBTEDNESS FOR SOUTH AMERICA

(millions of U.S. dollars)

	1970	1980
Total External Public Debt	\$15,466.8	\$105,489.9
Total Official Creditors	8,773.9	30,526.4
Total Private Creditors	6,692.9	74,763.5

 Figures are for total external public indebtedness outstanding, i.e., including undisbursed balances.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

The above evidence of a greater dependence on total private credits for financial resources may hold for the region in general, but does not necessarily hold for each

individual country. Albeit, the trend is obviously towards a greater dependence on private creditors. We see in Table 16 that in 1970 only for three countries, Argentina (60.8%), Peru (56.2%), and Venezuela (51.2%), did total private credits constitute the largest share in total external public debt. In 1980, however, total private credits consisted of the largest share of total external public debt for six countries: Argentina (78.8%), Brazil (77.0%), Chile (66.6%), Ecuador (63.5%), Uruguay (57.6%), and Venezuela (96.0%).

Even though most countries have increased their dependence on private sector credits, the degree of increased dependence varies across countries. For the period 1975-1980 Table 16 indicates that Chile, Ecuador, and Venezuela had the greatest change in the composition of their total external public debt. Specifically, Chile's, Ecuador's, and Venezuela's share of external public debt to private lenders increased 27.1, 30.5, and 42.3 percentage points respectively. Argentina, Bolivia, Brazil, Colombia, and Uruguay, on the other hand, showed modest increases of 10.2, 3.5, 10.9, 12.6, and 5.4 percentage points respectively in their share of private credits in total public debt outstanding from 1975 to 1980. The remaining countries, Paraguay and Peru, experienced modest decreases in their dependence to private lenders.

TABLE 16
STRUCTURE OF TOTAL EXTERNAL PUBLIC DEBT

(percentage of total)							
Country	1970	1975	1976	1977	1978	1979	1980
Argentina							
TOC	39.2	36.4	34.7	32.4	32.2	30.9	26.2
TPC	60.8	63.6	65.3	67.6	67.8	69.1	78.8
Bolivia							
TOC	59.6	65.4	60.3	58.0	60.5	61.0	61.9
IPC	40.3	34.6	39.7	42.0	39.5	39.0	38.1
Brazil							
TCC	60.0	33.9	32.3	28.9	25.0	22.8	23.0
IPC	40.0	66.1	67.7	71.1	75.0	77.2	77.0
Chile							
TOC	56.3	60.5	61.9	53.6	41.2	35.7	33.4
TPC	43.7	39.5	38.1	46.4	58.8	64.3	66.6
Colombia							
TOC	80.6	74.5	73.2	75.6	76.6	69.7	61.9
TPC	19.4	25.5	26.8	24.4	23.4	30.3	38.1
Ecuador							
TOC	58.9	67.0	58.0	43.7	39.7	35.3	36.5
IPC	41.1	33.0	42.0	56.3	60.3	64.7	63.5
Paraguay							
TOC	75.6	69.5	69.9	71.3	65.5	70.3	72.6
IPC	24.3	30.5	30.1	28.7	34.5	29.7	27.4
Peru							
TOC	43.8	41.9	45.2	47.5	49.5	48.9	50.2
TPC	56.2	58.1	54.8	52.5	50.5	51.1	49.8
Uruguay							
TOC	61.7	47.8	41.5	37.1	36.1	37.9	42.4
TPC	38.3	52.2	58.5	62.9	63.9	62.1	57.6
Venezuela							
TOC	48.8	46.3	19.1	12.4	7.5	4.8	4.0
TPC	51.2	53.7	80.9	87.6	92.6	95.2	96.0

TOC is total official creditors.

TPC is total private creditors.

See text for further detail on these creditor categories.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, L.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

The trend away from official sources and towards private sources for funds during the period 1970-1980 reflect several developments. First, it may be associated with the secular decline in the total amount of funds available from official creditors and hence the countries under consideration may have been compelled to borrow from the private sector. Second, it may reflect an assumption by official creditors that, for the most part, the South American countries have achieved an adequate economic foundation to guarantee the repayment of loans based on private credit terms, permitting official creditors to divert their limited financial resources to more urgent development problems in other parts of the world, e.g., Africa and Asia. Third, the change in debt structure may indicate the changing financial requirements of the South American countries from long-term to medium and short-term credits. Since official sources are often geared toward long run development goals, these countries must turn to the private sector to satisfy their medium and short term financial and/or liquidity needs. Fourth, the trend towards a greater share of external public debt outstanding consisting of funds from private creditors may indeed reflect a combination of all of the above mentioned factors.

The consequences, furthermore, of this change in the structure of external public debt is obvious: an increase in the real cost of obtaining a given amount of funds. This in

turn reduces the capitalized value of benefits for an investment and/or development project. Therefore, indifferent, marginal, or previous favorable investment and/or development projects may become unattractive, because of the difference in the terms of a loan from official and private creditors. Loans, in general, from official lenders are on concessional terms and hence the term "soft loans." In practice, a loan on concessional terms will have the following features:

1. there is some period of grace where amortization and interest payments are non-existent;
2. the interest rate charged does not reflect the real cost of illiquidity in the financial markets and is therefore lower than the "market rate of interest;"
3. given (1) and (2) the real cost or burden of the loan is lower.

Loans, in contrast, from private lenders are for the most part on commercial, i.e., market, terms.

The fact that the South American countries were able to increase their absolute and relative public indebtedness to the private financial markets may be indicative of their perceived creditworthiness for the historical period under consideration. Moreover, this development adds another policy instrument available to policymakers in the respective countries. Consider, for example, the contractionary effects of a shortfall in export earnings or

an international price shock - resulting, for example, from a quantum increase in the price of a major import item - will have on a developing economy. To reduce the impact of such events policymakers can opt to borrow immediately from the private credit markets; thus, avoiding the need to curtail imports or draw down international reserves. The availability, in essence, of this policy instrument of external debt financing minimizes transitory drawbacks on a country's development goals.

Between 1970 and 1980 there was also a change in the structure of total official external public debt. Table 17 indicates that total official external public debt for the region increased approximately 247.9%, from \$8,774.6 million in 1970 to \$30,526.6 million in 1980. Disecting this development, we find that loans from governments increased from \$5,489.2 million in 1970 to \$14,206.0 million in 1980 or 158.8%. Similarly, loans from international organizations increased approximately fivefold from \$3,285.4 million in 1970 to \$16,320.6 million in 1980. Alternatively stated, government or bilateral loans declined from 62.6% in 1970 to 46.5% in 1980 of total official external public debt; while multilateral loans increased from 37.4% in 1970 to 53.5% in 1980 of total official external public debt.

Analyzing the above developments on an individual country basis, we find in Table 18 that Argentina, Bolivia, Chile, Colombia, Ecuador, Paraguay, and Uruguay all obtained an

TABLE 17

TOTAL OFFICIAL EXTERNAL PUBLIC INDEBTEDNESS FOR SOUTH AMERICA

(millions of U.S. dollars)

	1970	1980
Total Official External Public Debt	\$8,744.6	\$30,526.6
Governments	5,489.2	14,206.0
International Organizations	3,285.4	16,320.6

Figures are for total official external public indebtedness outstanding, i.e., including undistributed balances.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

increasing share of their official external public debt from multilateral sources for the period 1975-1980. While two countries, Brazil and Peru, experienced relative stable shares of government and international organization loans in their official external public debt. Venezuela, however, had a declining share of their official external public debt from international organizations. We conclude, therefore, that the pattern in total official external public debt was for a declining contribution from unilateral sources and an increasing contribution from multilateral institutions.

This downward trend of government participation in loan funds may not reflect, however, a growing indifference on the part of the developed countries to the needs of the developing economies. Rather it probably is indicative of higher oil prices and increased claims on the budgets of the developed countries resulting from recessionary and inflationary pressures (stagflation) experienced during this historical period. However, some of the relative decline in government loan funds may indeed reflect a shifting of the distribution function from governments to international organizations. This contention appears to be supported by the data. Note, in particular, that the absolute and relative levels of funds from multilateral sources grew rapidly from 1970-1980 (see Tables 17 and 18). Further justification of the shifting of the distribution function is supported by the fact that international organizations receive a substantial amount of their funds from the governments of the industrialized countries. This development, needless to say, is favorable; for it implies a neutral party - an international organization - can determine the allocation of limited loan funds on need and pure economic criteria and not on political considerations.²⁶

²⁶ Obviously, there may be pressure placed on an international organization by a major contributor member-nation with regard to the distribution and allocation of funds.

TABLE 18
STRUCTURE OF TOTAL OFFICIAL EXTERNAL PUBLIC DEBT

		(percentage of total)						
		1970	1975	1976	1977	1978	1979	1980
Argentina								
GOVIS		45.1	53.4	49.5	39.5	35.3	28.3	29.5
INOCS		54.9	46.6	50.5	60.5	64.7	71.7	70.5
Bolivia								
GOVIS		83.4	67.8	60.1	60.3	56.4	54.0	50.9
INOCS		16.7	32.2	39.9	39.7	43.6	46.0	49.1
Brazil								
GOVIS		69.4	48.3	53.0	51.9	50.0	47.5	44.8
INOCS		30.6	51.7	47.0	48.1	50.0	52.5	55.2
Chile								
GOVIS		82.5	85.8	83.3	80.7	79.3	75.6	70.3
INOCS		17.5	14.2	16.7	19.9	20.7	24.4	29.8
Colombia								
GOVIS		52.0	46.8	46.4	41.5	39.9	33.0	30.4
INOCS		48.0	53.2	53.6	58.5	62.1	67.0	69.6
Ecuador								
GOVIS		48.4	40.7	42.3	38.1	38.3	31.7	29.0
INOCS		51.6	59.3	57.7	61.9	61.7	68.3	71.0
Paraguay								
GOVIS		58.6	52.9	51.3	47.9	41.8	41.2	37.8
INOCS		41.4	47.2	48.7	52.1	58.2	58.8	62.2
Peru								
GOVIS		58.3	81.1	77.1	78.6	80.6	77.6	77.2
INOCS		41.7	18.9	22.9	21.4	19.4	22.4	22.8
Uruguay								
GOVIS		51.8	47.5	47.4	44.6	37.8	30.7	34.3
INOCS		48.2	52.5	52.6	55.4	62.2	69.3	65.7
Venezuela								
GOVIS		28.3	39.3	39.8	46.4	46.3	47.3	51.9
INOCS		71.7	60.9	60.2	53.6	53.7	52.7	48.1

GOVIS represents bilateral or governmental official external public debt.

INOGS represents multilateral official external public debt.

See text for definitions of these creditor groups.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

The trend in the composition of total private external public indebtedness for South America also witnessed a marked change in its structure. More specifically, we see in Table 19 that total private external public debt gyrated from \$6,692.9 million in 1970 to \$74,963.5 million in 1980, an increase of 1,020.0%. We find, moreover, that suppliers' credits share in total private external public debt fell approximately by 39.4 percentage points from 1970 to 1980. In particular, suppliers' credits were \$3,499.7 million in 1970 or 52.3% of total private external public debt, while in 1980 they were \$9,654.4 million or 12.9% of total private external debt. We observe, on the other hand, that credits from financial markets went from \$2,723.0 million in 1970 to \$64,905.9 million in 1980; an increase of 2,283.6%. That is, the share of financial market credits in total private external public debt went from 40.7% in 1970 to 86.6% in 1980. This twenty-fourfold increase in financial market credits reflects the growing commitments of the international banking community to the South American economies. Needless to say, this figure would be larger if one included external non-guaranteed private debt. The discernible pattern for the final component of private external public debt, other private credits, is one of a declining importance. The minor role of other private lenders is clearly shown in Table 19: other private credits consisted of 7.0% in 1970 of total private external public debt only to decline to a .5% share in 1980.

TABLE 19

TOTAL PRIVATE EXTERNAL PUBLIC INDEBTEDNESS FOR SOUTH AMERICA

(millions of U.S. dollars)

	1970	1980
Total Private External Public Debt	\$6,692.9	\$74,963.5
Suppliers' Credits	3,499.7	9,654.4
Financial Market Credits	2,723.0	64,905.9
Other Private Credits	470.2	403.2

Figures are for total private external public indebtedness outstanding, i.e., including undisbursed balances.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

An individual country analysis of the structure of private external public indebtedness, Table 20, further indicates the diminishing part of suppliers's credits and the augmenting role of financial market credits in total private external public indebtedness. For example, Argentina, Bolivia, Chile, Colombia, Ecuador, and Venezuela experienced a 22.9, 23.3, 52.6, 18.3, 16.9, and 43.9 percentage points increase respectively in their share of financial market credits in total private external public debt. Or what is equivalent, all of the aforementioned

countries experienced significant decreases in the share of suppliers' credits in total private external public debt. In addition, Table 20 indicates the minor importance of unclassified debts to private creditors and debt on account of nationalized properties.

The trend of a greater share of financial market credits in total private external public debt is significant for the same reason the trend of an increasing share of total private credits, or decreasing share of total official credits, in total external public debt is important. Namely, an increase in the real cost of procuring a given level of external funds from private creditors. This holds given that credits extended by suppliers tend to be on easier credit terms. Exporters or manufacturers, for instance, may accept lower profit margins by giving buyers milder credit terms for their goods and services in the short-run so as to maintain their long-run share of the market in the face of temporary fluctuations in the market prices of their goods and/or exchange rates. Conversely, financial market creditors, such as private banks, are inclined to charge the market rate of interest on their loans. Furthermore, this development may also reflect the squeeze of stagnationary pressures on exporters and manufacturers clients' financial resources during the historical period under review.

TABLE 20

STRUCTURE OF PRIVATE EXTERNAL PUBLIC INDEBTEDNESS

	(percentage of total)						
	1970	1975	1976	1977	1978	1979	1980
Argentina							
SC	58.1	42.9	34.2	35.2	33.0	26.3	20.4
FMC	37.1	56.6	65.5	64.5	66.9	73.6	79.5
Other	4.8	.5	.3	.3	.1	.1	.1
Bolivia							
SC	26.0	24.3	19.9	16.2	13.9	14.7	12.6
FMC	38.5	64.1	74.0	81.1	85.3	85.3	87.4
Other	35.5	11.6	6.1	2.7	.8	---	---
Brazil							
SC	58.2	16.4	15.2	14.4	12.2	13.2	11.8
FMC	31.5	82.1	63.8	84.6	87.1	86.2	87.8
Other	10.3	1.5	1.0	1.0	.7	.6	.4
Chile							
SC	47.3	44.4	46.9	28.7	19.5	15.4	12.8
FMC	45.0	30.5	32.3	59.5	74.0	79.7	83.1
Other	7.7	25.1	20.8	11.8	6.5	4.9	4.1
Colombia							
SC	58.5	35.3	29.1	27.8	27.0	17.0	18.9
FMC	35.1	62.6	69.4	70.9	72.1	82.6	80.9
Other	6.4	2.1	1.5	1.3	.9	.4	.2
Ecuador							
SC	78.3	29.6	25.0	15.4	12.0	15.6	12.7
FMC	21.7	70.4	75.0	84.6	88.0	84.4	87.3
Paraguay							
SC	92.9	26.7	31.8	33.6	25.9	35.2	32.6
FMC	6.6	71.1	68.2	66.3	74.0	64.8	67.4
Other	.9	.2	---	.1	.1	---	---
Peru							
SC	51.1	29.2	22.9	30.1	30.9	27.3	28.1
FMC	48.9	70.8	77.1	69.9	69.1	72.7	71.9
Uruguay							
SC	13.2	7.0	5.1	4.3	5.1	4.6	4.3
FMC	86.8	93.0	94.9	95.7	94.9	95.4	95.7
Venezuela							
SC	29.5	34.2	9.9	6.4	6.3	3.9	3.3
FMC	70.5	52.1	51.1	78.7	86.8	92.2	96.0

Other	---	13.7	39.0	14.9	6.9	3.9	.7

SC refers to suppliers' credits.

FMC refers to financial market credits.

Other refers to other private credits.

See text for information on these creditor categories.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

The result of our analysis of the structure of external public indebtedness, i.e., of the rapid absolute and relative growth of financial market credits in total private external public debt does, not imply that the creditworthiness of the private sector in the South American countries has improved. Our result, however, does imply that the creditworthiness of the public sector is perceived to be favorably in the eyes of private creditors; for it is unlikely that the private sector would have been able to procure the absolute and relative level of funds represented by the data in Table 19 from non-domestic private creditors without the public sector of the recipient country as guarantor.

4.3 THE NET TRANSFER OF FINANCIAL RESOURCES ON PUBLIC ACCOUNT

The net transfer of financial resources is defined in this study as the difference between the net flow of financial resources and interest payments. Where the net flow is computed by deducting amortization payments from total loan disbursements. Notationally, we have the following

$$LD - A = NF$$

and

$$NF - Z = NT.$$

Where LD is total loan disbursements of external public debt; A represents total amortization payments on external

public debt; NF refers to the net flow or net borrowing; Z is total interest payments to all categories of external public debt; and NT refers to the net transfer of financial resources on public account.

In essence, a net transfer of financial resources into a developing country will augment the funds available for financing economic development. A net transfer of resources, effectively speaking, can be used to finance one or both of the following items:

1. the difference between net investment and net domestic savings, i.e., the savings gap;
2. the difference between the value of imported goods and services and the value of exported goods and services, i.e., the trade or foreign exchange gap.

From the microeconomic point of view a net transfer of resources in the short-run shifts a nation's budget constraint uniformly outward and thus increases its production transformation schedule. In the long-run, however, the burden of debt servicing may contract a nation's transformation schedule; the net result remains an empirical question yet to be answered.

For the South American continent as a whole the net transfer of resources for the period 1970-1975 increased 129.5% from \$1,023.6 million in 1970 to \$2,349.2 million in 1975. In contrast, the net transfer decreased 104.4% for the following period, 1975-1980, from \$2,349.2 million in

1975 to -\$104.5 million in 1980. The explanation for this development is clearly related in Table 21:

1. total loan disbursements from 1970 to 1975 increased 160.8% and then expanded by 150.6% from 1975 to 1980;
2. concomitant with (1) total amortization payments grew by 145.5% for the period 1970-1975, however, for the period 1975-1980 these payments increased by 224.1%;
3. the joint effect of (1) and (2) was to substantially lower the rate of growth of the net flow of resources, from 172.9% for the period 1970-1975 to 103.4% for the period 1975-1980;
4. total interest payments went from \$484.6 million in 1970 to \$1,766.4 million in 1975, an increase of 264.5%, while these payments gyrated by 372.7% for the period 1975-1980.

The general impression one receives from the above analysis is that in several instances, during this historical period, many South American countries appear to have been borrowing to service existing debt.

Turning to Table 22, we find all the South American countries, except for Chile, experienced a positive average net transfer for the period under consideration. The average annual net transfer for the period 1975-1980 was highest for Brazil at \$2,462.28 million followed by Ecuador with a net transfer of \$1,707.8 million. One can draw the preliminary conclusion from Table 22 that the real net

TABLE 21
NET TRANSFER OF FINANCIAL RESOURCES TO SOUTH AMERICA

(millions of U.S. dollars)

	1970	1975	1980
Net transfer	\$1,023.6	\$2,349.2	(\$104.5)
Total loan disbursements	2,654.4	6,923.8	17,348.0
Total amortization payments	1,146.2	2,808.1	9,102.0
Net flow	1,508.2	4,115.8	8,246.1
Total interest payments	484.6	1,766.4	8,350.5

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

transfer on average declined for the South American continent, for given a relative stable annual nominal net transfer together with relative high rates of world inflation for the period of time under review implies a decline in the real value of the net transfer. Additionally, given, for the most part, the nominal net transfer is denominated in U.S. dollars, the steady decline in the dollar's exchange rate relative to other currencies during this historical period implies a steady decline in the purchasing power of the dollar in world markets and in the real net transfer.

TABLE 22

PER COUNTRY ANALYSIS OF THE AVERAGE NET TRANSFER
OF FINANCIAL RESOURCES: 1975-1980

(millions of U.S. dollars)

Country	Total net transfer	Average annual net transfer
Argentina	\$4,203.7	\$700.62
Bolivia	949.0	158.17
Brazil	14,773.7	2,462.28
Chile	(806.7)	(134.45)
Colombia	1,041.3	173.55
Ecuador	1,707.8	284.63
Paraguay	377.2	62.87
Peru	1,749.4	291.57
Uruguay	125.8	20.97
Venezuela	5,657.3	942.88

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

The ratio of the net transfer of financial resources to GNP is presented in Table 23. This ratio can be considered as a crude measure of the contribution of the net transfer to GDP. Accordingly, in the case of Ecuador for 1980 the contribution of the net transfer to GNP was 3.07%. In contrast, Chile had a net transfer/GNP ratio in 1980 of -1.99%. This value represents a claim on current output attributed to the net outflow of financial resources. As noted earlier, a net outflow of resources occurs when the burden of past debt, amortization and interest payments, exceeds current loan disbursements. Bolivia, Brazil, Ecuador, Paraguay, and to some extent Peru and Venezuela realized, favorable ratios; in the remaining countries the ratios were not as impressive. In general, it is believed that the larger the ratio of the net transfer to GNP the greater the contribution of external flows on public account to the economic development process. This statement is preliminary, for if the net transfer is being funneled to highly productive sectors of the economy then its short and long-run contribution to GNP may be greater than that implied by the data. The converse is true if the net transfer is being channeled to low yielding projects. In the context of this exposition, little can be said about the productiveness of the net transfer, for that would involve individual project analysis. Further, there does not appear prima facie a pattern indicating that countries with high

net transfer/GNP ratios experiencing exceptional growth rates relative to countries with low ratios.

In addition to the above, we find in many countries that total loan disbursements from all lenders essentially declined, remained relatively stable, or changed radically from year to year (see Table 24). Amortization payments showed a similar pattern. For several years, however, amortization payments exceeded loan disbursements resulting in a non-positive net flow or net borrowing; Argentina (1975), Chile (1975 and 1980), Uruguay (1970), and Venezuela (1975) are cases in point. Interest payments for this historical period persistently increased for most countries. We find in Table 24, in particular, fourteen cases where the magnitude of interest payments resulted in a net transfer abroad of financial resources: Argentina (1975), Brazil (1980), Chile (1975-1977, 1980), Colombia (1976 and 1978), Peru (1970 and 1980), Uruguay (1970, 1977-1978), and Venezuela (1980).

One general implication may be drawn from Table 24; namely, that many South American countries experienced falling or stable nominal and therefore real net transfers. Since this region is still considered to be underdeveloped, this trend can only be viewed as unfavorable and may constrain the development process of these countries. Further, the empirical question arises if the primary and secondary effects of a net transfer can be measured and if

TABLE 23
RATIO OF NEI TRANSFER TO GROSS NATIONAL PRODUCT

	(percent)						
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	.31	(.82)	1.80	.28	1.77	2.78	1.23
Bolivia	3.50	3.57	6.49	8.69	4.23	1.30	2.83
Brazil	1.50	1.72	1.94	1.61	3.02	1.31	(.51)
Chile	(.51)	(3.15)	(2.11)	(1.26)	1.81	.24	(1.99)
Colombia	1.09	1.09	.11	.30	(.34)	1.35	1.73
Ecuador	.50	2.75	2.62	7.34	4.48	3.76	3.07
Paraguay	.75	1.33	2.33	4.01	3.57	2.30	1.59
Peru	(.30)	4.39	3.08	4.87	.79	1.29	(1.46)
Uruguay	.18	1.62	.50	(.47)	(.21)	.66	.37
Venezuela	1.90	(1.12)	2.05	3.32	4.86	4.69	(.18)

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

TABLE 24

NET TRANSFER OF FINANCIAL RESOURCES BY COUNTRY

(millions of U.S. dollars)

Country and year	LD	A	NE	Z	NT
Argentina					
1970	489.3	341.4	147.9	121.3	26.6
1975	473.4	522.5	(49.1)	266.3	(315.4)
1976	1,882.5	604.1	1,278.4	264.5	1,013.9
1977	1,161.7	721.6	460.1	318.0	142.1
1978	3,117.2	1,616.4	1,500.7	504.7	996.1
1979	3,034.2	902.7	2,131.6	583.2	1,548.4
1980	2,805.2	1,159.7	1,645.5	825.9	818.6
Bolivia					
1970	54.3	16.7	37.6	6.4	31.2
1975	160.9	50.3	110.7	23.8	86.9
1976	288.2	66.5	221.7	36.9	184.8
1977	436.3	95.6	340.7	57.2	283.5
1978	516.1	266.9	249.3	86.6	165.7
1979	312.8	142.5	179.3	116.2	63.1
1980	439.1	116.9	322.2	157.2	165.0
Brazil					
1970	992.2	315.6	676.6	123.5	553.1
1975	3,787.6	636.3	2,951.3	844.3	2,107.0
1976	4,921.4	1,181.0	3,740.4	946.1	2,794.3
1977	5,421.6	1,644.0	3,777.7	1,180.2	2,597.5
1978	10,116.3	2,583.1	7,533.2	1,827.2	5,706.0
1979	9,152.2	3,522.8	5,629.3	2,887.4	2,741.9
1980	6,893.0	3,640.0	3,253.0	4,426.1	(1,173.0)
Chile					
1970	398.5	163.5	235.0	78.0	157.0
1975	282.8	344.9	(62.1)	156.6	(218.7)
1976	555.6	548.0	7.5	208.9	(201.4)
1977	721.5	648.5	37.0	201.3	(164.3)
1978	1,486.2	925.8	560.4	289.8	270.6
1979	1,321.2	914.7	406.5	359.2	47.3
1980	868.6	914.8	(46.2)	494.0	(540.2)
Colombia					
1970	235.0	75.0	160.0	43.4	116.6
1975	390.2	135.3	254.9	113.7	141.2
1976	261.6	152.9	108.8	125.4	(16.7)
1977	371.1	175.8	195.3	137.3	58.0
1978	319.1	227.2	91.9	171.0	(79.1)
1979	1,040.6	434.5	606.1	230.7	375.5
1980	1,130.6	268.3	862.4	299.9	562.4

Ecuador					
1970	41.9	16.1	25.8	7.1	18.7
1975	166.4	32.9	133.5	17.5	116.0
1976	217.3	56.4	160.9	25.3	135.6
1977	577.9	72.2	505.7	45.0	460.7
1978	533.2	108.1	425.1	97.7	327.4
1979	1,064.1	573.2	492.9	157.3	333.6
1980	742.9	178.1	564.8	230.2	334.5
Paraguay					
1970	14.6	7.0	7.6	2.9	4.7
1975	41.8	14.2	27.6	7.5	20.0
1976	58.7	12.0	46.8	7.8	38.9
1977	109.1	16.1	93.0	10.5	82.4
1978	125.3	20.3	105.0	15.8	89.2
1979	141.2	36.0	105.2	26.9	78.3
1980	157.7	47.5	110.2	41.8	68.4
Peru					
1970	167.6	122.1	45.4	45.9	(.5)
1975	1,106.4	253.7	852.7	186.9	665.7
1976	869.7	256.0	633.7	199.0	434.7
1977	1,298.1	404.9	893.2	248.5	644.8
1978	841.4	432.7	408.7	319.9	88.8
1979	1,108.0	483.0	625.0	440.1	184.9
1980	1,230.7	953.5	277.2	546.7	(269.5)
Uruguay					
1970	36.6	47.0	(10.3)	15.7	(26.0)
1975	264.6	182.2	102.4	46.3	56.1
1976	224.1	148.6	75.6	57.4	18.2
1977	225.7	187.2	38.5	57.8	(19.3)
1978	416.0	366.0	49.9	60.5	(10.5)
1979	169.1	54.8	114.3	69.0	45.4
1980	224.4	90.0	134.4	98.5	35.9
Venezuela					
1970	224.4	41.8	182.6	40.4	142.2
1975	229.7	435.8	(206.1)	103.5	(309.6)
1976	1,053.6	285.0	768.6	121.6	647.0
1977	2,029.2	604.6	1,424.6	222.6	1,202.1
1978	2,678.5	356.3	2,322.2	393.3	1,928.9
1979	3,843.9	889.8	2,954.1	658.7	2,295.5
1980	2,855.8	1,733.2	1,122.6	1,229.2	(106.6)

LD is total loan disbursements on public account.

A represents total amortization payments.

NF is the net flow or net borrowing on public account.

NI refers to total interest payments.

NT is the net transfer on public account.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, L.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

so do the two effects neutralize each other. The primary or positive effects involve the increase in the production and consumption possibilities schedule, coverage of the savings-investment gap or import-export gap as well as multiplier effects. The secondary or negative effects are essentially the effects of debt burden, i.e., do debt servicing obligations impose contractionary effects on an economy? One would hope that whereas the secondary effects may be very real that they do not inundate the primary effects.

Summarizing, we find several factors have contributed to a declining annual net transfer during the historical period under study. Some factors are the growth in interest payments on previously contracted debt, worldwide inflation, and depreciation in the currency in which the net transfer is denominated.²⁹ It follows, therefore, that the current net transfer can be augmented by imposing longer grace periods on existing debt and/or reducing or canceling amortization and interest payments on the existing stock of external public debt.

²⁹ Some have argued that the debt burden is also reduced by inflation. However, this is true only if inflation also increases the price of a country's exports; and, in particular, those exports that generate the most foreign exchange.

4.4 SELECTED INDICATORS OF EXTERNAL PUBLIC INDEBTEDNESS

This section presents an analysis of various measures of the extent of external public indebtedness and the magnitude of the debt burden for the ten South American countries under review. The framework of analysis is similar to the one used earlier in this study, i.e., an analysis at the aggregate level coupled with an individual country analysis. Some traditional measures of indebtedness are used and are shown to lack objectivity.

The total external public indebtedness of South America rose from \$15,457.0 million in 1970 to \$39,071.0 million in 1975 to \$105,490.1 million in 1980. These magnitudes represent increases in external public debt outstanding of 152.6% for the period 1970-1975 and 170.0% for the period 1975-1980. Concomitant with this development, total debt service payments witnessed approximately a threefold increase for the period 1970-1975; from \$1,630.8 million in 1970 to \$4,574.5 million in 1975. Similarly, debt service payments experienced approximately a fourfold increase from 1975-1980; from \$4,574.5 million in 1975 to \$17,452.5 in 1980. These developments are presented in Tables 25 and 26. However, the distribution of external public debt outstanding, except for Venezuela, did not change significantly in South America for the period 1975-1980. The absolute increase, however, in debt outstanding and debt service payments on a per country basis also rose

dramatically. The percentage increase in total external public debt outstanding from 1975 to 1980 for these countries was: Venezuela, 699.9%; Ecuador, 375.3%; Brazil, 197.4%; Paraguay, 187.1%; Bolivia, 140.4%; Argentina, 134.5%; Colombia, 122.7%; Peru, 110.8%; Uruguay, 47.4%; and Chile, 19.6%. Similarly, the percentage increase in total debt service payments from 1975 to 1980 was: Venezuela, 449.3%; Brazil, 380.0%; Bolivia, 270.4%; Peru, 240.4%; Chile, 180.9%; Argentina, 151.9%; Colombia, 128.2%; Ecuador, 71.0%; Paraguay, 31.2%; and Uruguay, -17.5%.

Corollary to the analysis undertaken in Tables 25-26, in Table 27 we decompose the credit composition of total external public debt into its three components: concessional, fixed interest rate, and variable interest rate. The latter two components are simply subdivisions of commercially contracted external public debt. First, we observe that all countries, Peru being the exception, have experienced a steady decline in the proportion of concessional loans in their total public debt outstanding; Ecuador and Paraguay had the largest declines of 27.5 and 25.6 percentage points, respectively. Similarly, all countries, excluding Paraguay which had a 20.8 percentage points increase, had significant declines in the fixed interest rate portion of their total loans. In particular, the percentage point decreases were: Venezuela, 51.8; Argentina, 37.3; Chile, 32.6; Colombia, 17.6; Ecuador, 15.0;

TABLE 25

THE MAGNITUDE OF TOTAL EXTERNAL PUBLIC DEBT OUTSTANDING

(millions of U.S. dollars)				
Country	1970	1975	1979	1980
Argentina	2,488.8	5,224.4	10,994.7	12,249.2
POT	16.1	13.4	11.4	11.6
Bolivia	548.8	1,244.5	2,763.5	2,943.9
POT	3.6	3.1	2.9	2.8
Brazil	5,079.5	17,584.9	47,926.0	52,301.1
POT	32.8	45.0	49.7	49.6
Chile	2,537.4	4,387.8	5,695.2	5,249.8
POT	16.4	11.2	5.9	5.0
Colombia	1,851.7	3,010.5	5,427.4	6,703.1
POT	12.0	7.7	5.6	6.3
Ecuador	347.0	779.8	2,964.7	3,706.5
POT	2.2	2.0	3.1	3.5
Paraguay	144.2	429.3	1,188.0	1,232.5
POT	.9	1.1	1.2	1.2
Peru	1,195.6	4,002.2	7,996.9	8,435.2
POT	7.7	10.2	8.3	8.0
Uruguay	351.4	1,034.3	1,319.6	1,524.4
POT	2.3	2.7	1.4	1.4
Venezuela	922.6	1,393.3	10,238.8	11,144.4
POT	6.0	3.6	10.6	10.6
Total Debt for S.A.	15,467.0	39,071.0	96,514.8	105,490.1

POT refers to percentage of total.

Source: The World Bank, World Debt Tables, External Public Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

TABLE 26
THE MAGNITUDE OF TOTAL DEBT SERVICE PAYMENTS

(millions of U.S. dollars)				
Country	1970	1975	1979	1980
Argentina	462.7	788.8	1,485.9	1,986.6
POT	28.4	17.2	11.0	11.4
Bolivia	23.1	74.0	258.7	274.1
POT	1.4	1.6	1.9	1.6
Brazil	439.1	1,680.6	6,410.2	8,066.1
POT	26.9	36.7	47.5	46.2
Chile	241.4	501.5	1,273.8	1,408.8
POT	14.8	11.0	9.4	9.1
Colombia	118.4	249.0	665.1	568.2
POT	7.3	5.4	4.9	3.3
Ecuador	23.2	50.4	730.5	408.3
POT	1.4	1.1	5.4	2.3
Paraguay	10.0	21.7	62.9	89.3
POT	.6	.5	.5	.5
Peru	168.0	440.7	923.2	1,500.2
POT	10.3	9.6	6.9	6.6
Uruguay	62.7	228.5	123.7	188.5
POT	3.8	5.0	.9	1.1
Venezuela	82.2	539.3	1,548.4	2,962.4
POT	5.0	11.8	11.5	17.0
Total debt service for S.A.	1,630.8	4,574.5	13,482.4	17,452.5

POT refers to percentage of total.

Source: The World Bank, World Debt Tables, External Public The Debt of Developing Countries, Vol. I, Document of The World Bank No. EC-167/77 (Washington, D.C.: The World Bank, September 2, 1977), pp. country pages.

The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

Bolivia, 6.0; Brazil, 2.9; Uruguay, 2.1; and Peru, .9 points. As a logical corollary to the above, we find that the variable interest rate component of the total credit composition of external public debt showed large increases for most countries. The increase in terms of percentage points were specifically: Venezuela, 59.6; Ecuador, 42.5; Chile, 40.8; Argentina, 40.2; Colombia, 32.0; Bolivia, 19.3; Brazil, 11.2; Peru, 8.1; Uruguay, 5.9; and Paraguay, 4.8 points.

While the above statistics are helpful in obtaining a perspective on the magnitude and credit morphology of external public indebtedness in South America, these statistics do not, however, relate information about the burden or productiveness of this debt. An analysis of the productiveness of debt could involve an ex-post evaluation of each investment project within the framework of a modified cost-benefit analysis. Such an evaluation would be a cumbersome and tedious task and as is evident is beyond the scope of this study. In practice the burden of debt has been analyzed with the use of some simplistic aggregate ratios. As noted earlier in this study, given the unique nature of external public debt, debt service payments can result from contractual external debt denominated in foreign currency to create an infrastructure. Service payments, therefore, become a general claim on the aggregate productive capacity of the economy and its ability to

TABLE 27
CREDIT STRUCTURE OF TOTAL EXTERNAL PUBLIC DEBT

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina							
CONL	9.1	6.4	4.6	4.2	5.0	4.6	3.5
FIRL	90.7	76.1	58.6	56.4	56.2	46.9	38.8
VIRL	.2	17.5	36.8	39.4	38.8	48.5	57.7
Bolivia							
CONL	46.4	46.3	41.4	35.1	34.7	34.5	33.0
FIRL	53.6	40.9	38.0	35.9	35.3	36.1	34.9
VIRL	-	12.8	20.6	29.0	30.0	29.4	32.1
Brazil							
CONL	35.8	12.3	9.8	7.7	5.5	4.6	4.0
FIRL	47.7	36.3	35.4	37.7	37.5	34.6	33.4
VIRL	16.5	51.4	54.8	54.6	57.0	60.8	62.6
Chile							
CONL	33.0	22.1	21.8	20.6	17.4	15.1	13.9
FIRL	66.8	66.9	64.9	61.5	50.0	37.9	34.3
VIRL	.2	11.0	13.3	17.9	32.6	47.0	51.8
Colombia							
CONL	48.0	37.4	37.0	34.1	34.4	28.4	23.0
FIRL	52.0	60.7	60.7	61.9	60.7	47.1	43.1
VIRL	-	1.9	2.3	4.0	4.9	24.5	33.9
Ecuador							
CONL	51.7	39.7	35.4	21.8	17.0	14.9	12.2
FIRL	48.3	40.1	37.4	33.9	31.0	25.2	25.1
VIRL	-	20.2	27.2	44.3	52.0	59.9	62.7
Paraguay							
CONL	58.3	59.2	59.5	49.9	45.8	39.0	33.6
FIRL	41.7	36.3	35.5	45.5	47.7	50.6	57.1
VIRL	-	4.5	5.0	4.6	6.5	10.4	9.3
Peru							
CONL	13.5	12.4	12.3	18.6	12.2	19.2	21.4
FIRL	86.3	54.3	52.0	51.0	51.3	52.3	53.4
VIRL	.2	33.3	35.7	30.4	27.5	28.5	25.2
Uruguay							
CONL	26.6	12.0	10.7	9.8	9.5	9.0	8.2
FIRL	70.7	70.7	66.9	68.8	72.9	72.4	68.6
VIRL	2.7	17.3	22.4	21.4	17.6	18.6	23.2

Venezuela							
CONL	8.0	8.3	2.9	1.9	.9	.6	.5
FIRL	65.4	73.4	58.1	37.9	37.5	24.3	21.6
VIKL	6.6	18.3	39.0	60.2	61.6	75.1	77.9

CONL refers to concessional interest rate loans.

FIRL refers to fixed interest rate loans.

VIKL refers to variable interest rate loans.

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/61 (Washington, D.C.: The World Bank, December 1961), pp. country pages.

translate additional output in other sectors into increased foreign exchange availabilities. Hence, the ability to service foreign debt is a function of the extent borrowed funds augment domestic savings and foreign reserves. Further, the debt burden is essentially the claim that debt servicing makes on a country's economy. The claim of external debt servicing has two components: amortization and interest payments to be rendered in foreign currency. It should be kept in mind, moreover, that the debt burden if severe becomes a "debt problem" and may therefore interfere with the development goals of a country. The debt ratios used in this paper are aggregate ratios and are intended to indicate the degree of pressure the debt burden has on an economy.

The first ratio considered is the ratio of debt outstanding and disbursed to GNP (DOD/GNP). This ratio gives a measure of a country's debt as a fraction of current output. It is a ratio of a stock to a flow and therefore

has a time dimension.³⁰ This ratio, theoretically speaking, relates the claim external public debt has on the current output of an economy over time. Increases in this ratio over time indicate that an increasing proportion of current output is obligated to foreign creditors. This development is not unfavorable in and of itself as long as the marginal return of external debt exceeds its cost. However, the political implications of a large claim on current output by foreigners cannot be ignored. As can be seen from Table 28, for the period 1975-1980 Ecuador, Peru, and Venezuela had the greatest increases in their DOD/GNP ratios, 13.7, 13.8, and 13.3 percentage points, respectively. Conversely, Chile and Uruguay had the greatest decreases in their ratios, 35.8 and 7.1 percentage points, respectively. The double-digit geometric averages for the ratio of debt outstanding and disbursed to GNP for the period 1975-1980 were: Bolivia, 37.7%; Peru, 32.7%; Chile, 30.8%; Ecuador, 17.6%; Paraguay and Uruguay, 15.4%; Brasil and Colombia, 14.2%; Venezuela, 12.2%; and Argentina, 11.0%.

Table 29 presents the ratio of international reserves to debt outstanding and disbursed (RES/DOD).³¹ Whereas total

³⁰ The ratio of debt outstanding and disbursed to GNP can take the following values: $DOD/GNP \geq 0$, where DOD is debt outstanding and disbursed. In general, the smaller the value of this ratio the more favorable it is.

³¹ This ratio of international reserves to debt outstanding and disbursed can take the following values: $0 \leq RES/DOD < \infty$, where RES represents international reserves and DOD is total debt outstanding and disbursed. This ratio becomes increasingly favorable as it approaches infinity,

TABLE 28

RATIO OF DEBT OUTSTANDING AND DISBURSED TO GNP

	(percent)						
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	7.5	6.1	7.8	9.8	12.1	15.7	15.4
Bolivia	47.0	32.8	35.9	42.2	42.1	37.7	36.4
Brazil	7.7	11.2	12.1	13.4	16.1	17.0	16.6
Chile	21.4	53.8	39.0	29.6	30.4	25.2	18.0
Colombia	18.7	18.1	16.4	13.9	12.1	12.3	13.2
Ecuador	14.7	10.8	12.0	16.2	21.7	23.7	24.5
Paraguay	18.7	12.6	14.2	16.3	18.3	16.5	15.5
Peru	11.9	19.9	26.0	35.6	48.1	41.2	33.7
Uruguay	10.6	17.8	19.0	17.9	16.1	13.2	10.7
Venezuela	8.5	4.6	9.4	12.2	17.4	20.0	17.9

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

debt outstanding is liquidated over many years, this ratio, ceteris paribus, provides a measure of a country's stock of foreign exchange availabilities to service its debt; it can be used as an input in determining a country's short and/or long term liquidity. A ratio less than unity would indicate the long-run need to obtain greater amounts of foreign exchange; this need may eventually manifest itself in a curtailment of development ambitions. Conversely, a ratio greater than unity would imply greater flexibility in financing new development projects from accumulated foreign exchange. Further, such a ratio would increase the creditworthiness of a country in the international financial markets. Increases in this ratio can come from two sources. First, from a decrease in external debt outstanding; second, from an increase in international reserves. In general, however, dramatic changes in a country's international reserves position do not frequently occur. A quantum increase, however, in the relative price of a major export item can and does increase international reserves abruptly. Such an event would curtail a country's external borrowing requirements. This explains why Venezuela is the only South American country with a persistent international reserves/debt outstanding and disbursed ratio exceeding unity and of its rapid increase after 1974. The geometric

implying a negligible level of DOD relative to international reserves. Conversely, the ratio approaches zero when a country's reserves are close to or equal to zero - implying a highly adverse external position.

averages for this ratio for each country during the period 1975-1980 were: Venezuela, 220.9%; Uruguay, 146.5%; Paraguay, 86.4%; Colombia, 79.1%; Argentina, 67.2%; Ecuador, 56.5%; Brazil, 30.3%; Chile, 25.0%; Bolivia, 23.3%; and Peru, 18.8%.

Another measure of the burden of external indebtedness frequently used is the ratio of debt outstanding and disbursed to exports of goods and services (DOD/XGS).³² This ratio provides a measure of a country's current ability to obtain foreign exchange to cover its outstanding debt from current exports of goods and services. This measure, however, is an impromptu indicator given that it implicitly assumes imports of goods and services are equal to zero; for only then can foreign exchange generated by exports be available to cover debt outstanding and disbursed. The popular use of this ratio without noting this shortcoming has led some to mistakenly believe that the debt burden is of minor importance. In essence, one must examine the export/import goods and services ratio (XMR) before drawing conclusions about the significance and implications of the debt outstanding and disbursed to export of goods and services ratios. A persistent favorable export/import goods and services ratio is defined in this study as a value of

³² This ratio can have the following values:

$$-\infty \leq \text{DOD/XGS} \leq +\infty .$$

TABLE 29

RATIO OF INTERNATIONAL RESERVES TO DEBT OUTSTANDING AND
DISBURSED

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	14.1	27.2	44.8	76.3	87.2	133.0	85.1
Bolivia	10.7	24.6	20.1	22.6	19.0	28.8	26.2
Brazil	43.7	30.4	38.4	34.5	40.3	27.7	16.3
Chile	10.5	6.4	15.8	16.9	30.8	54.6	84.0
Colombia	14.8	27.0	52.7	76.1	100.3	146.9	153.1
Ecuador	29.3	71.0	85.0	58.3	44.3	43.6	47.7
Paraguay	17.2	60.8	66.7	80.6	98.5	112.2	114.9
Peru	47.6	18.7	11.6	11.1	11.4	35.7	45.7
Uruguay	69.9	92.2	93.4	121.8	139.9	256.3	263.0
Venezuela	154.3	790.3	352.2	216.7	124.9	134.1	115.1

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

the ratio greater than unity.³³ To further emphasize this point we now compare the geometric averages of the DOD/XGS ratios and the XMRs for the period 1975-1980. We find the following: Argentina, 86.9% and 98.4%; Bolivia, 189.6% and 79.1%; Brazil, 167.8% and 64.7%; Chile, 133.1% and 82.5%; Colombia, 78.1% and 104.8%; Ecuador, 66.4% and 81.7%; Paraguay, 89.5% and 76.0%; Peru, 181.1% and 75.2%; Uruguay, 95.6% and 73.3%; and Venezuela, 37.3% and 98.7% (see Table 30). As the reader can see the DOD/XGS ratios inappropriately indicate that several countries had the foreign exchange availabilities to retire all or much of their external public debt outstanding and disbursed, because the import requirements of these countries are ignored by this ratio. Keeping this caveat in mind, even if the South American countries could reduce their imports to some maintenance or compressible level, export earnings in many instances would not cover their outstanding debt. If this is a secular trend then the South American countries may experience debt difficulties in the future. In general, therefore, the former ratio of international reserves to debt outstanding is a better indicator of an

³³ Letting X = exports of goods and services, M = imports of goods and services, and assuming that $M \neq 0$, the ratio can take the following values $0 < X/M < \infty$. If $X/M < 1$, exports do not generate enough foreign exchange to cover imports. If $X/M = 1$, exports generate sufficient foreign exchange to cover imports only. Finally, if $X/M > 1$, then exports produce foreign exchange availabilities in excess of import requirements that can be used to cover debt obligations.

economy's ability to repay its debt over time.

The following table, Table 31, provides three proxy measures for the average cost of each country's total debt outstanding. In particular, the first measure, the ratio of total debt service payments to total debt outstanding, provides an estimate of the average nominal cost of outstanding debt. It is, in short, an indicator of the average terms on which past debt has been accumulated. It is, however, sensitive to the maturity structure of outstanding debt. For the period 1975-1980 the average annual terms of debt outstanding were: Chile, 18.9%; Uruguay and Venezuela, 18.0%; Argentina, 16.0%; Peru, 11.3%; Brazil, 11.0%; Ecuador, 9.6%; Colombia, 9.1%; Bolivia, 8.5%; and Paraguay, 5.2%. Furthermore, note that most countries experienced increasing average annual terms during this historical period. Table 31 also decomposes the average nominal cost of external debt into its two components: the average nominal cost on amortization payments (AMOR) and on interest payments (INTE). We find, in general, that in many countries the burden of debt is greater for amortization payments than interest payments and that both component costs tend to be increasing. The average annual burden of amortization payments for the period 1975-1980 was: Chile, 13.6%; Uruguay, 11.8%; Venezuela, 11.5%; Argentina, 10.7%; Peru, 6.6%; Brazil, 5.9%; Ecuador, 5.8%; Bolivia, 5.2%; Colombia, 5.0%; and Paraguay, 3.0%. Similarly, the average

TABLE 30

RATIO OF DEBT OUTSTANDING AND DISBURSED
TO EXPORTS OF GOODS AND SERVICES

(percent)

Country	1971	1975	1976	1977	1978	1979	1980
Argentina	100.9	87.0	94.3	74.7	86.8	88.4	91.8
XMR	84.6	73.5	115.6	123.0	129.8	95.3	70.4
Bolivia	254.7	156.3	156.6	193.1	232.5	210.4	200.6
XMR	97.6	74.9	69.5	89.1	69.2	69.0	85.9
Brazil	120.4	136.9	152.8	159.4	208.1	196.6	163.7
XMR	66.9	58.7	63.3	72.4	67.1	63.3	64.4
Chile	190.6	212.9	153.7	144.1	143.4	103.5	79.5
XMR	84.7	75.2	105.5	80.5	77.0	83.4	76.8
Colombia	137.7	104.9	84.1	75.1	67.1	67.7	75.6
XMR	67.7	94.4	106.9	113.5	107.5	107.8	99.8
Ecuador	87.0	40.6	43.2	70.0	91.2	84.2	91.0
XMR	60.7	81.7	97.7	81.1	70.1	79.4	82.7
Paraguay	135.7	80.8	92.8	80.5	93.5	94.4	96.3
XMR	75.0	73.1	77.3	86.9	80.4	68.9	70.8
Peru	82.8	173.1	217.5	219.9	224.5	143.7	132.1
XMR	94.0	52.7	56.0	68.6	90.4	113.7	86.7
Uruguay	137.2	135.4	109.3	104.8	99.9	72.9	67.6
XMR	65.8	60.9	81.0	71.2	74.6	79.4	74.3
Venezuela	30.7	12.6	28.5	40.4	63.5	59.9	48.6
XMR	102.1	130.7	104.9	79.1	67.1	100.7	126.4

XMR is the export/import goods and services ratio.

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

annual burden of interest payments for this period was: Venezuela, 6.1%; Argentina, Chile, and Uruguay, 5.2%; Brazil, 5.1%; Peru, 4.7%; Colombia, 4.0%; Ecuador, 3.5%; Bolivia, 8.5%; and Paraguay, 2.1%.

The following three ratios of debt burden are measures of the debt burden on the international reserves position of a country. Consider, for example, the ratio of a country's debt service payments to its international reserves position (Table 32). This ratio relates the 'tax' or share of the absolute level of international reserves each year that is required to meet a country's debt servicing obligations. Notationally, the ratio can be written as $(A + Z)/RES$, and its range is: $0 \leq (A + Z)/RES \leq \infty$. The ratio is considered favorable if it is close to zero, implying a negligible claim on reserves by debt service payments. Conversely, the ratio should be considered unfavorable if it equals or exceeds .5, for then fifty or more percent of existing reserves are drained, or a fifty or more percent increase in reserves are being denied because of external debt servicing. Hence, an empirical ratio close to .5 is considered unhealthy in this study; it indicates that international reserves are heavily 'taxed' to meet debt service payments. Many countries, however, experienced ratios below this benchmark figure for most years during the period 1975-1980. Indeed, seventy percent of the countries under review had lower ratios in 1980 relative to 1975.

TABLE 31

RATIO OF DEBT SERVICE PAYMENTS TO TOTAL DEBT OUTSTANDING

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	14.6	15.1	13.3	13.7	23.5	13.5	19.3
AMOR	10.1	10.0	9.3	9.5	17.9	8.2	11.3
INTE	4.6	5.1	4.0	4.2	5.6	5.3	8.0
Bolivia	3.9	6.0	6.4	7.6	14.8	9.4	9.3
AMOR	2.7	4.1	4.1	4.8	11.3	5.2	4.0
INTE	1.2	1.9	2.3	2.8	3.5	4.2	5.3
Brazil	8.3	9.6	8.9	9.4	10.9	13.4	15.4
AMOR	5.5	4.8	4.9	5.5	6.4	7.3	7.0
INTE	2.8	4.8	4.0	3.9	4.5	6.0	8.5
Chile	8.9	11.4	17.1	18.4	20.9	22.4	26.8
AMOR	5.9	7.9	12.4	14.2	15.9	16.1	17.4
INTE	3.0	3.6	4.7	4.2	5.0	6.3	9.4
Colombia	6.8	8.3	8.3	8.4	9.2	12.2	8.5
AMOR	4.4	4.5	4.5	4.7	5.3	8.0	4.0
INTE	2.4	3.8	3.7	3.7	4.0	4.2	4.5
Ecuador	8.0	6.4	7.6	6.5	9.1	24.6	11.0
AMOR	6.0	4.2	5.3	4.0	4.8	19.3	4.8
INTE	2.0	2.2	2.4	2.5	4.3	5.3	6.2
Paraguay	7.6	5.0	4.3	4.9	4.8	5.3	7.2
AMOR	4.9	3.3	2.6	3.0	2.7	3.0	3.6
INTE	2.7	1.7	1.7	1.9	2.1	2.3	3.4
Peru	13.9	11.0	8.2	10.1	11.1	11.5	17.8
AMOR	9.8	6.3	4.6	6.3	6.4	6.0	11.3
INTE	4.1	4.7	3.6	3.7	4.7	5.5	6.5
Uruguay	15.7	22.1	17.9	20.9	35.3	9.4	12.4
AMOR	11.4	17.6	12.9	16.0	30.3	4.1	5.9
INTE	4.3	4.5	5.0	4.9	5.0	5.2	6.5
Venezuela	9.3	38.7	12.7	17.3	10.1	15.1	26.6
AMOR	5.9	31.3	8.9	12.7	4.8	8.7	15.6
INTE	3.5	7.4	3.8	4.7	5.3	6.4	11.0

AMOR is the ratio of amortization payments to total debt outstanding.

INTE represents the ratio of interest payments to total debt

outstanding.

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

brazil, however, had an 88.7 percentage points increase during this period; such a heavy claim on international reserves cannot occur without some hinderance to development goals.

Another ratio of the burden of external public indebtedness is the ratio of debt service payments to changes in international reserves.³⁴ This ratio is an indicator of the magnitude of the actual or potential changes in international reserves that may be attributable to debt servicing. If the ratio approaches -1 (and assuming the country's international accounts are in balance) the implication is that the total change (in this case reduction) in reserves is attributable to the burden of servicing external debt. If the ratio is explosive on the negative side this would imply that large debt servicing obligations can be met mostly from currently generated foreign exchange availabilities and thus minimizing the drain on a country's stock of international reserves. From Table 33 we find that ninety per cent of the South American countries have experienced this in one or more years during the period 1975-1980.

A modified and more accurate version of the debt service/changes in reserves ratio is the ratio of total debt service payments to adjusted changes in reserves. This

³⁴ Here again the ratio is defined symbolically as $(A + Z) / \Delta RES$, where ΔRES represents changes in reserves. The ratio's range is: $-\infty \leq (A + Z) / \Delta RES \leq +\infty$.

TABLE 32

RATIO OF TOTAL DEBT SERVICE PAYMENTS TO INTERNATIONAL
RESERVES

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	142.1	92.9	43.8	27.0	35.7	12.8	22.7
Bolivia	43.6	37.6	50.2	49.3	111.6	49.2	49.3
Brazil	28.1	40.3	31.9	38.0	36.2	65.2	129.0
Chile	105.7	209.8	129.2	136.1	86.5	46.9	34.3
Colombia	68.9	39.3	21.6	15.4	14.2	13.2	8.6
Ecuador	48.4	15.5	15.5	17.6	29.2	79.6	32.0
Paraguay	61.4	18.9	12.5	9.9	8.0	10.0	11.6
Peru	39.6	76.0	107.3	125.1	122.2	43.7	53.0
Uruguay	27.9	40.1	31.8	27.3	38.4	5.3	6.9
Venezuela	8.0	5.4	4.2	8.6	8.7	11.8	23.7

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

TABLE 33

RATIO OF TOTAL DEBT SERVICE PAYMENTS TO CHANGES IN RESERVES

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	(114.3)	(75.8)	76.6	55.9	101.4	26.1	(69.3)
Bolivia	244.0	(134.5)	1148.9	146.9	8762.5	122.0	913.7
Brazil	87.5	(129.6)	85.1	364.4	92.9	(272.4)	(225.0)
Chile	148.5	(71.6)	218.1	1362.8	161.2	97.2	101.6
Colombia	(141.9)	202.4	42.4	42.3	51.2	29.9	36.8
Ecuador	(411.2)	76.4	40.4	84.9	527.7	341.4	114.4
Paraguay	430.0	80.4	46.0	23.8	20.0	35.3	64.7
Peru	186.9	(80.6)	(322.7)	666.6	800.7	616.3	208.9
Uruguay	300.5	(134.4)	(264.0)	98.4	199.3	10.1	46.4
Venezuela	23.6	29.1	(119.9)	(2067.8)	(76.3)	34.1	(458.6)

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

ratio provides a more comprehensive standard by which one can attribute actual or potential changes in international reserves to the burden of external debt servicing. The ratio eliminates double counting by dividing debt service payments by the sum of debt servicing payments and changes in reserves; the summing procedure is required since changes in reserves in and of themselves may reflect the outflow of foreign exchange for debt servicing.³⁵ Table 34, however, reconfirms the results of Table 33. We conclude, in short, that several of the South American countries for many of the years under review had ratios in the range between zero and unity - indicating that they were capable of augmenting their reserve positions in light of the presence of an external debt servicing burden. Moreover, since the export/import ratios were unfavorable for several countries during this period, reflecting trade deficits, this observation implies that the remaining two accounts in the balance of payments were important in procuring foreign exchange availabilities.

The next ratio considered is the ratio of total debt service payments to exports of goods and all services (TDS/XGS), known in the literature as the debt service ratio (DSR). This ratio is frequently used and is an indicator of the magnitude of export earnings required to finance

³⁵ The ratio of debt service payments to adjusted changes in reserves has the following range: $-\infty < (A + Z)/\Delta RES^* < +\infty$, where $\Delta R^* = A + Z + \Delta RES$. The properties of this ratio are similar to those of the unadjusted ratio.

TABLE 34

RATIO OF TOTAL DEBT SERVICE PAYMENTS
TO ADJUSTED CHANGES IN RESERVES

	(percent)						
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	801.3	(312.8)	43.4	35.9	50.4	20.7	(225.4)
Bolivia	70.9	389.5	92.0	59.5	98.9	55.0	90.1
Brazil	46.7	438.1	46.0	78.5	48.1	158.0	180.0
Chile	306.1	116.2	68.6	93.2	61.7	49.3	50.4
Colombia	100.7	66.9	29.8	29.7	33.9	23.0	26.9
Ecuador	132.1	(323.1)	28.8	45.9	84.1	77.3	53.3
Paraguay	81.1	44.6	31.5	19.2	16.7	26.1	39.3
Peru	65.1	(414.6)	144.9	87.0	88.9	38.1	67.6
Uruguay	75.0	390.6	72.5	49.6	66.6	9.2	31.7
Venezuela	19.1	22.6	602.2	105.1	(322.5)	25.4	127.9

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

imports. Alternatively stated, the indicator is a measure of the ability to meet debt service payments from current exports. The importance of this ratio is magnified if foreign exchange reserves and capital flows are low. A corollary measure presented in Table 35 is the interest service ratio (ISR), which indicates the fraction of export earnings 'claimed' by interest payments on external public debt. The difference between the two aforementioned ratios can be considered as the amortization repayment ratio, i.e., the percentage of export earnings going towards principal payments on prior contractual external public debt. It is clear, therefore, that the bulk of total debt service payments is for amortization payments.

One must keep in mind, albeit some of the above ratios appear low and innocuous, that the crucial question is if exports of goods and nonfactor services can generate sufficient foreign exchange availabilities to cover imports of goods and nonfactor services as well as the service payments on external public debt. We present, therefore, in Table 35 the export/import goods and services ratio (XMR) to facilitate such a comparison. We find, specifically, that for many of the years under review several of the South American countries have export/import goods and services ratios of less than unity. There were, in principle, no surpluses from exports of goods and services to cover debt service payments as is usually implied by the TDS/XGS ratio.

The concept behind this frequently used and misleading ratio is that the lower the ratio the greater is a country's ability to meet debt servicing obligations from currently generated foreign exchange availabilities. Letting A represent amortization payments and Z interest payments, then $0 \leq (A + Z)/X \leq \infty$. The ratio is misleading in that it does not really indicate a country's current ability to generate foreign exchange availabilities for debt servicing. Indeed, the ratio implicitly assumes $M = 0$ during any given time period. A more objective ratio would be $0 \leq (A + Z)/X^* \leq \infty$, where $X^* = X - M$. This ratio, referred henceforth as the adjusted debt service ratio, would become increasing large as a country's balance on trade and services experiences a declining surplus; if this balance is in deficit, $X^* < 0$, then the country faces a problem of external imbalance. In both cases a country would have to depend on one of the two remaining accounts in the balance of payments or on its reserves to meet debt servicing obligations.

The geometric averages of the TDS/XGS and XMR ratios for the period 1975-1980 were: Argentina, 18.7% and 98.4%; Bolivia, 23.9% and 79.1%; Brazil, 25.0% and 64.7%; Chile, 29.7% and 82.5%; Colombia, 10.3% and 104.8%; Ecuador, 9.8% and 81.7%; Paraguay, 8.8% and 76.0%; Peru, 27.8% and 75.2%; Uruguay, 26.8% and 73.3%; and Venezuela, 7.2% and 98.7%. In practice, countries with a ratio of exports to imports less

than unity must depend on one of the following sources for foreign exchange availabilities:

1. unilateral transfers - either private remittances or government transfers;
2. direct or indirect foreign investments;
3. short, medium, or long-term financial market credits;
4. international reserves accumulated in the past.

TABLE 35

RATIO OF TOTAL DEBT SERVICE TO EXPORTS OF GOODS AND ALL SERVICES

(percent)							
Country	1971	1975	1976	1977	1978	1979	1980
Argentina	20.3	22.0	18.5	15.4	27.1	15.0	17.7
ISR	6.3	7.4	5.6	4.7	6.4	5.9	7.4
XMR	84.6	73.5	115.6	123.0	129.8	95.3	70.4
Bolivia	11.8	14.5	15.8	21.5	49.4	29.8	25.9
ISR	3.6	4.6	5.6	8.0	11.8	13.4	14.8
XMR	97.6	74.9	89.5	89.1	69.2	69.0	85.9
Brazil	14.8	16.8	18.7	20.8	30.3	35.5	34.5
ISR	5.0	8.4	8.3	8.7	12.6	16.0	18.9
XMR	66.9	58.7	63.3	72.4	67.1	63.3	64.4
Chile	21.2	28.6	31.3	33.2	38.2	26.5	22.9
ISR	7.0	8.9	8.6	7.5	9.1	7.5	8.0
XMR	84.7	75.2	105.5	80.5	77.0	83.4	76.8
Colombia	14.1	11.1	9.5	8.8	9.5	13.2	10.0
ISR	4.9	5.1	4.3	3.9	4.1	4.6	5.3
XMR	67.7	94.4	106.9	113.5	107.5	107.8	99.8
Ecuador	12.4	4.5	5.7	7.2	11.8	29.2	13.9
ISR	3.0	1.6	1.6	2.8	5.6	6.3	7.8
XMR	60.7	81.7	97.7	81.1	70.1	79.4	82.7
Paraguay	14.4	9.3	7.8	6.8	7.4	10.6	12.9
ISR	5.1	3.2	3.1	2.5	3.2	4.5	6.0
XMR	75.0	73.1	77.3	86.9	80.4	68.9	70.8
Peru	15.6	25.3	27.0	30.5	31.3	22.4	31.9
ISR	4.6	10.7	11.0	11.6	13.3	10.7	11.6
XMR	94.0	52.7	56.0	68.6	90.4	113.7	86.7
Uruguay	26.7	50.0	32.4	34.9	53.7	9.9	12.2
ISR	7.3	10.1	9.0	8.2	7.6	5.5	6.4
XMR	65.8	60.9	61.0	71.2	74.6	79.4	74.3
Venezuela	3.8	5.4	3.9	7.6	6.9	9.5	13.2
ISR	.4	.4	.4	.6	1.0	1.3	2.0
XMR	102.1	130.7	104.9	79.1	67.1	100.7	126.4

ISR is the interest service ratio, i.e., the ratio of interest payments to total debt outstanding.

XMR is the export/import goods and services ratio.

Source: The World Bank, World Debt Tables, Document of The World Bank no. EC-167/81 (Washington, D.C.: The World Bank, December 1981), pp. country pages.

4.5 CONCLUSIONS

A survey of external public debt for the recent historical period was undertaken in this chapter. More specifically, the structure of external public debt, the net transfer of financial resources, and a selective group of indicators of the burden of external public indebtedness were reviewed and studied. First, total external public borrowing by country and source was analyzed and some conclusions drawn. We noticed a discernible pattern in the structural composition of external public debt. In general, total private credits are claiming an increasing share of total public debt. We found that in 1980 sixty percent of the countries had total private credits constituting the greatest share in total external public debt compared to only twenty percent of the group of ten in 1970. Dissecting this development further, we found that the composition of official external public debt was also changing structurally, i.e., international organization's share in total official debt is increasing rapidly. Similarly, the structure of private external public debt changed significantly with financial market credits becoming the dominant component. We then decomposed the credit terms of total external public debt into three categories. It was found that concessional and commercial fixed interest rate loans exhibited a steady decline in their relative share of total debt outstanding. Consequently, the relative share of variable interest rate

loans experienced a significant increase. The consequences of these changes are comprehensively discussed in section 5.2; suffice to say, the aforementioned developments manifested themselves in an increase in the real cost of obtaining a given level of external financial funds.

In analyzing the net transfer of financial resources on public account, we observed a noticeable decrease in the net transfer for the period 1975-1980; this decline was explained by analyzing the changes in the components of the net transfer. In particular, the decline in the growth of net borrowing and the net transfer are a result of the rapid growth in amortization and interest payments respectively during the period 1975-1980. The conclusion one arrives at from this analysis is that many of the South American countries may have been borrowing to service existing debt during this historical period. Additionally, we found that the real net transfer on a country specific basis did not, for the most part, increase during this historical period. As a follow-up to this presentation, the ratio of the net transfer of financial resources on public account to GNP was calculated as a crude measure of the net transfer's contribution to current output; six out of the ten countries had favorable ratios, i.e., ratios for the most part exceeding 1.5 per cent, for the period 1975-1980.

Various macro or aggregate ratios were looked at to obtain an overview of the extent of external public

indebtedness and the magnitude of the debt burden for the South American countries under review. Recapitulating, it was found that by 1980 total external public debt outstanding and debt service payments increased 2.7 and 3.8 times respectively from their initial levels in 1975. The disbursed and outstanding debt to GNP ratio (DOL/GRP), a measure of a country's debt as a fraction of current output, shows a propensity to rise and is in the double digit range in terms of percentages for all countries. The ratio of international reserves to debt outstanding and disbursed (RES/DOD), on the other hand, provides a measure of a country's foreign exchange availabilities to service its debt. We found only two countries, Uruguay and Venezuela, had an average ratio exceeding unity for the period 1975-1980. Another ratio reviewed as a measure of a country's current ability to procure foreign exchange to cover its outstanding debt from current exports is the ratio of debt outstanding and disbursed to exports of goods and services (DOD/XGS). We showed that this ratio tends to over estimate a country's ability to obtain foreign exchange availabilities to retire debt; for it ignores the import requirements of a country. It was found that in many cases export earning were insufficient to meet current import requirements let alone cover portions of existing debt.

Related to the above analysis, the ratio of total debt service payments to total debt outstanding was calculated as

a proxy measure for the average cost of each country's total debt. Our comparisons for this ratio indicated increasing annual terms during this historical period; with the burden of amortization payments exceeding that of interest payments.

The following three ratios considered were measures of the debt burden on the international reserves position of a country. These ratios were: total debt service payments to international reserves, total debt service payments to changes in reserves, and total debt service payments to adjusted changes in reserves. The first ratio, indicates, *ceteris paribus*, the annual share of international reserves claimed by debt servicing. The second ratio, the ratio of debt service payments to changes in reserves, is an indicator of the actual or potential changes in international reserves that are attributable to external public debt servicing; while the ratio of total debt service payments to adjusted changes in reserves, the third ratio, is a more inclusive standard of this measure. All three indicators, in most cases, were favorable during the period 1975-1980.

In conclusion, in Table 35, the ratio of total debt payments to exports of goods and services was shown to over estimate the importance of exports in generating foreign exchange availabilities for debt servicing; for an analysis of the export/import goods and services ratio is a

prerequisite to determining the informativeness of this indicator. Further, an alternative, i.e., adjusted for imports, debt servicing ratio was suggested to be a better indicator. In the following chapter we will use this adjusted debt service ratio to determine if debt servicing has imposed an adverse effect on the economic development of the subset of LDCs under consideration.

Chapter V

EXTERNAL FLOWS, ECONOMIC DEVELOPMENT AND CAUSALITY

5.1 INTRODUCTION

This chapter summarizes the main theoretical and empirical investigations of this study. In particular, we develop and present the methodology for determining the distributed lag causal relationship between external flows and economic development. Two measures of economic development and four measures of external flows are used. The levels of gross domestic product and gross fixed capital formation are the two development indicators. Similarly, the four categories of external flows are the levels of external public debt disbursements, export earnings, direct foreign investment and unilateral transfers. All variables are measured in levels of gross real per capita units. Using a bivariate distributed lag system, it is shown that the null hypothesis for the absence of a causal relationship, either unidirectional or with feedback, between external flows and economic development can in several cases be rejected at conventional levels of statistical significance. Further, the sign and magnitude of causality in several cases differ from what neoclassical theory would predict. Results, however, vary depending on the external flow, development indicator and particular South American country under

review. Similarly, tests between the adjusted debt service ratio and the two development indicators, for several countries during the various indicated historical periods, reject the null hypothesis for the lack of an adverse effect on economic development resulting from the burden of financing an external public debt.

5.2 DIGRESSION ON CAUSALITY

The important purpose of a scientific law is to permit prediction, and prediction is in turn sought because it permits control over phenomena. That control requires prediction is self evident, for unless one knows what "causes" a particular phenomenon, one cannot affect or prevent its occurrence.³⁶

Neoclassical economic theory provides a corpus of knowledge that purports to give economists the tools of analysis to predict the path of micro/macro-economic variables. Further, the use of neoclassical theory for specification of econometric models in terms of endogenous and exogenous variables implies a route of causality from the parent parameters of the latter to the former. Econometric models, in short, are causal models; causality being defined by theory. Economic theory, however, is often ambiguous on what choice variables should be considered as

³⁶ Quote attributed to George Stigler. Zellner, Arnold, "Causality and Econometrics," H.G.B. Alexander Research Foundation, Graduate School of Business, University of Chicago. Invited paper presented at a joint University of Rochester-Carnegie-Mellon University Conference held at the University of Rochester, April 28-29, 1978, pp. 1-2.

exogenous. This ambiguity of economic theory has resulted in attempts to develop theoretical constructions, together with their empirical counterparts, to test for causality and/or exogeneity of variables.³⁷ Caines and Chan (1975), Granger (1969), Granger and Newbold (1977), Pierce (1977), Pierce and Haugh (1977) and Sims (1972), have all proposed associated exogeneity tests. Further, Sims (1977) attempts to clarify and interpret these tests for exogeneity by attempting to refine the meaning of commonly used terminology describing variables as causal, behavioral, exogenous and structural. Zellner (1977, 1978) disputes if one can determine causal priority. For an historical perspective, note that Hume distinguishes between correlation and causality. Correlation, he states, contains the property of prediction, i.e., contiguity and temporal succession or simply spatial-temporal relations of events. Causality, in contrast, has the properties of prediction and necessary connection.³⁸ Hume disputes, however, the existence of necessary connection and argues that relationships, in principle, are correlations and that people attribute cause and effect to observations as a result of habit, i.e., the concept of causality is incorrectly used as "an idea related to or associated with a

³⁷ See Zellner (1978) for an historical and contemporary review of causality and econometrics.

³⁸ Hume, David, A Treatise of Human Nature, Volume One (New York and London: Everyman's Library, 1964), pp. 73-100.

present impression."³⁹

The above caveats,⁴⁰ notwithstanding, there have been many papers using the techniques developed by Granger (1969) and Sims (1972) to determine causal priority between and among macroeconomic variables. Works by Hafer (1981), Leiderman (1980), Neftci (1978) and Mehra (1977, 1978) are some examples of this evolving tradition. The method used in this research to determine causal priority is based primarily on the work of Granger (1969) and Granger and Newbold (1977). We now turn to develop and extend their methodology.

5.3 METHODOLOGY

Granger (1969) and Granger and Newbold (1977) have proposed an operational theory of causality testing premised on several assumptions. First, causality is defined relative to a given information set. Second, it is only relevant for stationary stochastic processes. Third, the future cannot cause the past.⁴¹

³⁹ Ibid., p. 95.

⁴⁰ For further alternative definitions of causality see The Encyclopedia of Philosophy, Volume Two (New York, New York: The Macmillan Company & The Free Press, 1967), pp. 56-66 and/or Erugger, Walter, Philophical Lictionary (Spokane, Washington: Gonzaga University Press, 1972), pp. 52-57.

⁴¹ This third premise ignores that expectations of the future may cause the past.

Of foremost importance is the theoretical specification of our model. Therefore, following Granger (1969), consider two stationary stochastic process, X_t and Y_t . Let $\bar{X}_t$ and $\bar{Y}_t$ denote the set of past values for both series. That is $\bar{X}_t = \{X_{t-j}, j = 1, \dots, \infty\}$ and $\bar{Y}_t = \{Y_{t-j}, j = 1, \dots, \infty\}$. Then denote the respective optimum, unbiased, least squares predictors of X_t and Y_t using the set of information embodied in their own past values as $P_t(X|\bar{X})$ and $P_t(Y|\bar{Y})$. Hence, the respective error series of each variable can be formulated as:

$$\epsilon_t(X|\bar{X}) = X_t - P_t(X|\bar{X}) . \quad (5.3.1)$$

$$\eta_t(Y|\bar{Y}) = Y_t - P_t(Y|\bar{Y}) . \quad (5.3.2)$$

Letting $\sigma^2(X|\bar{X})$ and $\sigma^2(Y|\bar{Y})$ represent the variances of the predictive error series given by equations (5.3.1) and (5.3.2), we can arrive at definitions for unidirectional causality and causality with feedback relative to the information embodied in the stationary stochastic series X_t and Y_t . We will consider three alternative scenarios. First, X_t is causing Y_t if:

$$\sigma^2(Y_t|\bar{X}_t, \bar{Y}_t) < \sigma^2(Y_t|\bar{Y}_t) , \quad (5.3.3)$$

denoted by $X_t \rightarrow Y_t$. Equation (5.3.3) states that X_t is causing Y_t if one minimizes the variance of the forecast error of Y_t by using the universe of information $[\bar{X}, \bar{Y}, \bar{U}]$ than only by its own past $[\bar{U} - \bar{X}]$.

Alternatively, causality from Y_t to X_t , $Y_t \rightarrow X_t$, exists if:

$$\sigma^2(X_t | \bar{X}_t, \bar{Y}_t) < \sigma^2(X_t | \bar{X}_t) . \quad (5.3.4)$$

In essence, Y_t causes X_t if one obtains better predictions of X_t using own past observations and past observations of Y_t than by X_t 's own past observations.

The third and final scenario is when both of the aforementioned circumstances occur simultaneously:

$$\begin{aligned} \sigma^2(Y_t | \bar{X}_t, \bar{Y}_t) &< \sigma^2(Y_t | \bar{Y}_t) , \\ \sigma^2(X_t | \bar{X}_t, \bar{Y}_t) &< \sigma^2(X_t | \bar{X}_t) . \end{aligned} \quad (5.3.5)$$

Causality with feedback is said to occur when the variance of the forecast error of both series X_t and Y_t is smaller when own and non-own past values are included as explanatory variables than if only own past values are used. Notationally, $X_t \leftrightarrow Y_t$.

In passing, note that Zellner (1978) has criticized the theoretical restrictions and lack of generality of Granger's model by indicating the existence of alternative definitions of causality. He notes, in particular, Feigl's philosophical conception of causality in terms of "predictability according to a law."⁴² Zellner further attacks Granger's methodology by describing it as "measurement without theory."⁴³ Jacobs, Leamer and Ward (1979) argue that one cannot, from observed correlations, imply causality and that Granger's technique is really a test for informativeness.⁴⁴

Sims (1972) has shown that Granger-causality testing is equivalent to a test of exogeneity between or among variables. It follows then that if and only if equation (5.3.3) holds, then X_t is exogenous to Y_t ; it is appropriate to regress Y_t on X_t in a single multiple regression equation. Conversely, if and only if $Y_t \rightarrow X_t$, i.e., equation (5.3.4) holds, it is correct to regress X_t on Y_t in a single multiple regression equation. In practice, however, the theoretical direction of causality in a multiple regression equation is determined a priori. If the model's specification is wrong then the multiple regression

⁴² Zellner, op. cit., p. 6.

⁴³ Ibid., p. 65.

⁴⁴ In view of the manifold philosophical meanings of causality this concept shall henceforth be interpreted as standing for statistical evidence of intertemporal connectiveness or association.

technique collapses to a test of the strength of the linear relationship between or among the endogenous and exogenous variables. It is also clear that if X_t and Y_t are jointly determined, a single equation specification of the relationship between X_t and Y_t would introduce simultaneity bias with resulting biased and inconsistent estimators.

The empirical analog to our theoretical model is given by the following linear equations:

$$Y_t = \alpha_0 + \sum_{j=1}^m \beta_j Y_{t-j} + \sum_{j=1}^m \gamma_j X_{t-j} + \delta LT + \epsilon_t. \quad (5.3.6)$$

$$X_t = \alpha_0^* + \sum_{j=1}^m \beta_j^* X_{t-j} + \sum_{j=1}^m \gamma_j^* Y_{t-j} + \delta LT + \eta_t. \quad (5.3.7)$$

both time series data for X_t and Y_t are assumed to be jointly covariance stationary. This is achieved by expressing X and Y in natural log form and detrending the series by including a linear trend variable in the specification of each equation. The innovations in equations (5.3.6) and (5.3.7) are assumed to be two uncorrelated white-noise series, i.e., $E[\epsilon_t, \epsilon_s] = 0 = E[\eta_t, \eta_s]$, for $s \neq t$ and $E[\epsilon_t, \eta_s] = 0$ for all t, s . On the null hypothesis that X_t causes Y_t , the estimated coefficients on the lagged X variable in equation (5.3.6) are statistically non-zero as a group; X_t unidirectionally causes Y_t . On the other hand, unidirectional causality from Y_t to X_t is said

to exist if the coefficients on lagged Y_t in equation (5.3.7) are statistically different from zero as a group. A feedback relationship is said to exist between X_t and Y_t if the coefficients on lagged X_t in equation (5.3.6) and on lagged Y_t in equations (5.3.7) are both simultaneously non-zero as a group. Recall, further, that the theory underlying this empirical procedure assumes the lag structure of the model approaches infinity. Generally, therefore, in all of the foregoing three scenarios one should select the longest statistically significant lag as determining the course of causal priority: shorter statistically significant lags, while are interesting to report, may give biased estimates and the direction of biasness cannot be ascertained from the sample data.

The contribution of the causal variable, X_t in equation (5.3.6) and Y_t in equation (5.3.7), is determined by the statistical significance of the F-ratio:

$$F_{m, N - k} = \frac{\frac{ESS_{UR} - ESS_R}{m}}{\frac{USS_{UR}}{N - k}} \quad (5.3.8)$$

Where ESS_{UR} and ESS_R are the explained sum of squares in the unrestrained and restrained equations respectively; USS_{UR} is the unexplained sum of squares in the unrestrained equation;

m denotes the number of lag causal variables in the unconstrained equation; N represents the number of observations in the unconstrained equation; and k is the number of coefficients in the unconstrained equation including the constant and linear trend variable.

Although Granger (1969) did not discuss how to determine the sign and significance of causality two alternative procedures can be derived for this purpose. First, consider equation (5.3.6):

$$Y_t = \alpha_0 + \sum_{j=1}^m \beta_j Y_{t-j} + \sum_{j=1}^m \gamma_j X_{t-j} + \delta LT + \epsilon_t .$$

If

$$X_{t-1} \approx X_{t-2} \approx \dots \approx \tilde{X} \quad (5.3.9)$$

then $\tilde{X}$ can be considered as the secular value of X_t . This enables us to write equation (5.3.6) as:

$$Y_t = \alpha_0 + \sum_{j=1}^m \beta_j Y_{t-j} + \tilde{X} \sum_{j=1}^m \gamma_j + \delta LT + \epsilon_t . \quad (5.3.10)$$

Equation (5.3.10) provides us with a rationale for summing the coefficients of the causal variable to determine the sign and magnitude of causality. In short, the sum of the

coefficients of the causal variable then indicates the effect on Y_t of an incremental change in the secular value of X_t , holding Y_{t-j} , as $j = 1, \dots, m$, invariant. We use the following procedure to test for the statistical significance of the sign and magnitude of causality: Let $r = \sum_{j=1}^m \gamma_j$, then the standard error of r is:

$$\sigma_r = \left[\sum_{j=1}^m \text{Var. } \gamma_j + 2 \sum_{j=1}^m \sum_{t=1}^m \text{Cov. } \gamma_j \gamma_{t-j} \right]^{1/2} \quad (5.3.11)$$

So that the relevant t -statistic is:

$$t = \frac{r - 0}{\sigma_r} \quad (5.3.12)$$

The sign and magnitude of causality as given by r is relevant only if equation (5.3.12) is statistically different from zero.

Though the aforementioned technique may be intuitively acceptable, equation (5.3.10) assumes Y_{t-j} , as $j = 1, \dots, m$, is invariant with respect to X . Indeed, this assumption may not hold; Y_{t-j} , as $j = 1, \dots, m$, will vary as X varies. Therefore, another approach to determine the sign and magnitude of causality will be derived. In particular, let

$$Y_t \approx Y_{t-1} \approx \dots \approx Y_{t-m} \approx \tilde{Y} \quad (5.3.13)$$

where $\tilde{Y}$ is the secular value of Y_t . Equation (5.3.6) can now be written as:

$$\tilde{Y} = \theta \tilde{X}, \quad (5.3.14)$$

where $\theta = \frac{\Gamma}{1 - \mu}$, $\Gamma = \sum_{j=1}^m \gamma_j$, $1 - \mu = 1 - \sum_{j=1}^m \beta_j$, and $1 - \mu >$

0 for stability. If the stability condition is not satisfied then, the coefficient of the total effect of the causal variable, is misleading. It is clear that equation (5.3.14) can be considered as a reduced form of equation (5.3.6) which provides a more comprehensive measure of the direction and magnitude of causality. The standard error of θ is calculated from Kmenta's (1971) general case as:⁴⁵

$$\begin{aligned} \sigma_{\theta} = & \left[A^2 \left\{ \sum_{j=1}^m \text{Var. } \gamma_j + 2 \sum_{j=1}^m \sum_{t=1}^n \text{Cov. } \gamma_j \gamma_{t-j} \right\} \right. \\ & + B^2 \left\{ \sum_{j=1}^m \text{Var. } \beta_j + 2 \sum_{j=1}^m \sum_{t=1}^n \text{Cov. } \beta_j \beta_{t-j} \right\} \\ & \left. + 2AB \left\{ \sum_{j=1}^m \sum_{t=1}^n \text{Cov. } \beta_j \gamma_{t-j} \right\} \right]^{1/2} \bullet \end{aligned}$$

⁴⁵ This is the derivation of the large-sample standard error formula for an estimator, say θ , which is a function of k and m other estimators, $\beta_1, \dots, \beta_m$ and $\gamma_1, \dots, \gamma_m$. Therefore, given our small sample size, results should be cautiously interpreted. See Kmenta (1971) page 444 for further detail.

(5.3.15)

Where $A = \frac{1}{1 - \mu}$ and $B = \frac{\Gamma}{(1 - \mu)^2}$. The statistical significance of the direction and magnitude of causality as measured by θ can now be tested with the following t-statistic:

$$t = \frac{\theta - 0}{\sigma_{\theta}} \quad (5.3.16)$$

Here again, the sign and magnitude of causality as given by is of interest only if equation (5.3.16) is statistically non-zero at conventional levels of significance.

Before preceding to discuss the empirical results given by the aforementioned methodology, we shall first examine the theoretical considerations for the presence of autocorrelation in the disturbance terms in equations (5.3.6) and (5.3.7). Of critical importance is how autocorrelation effects the statistical significance of our empirical results. It is well documented⁴⁶ that typical consequences

⁴⁶ See Gujarati, Damodar, Basic Econometrics (New York, New York: McGraw-Hill Book Company, 1978), pp. 219-245, and Pindyck, Robert S. and Daniel L. Rubinfeld, Econometric Models & Economic Forecasts, Second Edition (New York, New York: McGraw-Hill Book Company, 1981), pp. 152-154 and pp. 193-199.

of autocorrelation in an equation specification with strictly exogenous variables, while leaving OLS estimators unbiased and consistent, will result in inefficient estimators. This property holds in small as well as large samples. Moreover, the existence of autocorrelation in the residuals in an econometric equation specification characterized by a lagged endogenous variable will result in OLS estimators being biased and inconsistent. Consequently, the probability of making a type II error, rejecting the null hypothesis when it should be accepted, increases. Or in our study, the probability of rejecting the model for the absence of a causal nexus between external flows and economic development is refuted when it should be accepted. The variance, in essence, of the residuals and standard errors of the ordinary least squares estimators tend to be underestimated relative to their true population values. This in turn will result in "bloated" R^2 , t and F -statistics as given by equations (5.3.6), (5.3.7), (5.3.8), (5.3.12) and (5.3.16).

Traditionally one can test for the presence of autocorrelation by using various techniques. Note, however, that one cannot use the Durbin-Watson d -statistic to test for autocorrelation in our model,⁴⁷ for its specification

⁴⁷ The Durbin-Watson d -statistic is given by

$$D = \frac{\sum_{t=2}^{t=N} (\epsilon_t - \epsilon_{t-1})^2}{\sum_{t=1}^{t=N} \epsilon_t^2}$$

includes a lag endogenous variable which biases the d-statistic to a value of 2, i.e., to the rejection of the null hypothesis for the absence of autocorrelation. Second, for several countries we do not have the minimum required number of fifteen observations. Similarly, the Durbin h-statistic⁴⁸ is not applicable here because it is a large sample test and moreover the variance of the coefficient of the first lagged endogenous variable exceeds unity in most equation estimations. In conclusion, the correlogram, a graph of the autocorrelation of the residuals plotted as a function of the time lag between observations, is used in this study to detect for serial correlation in the residuals of our model. Data permitting, the results of these tests are reported up to a ten year lag distribution for the residuals.

In theory, however, the problem of autocorrelation is eliminated by including a sufficient number of lags in our model specification. Consider, for example, equation (5.3.6) specified here for ease of exposition with only two

⁴⁸ The Durbin h-statistic is defined as

$$h = \hat{\rho} \sqrt{\frac{N}{1 - N [\text{Var}(\hat{\alpha}_2)]}}$$

where $\hat{\alpha}_2$ is the estimate of the coefficient of the first-order serial correlation, N represents the sample size and $\text{Var}(\hat{\alpha}_2)$ denotes the variance of the coefficient of the first lagged endogenous variable.

own and cross own lags and ignoring the linear trend variable:

$$y_t = \alpha_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \gamma_1 x_{t-1} + \gamma_2 x_{t-2} + \varepsilon_t \quad (5.3.17)$$

We assume that ε_t is known to follow a Markov first-order autoregressive scheme:

$$\varepsilon_t = \rho \varepsilon_{t-1} + u_t, \quad -1 < \rho < +1 \quad (5.3.18)$$

Where u_t is a stochastic disturbance term following standard OLS assumptions, i.e., $E(u_t) = 0$, $\text{Var}(u_t) = \sigma^2$ and $\text{Cov}(u_t, u_{t-1}) = 0$. Now substituting equation (5.3.18) into equation (5.3.17) we obtain:

$$y_t = \alpha_0 + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \gamma_1 x_{t-1} + \gamma_2 x_{t-2} + \rho \varepsilon_{t-1} + u_t \quad (5.3.19)$$

Lagging equation (5.3.17) and solving for the lagged one period disturbance term and substituting this expression into equation (5.3.19), we derive the following expression:

$$y_t = \phi_0 + \phi_1 y_{t-1} + \phi_2 y_{t-2} + \phi_3 y_{t-3} + \phi_4 x_{t-1} + \phi_5 x_{t-2} + \phi_6 x_{t-3} + u_t \quad (5.3.20)$$

Where $\phi_0 = \alpha_0 (1 - \rho)$, $\phi_1 = \beta_1 + \rho$, $\phi_2 = \beta_2 - \beta_1 \rho$, $\phi_3 = -\beta_2 \rho$, $\phi_4 = \gamma_1$, $\phi_5 = \gamma_2 - \gamma_1 \rho$, $\phi_6 = -\gamma_2 \rho$. In practice, therefore, we can estimate equation (5.3.20) using ordinary least squares and then conduct the F test on the group of variables X_{t-j} , as $j=1, \dots, 3$. Even though we cannot retrieve the structural parameters, ϕ_4 , ϕ_5 and ϕ_6 are zero only if γ_1 and γ_2 are zero, i.e., the null hypothesis for a lack of unidirectional causality from X_t to Y_t is accepted.

5.4 EMPIRICAL RESULTS

The empirical results reported here are based on annual data and truncating the lag distributions of equations (5.3.6) and (5.3.7) from two to eight own and cross-own lags. In particular, the specific truncation for each estimated equation was determined ad hoc by data availability; a technique common to most econometric work. This truncation, it is important to note, is not expected to affect the robustness of our results. According to Neftci (1978) "there exists a finite truncation point so that the omitted tails of the lag distribution contribute negligible explanatory power."⁴⁹

To recapitulate from section 5.1. of this chapter, recall that all variables are constructed in terms of real per capita units. The two development indicators, real per

⁴⁹ Neftci, Salih N., "A Time-Series Analysis of the Real Wages-Employment Relationship," Journal of Political Economy (April, 1978), Vol. 86, No. 2, Part 1, p. 284.

capita gross domestic product and gross fixed capital formation, were constructed by deflating each country's data by its own consumer price index and dividing this figure by each country's population. Similarly, the four measures of external flows - real per capita external public debt disbursements, export earnings, direct foreign investment and unilateral transfers - were deflated using the United States finished goods index (USFGI) and these figures were divided by own-country population figures.⁵⁰ The adjusted debt service ratio was measured as the quotient of amortization and interest payments to the balance on goods and services. Long and Veneroso (1978) have argued that the real value of international financial assets have been underestimated and that a global, e.g., U.S., index of changes in value should be adopted when deflating external flows. In this study the USFGI is used because it is a weighted average of the prices of finished and unfinished goods: goods which a typical LDC may purchase on international markets.

We now present summary statistics, mean, standard deviation and the coefficient of variation, in Table 36 for the aforementioned variables. Examining the dispersion of the two development indicators, we observe the coefficient

⁵⁰ Note that the nominal values for gross domestic product and gross fixed capital formation are expressed in local currency for each country. All nominal external flows, on the other hand, are given in U.S. dollars. See Appendix A for further detail on the construction of variables.

of variation, a measure of relative dispersion, to be somewhat large for most South American countries for the various historical periods under consideration. First, except for Uruguay, all countries have coefficients of variation of real gross domestic product per capita in domestic currency (GDP) in excess of twenty percent. The coefficients of variation for real gross fixed capital formation per capita in domestic currency (GFCF), similarly, exceed twenty percent for nine countries; with six countries having ratios of forty-seven percent or more. With regard to the relative dispersion in the external flow indicators we find the following: Ecuador (1.276) and Venezuela (1.242) have the highest coefficients for external public debt disbursements per capita in U.S. dollars (EPDD), Colombia the lowest (.407); the ratio for real exports f.o.b. per capita in U.S. dollars (EXP) is below forty percent for sixty percent of the countries under review; practically all countries have a coefficient of variation in excess of one-hundred percent for real gross direct foreign investment per capita in U.S. dollars (DFI); and the coefficient of variation for real gross unilateral transfers per capita in U.S. dollars (UT) is relatively high for most countries. In addition, the coefficient of variation for the adjusted debt service ratio (ADSR) is extremely large for almost all in the group of ten.

TABLE 36

DESCRIPTIVE STATISTICS FOR REAL PER CAPITA MEASURES
OF ECONOMIC DEVELOPMENT AND EXTERNAL FLOWS

Country	Mean	Std. Dev.	Coef. of Var.	Sample Period
Argentina				
GDP	50360.100	20606.700	.409	1951-1978
GFCF	8866.180	2338.180	.264	1951-1978
EXP	117.966	33.468	.284	1951-1978
DFI	3.966	6.834	1.723	1951-1978
UI	.433	.619	1.430	1951-1978
Bolivia				
GDP	8526.360	3254.500	.382	1950-1980
GFCF	1371.080	692.799	.505	1950-1980
EXP	57.300	33.220	.580	1951-1980
DFI	1.951	6.171	3.164	1954-1980
UI	6.206	4.250	.685	1950-1980
Brazil				
GDP	6501.560	2508.110	.385	1958-1979
GFCF	1374.050	683.999	.498	1958-1979
EXP	52.490	25.528	.486	1958-1979
DFI	7.533	5.329	.707	1958-1979
UI	1.321	.417	.316	1958-1979
Chile				
GDP	3918.590	1430.490	.365	1966-1980
GFCF	519.484	241.482	.465	1966-1980
EPDD	68.430	48.381	.707	1966-1980
ADSR	.017	2.703	159.000	1966-1980
EXP	188.096	43.777	.233	1966-1980
DFI	.012	19.985	1643.850	1966-1980
UI	3.173	2.742	.864	1966-1980
Colombia				
GDP	13292.600	3315.680	.249	1950-1980
GFCF	2412.110	857.593	.356	1950-1980
EPDD	15.701	6.389	.407	1956-1980
ADSR	-.192	1.709	-8.901	1956-1980
EXP	67.773	19.833	.293	1956-1980
DFI	1.925	1.852	.962	1950-1980
UI	1.980	1.241	.627	1951-1980
Ecuador				
GDP	11315.800	3566.770	.315	1951-1980
GFCF	1965.190	1238.370	.630	1951-1980
EPDD	19.551	24.950	1.276	1956-1980
ADSR	-.150	3.085	-20.567	1956-1980

EXP	67.950	53.384	.607	1951-1980
DFI	6.653	7.894	1.187	1951-1980
UT	3.072	1.489	.485	1951-1980
Paraguay				
GDP	53362.100	15839.500	.297	1950-1979
GFCF	11238.600	5920.830	.527	1962-1979
EPDD	12.127	10.377	.856	1956-1979
ADSR	-.348	.224	-.644	1962-1979
EXP	51.370	20.971	.408	1951-1979
DFI	95.996	273.758	2.852	1950-1979
UT	257.708	612.400	2.376	1950-1979
Peru				
GDP	28412.000	5811.920	.205	1950-1980
GFCF	4688.370	801.218	.171	1950-1980
EPDD	24.184	22.631	.936	1956-1980
ADSR	.591	5.918	10.014	1956-1979
EXP	92.772	20.701	.223	1956-1979
DFI	4.655	6.586	1.415	1950-1979
UT	3.108	1.705	.548	1950-1979
Uruguay				
GDP	2924.870	180.328	.062	1955-1980
GFCF	398.760	108.387	.272	1955-1980
EPDD	40.314	35.489	.880	1956-1980
ADSR	-.538	2.045	-3.801	1959-1979
EXP	131.820	38.034	.289	1959-1979
UT	4.051	2.378	.587	1955-1979
Venezuela				
GDP	6642.200	2145.750	.323	1950-1979
GFCF	1673.210	942.508	.563	1950-1979
EPDD	44.869	55.719	1.242	1956-1979
ADSR	-1.120	7.951	-7.099	1956-1979
EXP	575.599	161.294	.280	1956-1979
DFI	15.004	64.196	4.279	1950-1979
UT	.309	.433	1.400	1950-1979

GDP is real gross domestic product per capita in domestic currency.
 GFCF is real gross fixed capital formation per capita in domestic currency.
 EPDD is external public debt disbursements per capita in U.S. dollars.
 ADSR is the adjusted debt service ratio; it is not measured in per capita units.
 EXP is real exports f.o.b. per capita in U.S. dollars.
 DFI is real gross direct foreign investment per capita in U.S. dollars.
 UT is real gross unilateral transfers per capita in U.S. dollars.

For further detail on the construction of these variables see the text of this chapter and Appendix A.

In Table 37 we present the bivariate linear coefficients of correlation between our real per capita measures of economic development and external flows and test for the strength of their relationship at conventional levels of statistical significance.⁵¹ In general, we find a very strong, in most cases at the 1% level, statistical significance between our development and external flow indicators. Accordingly, the coefficient of correlation between EFDD and GDP and EPDD and GFCF is statistically significant for nine and eight countries, respectively. However, this coefficient between ADSR and GDP or GFCF was almost always statistically insignificant. The results for EXP and the two development indicators show that the aforementioned statistic is significant in nine of ten countries. The coefficient of correlation, in contrast, was not statistically significant between DFI and GDP and DFI and GFCF in seven and six countries, respectively. Finally, we observe this coefficient for UT and GDP to be statistically significant in half of the countries, while for UT and GFCF the coefficient is significant in six of the countries.

⁵¹ The relevant t-statistic is given by:

$$t = \frac{r\sqrt{N-2}}{\sqrt{1-r^2}} .$$

to test the null hypothesis $\rho = 0$.

TABLE 37

COEFFICIENTS OF CORRELATION BETWEEN REAL PER CAPITA
MEASURES OF EXTERNAL FLOWS AND ECONOMIC DEVELOPMENT

A. Ccoefficients of Correlation Between EPDD and GLP

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Chile	.10	.362	1966-1980	(15)
Colombia	.42	2.219**	1956-1980	(25)
Ecuador	.86	8.802*	1956-1980	(25)
Paraguay	.90	9.684*	1956-1979	(24)
Peru	.70	4.701*	1956-1980	(25)
Uruguay	.38	1.970***	1956-1980	(25)
Venezuela	.72	4.866*	1956-1979	(24)

B. Ccoefficients of Correlation Between EPDD and GFCF

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Chile	.10	.362	1966-1980	(15)
Colombia	.43	2.284**	1956-1980	(25)
Ecuador	.88	8.885*	1956-1980	(25)
Paraguay	.94	11.021*	1962-1979	(18)
Peru	.39	2.031***	1956-1980	(25)
Uruguay	-.09	-.433	1956-1980	(25)
Venezuela	.86	7.905*	1956-1979	(24)

C. Ccoefficients of Correlation Between ADSR and GLP

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Chile	-.14	-.510	1966-1980	(15)
Colombia	-.09	-.433**	1956-1980	(25)
Ecuador	.20	.979	1956-1980	(25)
Paraguay	-.15	-.712	1956-1979	(24)
Peru	-.26	-1.263	1956-1979	(24)
Uruguay	-.09	-.394	1959-1979	(21)
Venezuela	.16	.760	1956-1979	(24)

D. Ccoefficients of Correlation Between ADSR and GFCF

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Chile	-.22	-.813	1966-1980	(15)
Colombia	-.14	-.678	1956-1980	(25)
Ecuador	.11	.531	1956-1980	(25)

Paraguay	.07	.281	1962-1979	(18)
Peru	-.10	-.471	1956-1979	(24)
Uruguay	-.38	-1.791***	1959-1979	(21)
Venezuela	.14	.663	1956-1979	(24)

E. Coefficients of Correlation Between EXP and GDP

Country	Ccoef. of Cor.	t-statistic	Sample Period	(N)
Argentina	.18	.933	1951-1978	(28)
Bolivia	.57	3.671*	1951-1980	(30)
Brazil	.98	22.024*	1958-1979	(22)
Chile	.77	4.351*	1966-1980	(15)
Colombia	.69	4.572*	1956-1980	(25)
Ecuador	.95	16.099*	1951-1980	(30)
Paraguay	.88	9.627*	1951-1979	(29)
Peru	.66	4.121*	1956-1979	(24)
Uruguay	.67	3.934*	1959-1979	(21)
Venezuela	.57	3.254*	1956-1979	(24)

F. Coefficients of Correlation Between EXP and GFCF

Country	Ccoef. of Cor.	t-statistic	Sample Period	(N)
Argentina	.53	3.187*	1951-1978	(28)
Bolivia	.63	4.293*	1951-1980	(30)
Brazil	.96	15.333*	1958-1979	(22)
Chile	.85	5.818*	1966-1980	(15)
Colombia	.66	4.213*	1956-1980	(25)
Ecuador	.91	11.614*	1951-1980	(30)
Paraguay	.95	12.170*	1962-1979	(18)
Peru	-.19	-.908	1956-1979	(24)
Uruguay	.47	2.321**	1959-1979	(21)
Venezuela	.40	2.047***	1956-1979	(24)

G. Coefficients of Correlation Between DFI and GDI

Country	Ccoef. of Cor.	t-statistic	Sample Period	(N)
Argentina	-.22	-1.150	1951-1978	(28)
Bolivia	-.06	-.300	1954-1980	(27)
Brazil	.91	9.816*	1958-1979	(22)
Chile	.08	.289	1966-1980	(15)
Colombia	.47	2.867*	1950-1980	(31)
Ecuador	.18	.968	1951-1980	(30)
Paraguay	-.35	-1.977***	1950-1979	(30)
Peru	-.22	-1.193	1950-1979	(30)
Venezuela	-.23	-1.251	1950-1979	(30)

H. Coefficients of Correlation Between DFI and GFCF

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Argentina	-.24	-1.261	1951-1978	(28)
Bolivia	-.02	-.100	1954-1980	(27)
Brazil	.91	9.816*	1958-1979	(22)
Chile	.20	.736	1966-1980	(15)
Colombia	.53	3.366*	1950-1980	(31)
Ecuador	.24	1.308	1951-1980	(30)
Paraguay	.85	6.454*	1962-1979	(18)
Peru	.51	3.137*	1950-1979	(30)
Venezuela	-.10	-.532	1950-1979	(30)

I. Coefficients of Correlation Between UT and GDP

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Argentina	-.06	-.306	1951-1978	(28)
Bolivia	-.24	-1.331	1950-1980	(31)
Brazil	.24	1.106	1958-1979	(22)
Chile	.82	5.166*	1966-1980	(15)
Colombia	.72	5.490*	1951-1980	(30)
Ecuador	.65	4.526*	1951-1980	(30)
Paraguay	-.47	-2.818*	1950-1979	(30)
Peru	.56	3.577*	1950-1979	(30)
Uruguay	.06	.288	1955-1979	(25)
Venezuela	-.03	-.159	1950-1979	(30)

J. Coefficients of Correlation Between UT and GFCF

Country	Coef. of Cor.	t-statistic	Sample Period	(N)
Argentina	.33	1.782***	1951-1978	(28)
Bolivia	-.06	-.323	1950-1980	(31)
Brazil	.23	1.057	1958-1979	(22)
Chile	.77	4.531*	1966-1980	(15)
Colombia	.75	6.000*	1951-1980	(30)
Ecuador	.59	3.867*	1951-1980	(30)
Paraguay	-.66	-3.514*	1962-1979	(18)
Peru	.13	.694	1950-1979	(30)
Uruguay	-.63	-3.890*	1955-1979	(25)
Venezuela	-.26	1.425	1950-1979	(30)

See Table 36 for definition of variables.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

In reviewing these results certain caveats should be remembered. The sample correlation coefficient, r , is a biased estimator of the population correlation coefficient, ρ , except when $\rho = 0$, and this bias only becomes negligible for large-samples; for our empirical investigations we only have a small sample for each country. Moreover, the statistic only relates the extent to which variations in one variable are linearly related to variations in another variable, assuming both variables are random. Correlation analysis does not prove causation; two variables may be related without a causal relationship from one variable to another. In the case of time series data, as in the data used in this study, two variables may be highly correlated without the existence of a causal relationship between them. Consider, for example, two variables with a strong time trend, then a third variable, namely time, will result in the two variables being highly correlated without the presence of a true causal connection. This problem, in theory, is avoided in this research by making our data jointly covariance stationary; this is achieved by expressing variables in natural log form and including a linear trend variable in our model specification.⁵²

⁵² The birectional causality tests between ADSR and GDP and ADSR and GFCF, however, were run on levels; this procedure still achieves stationarity.

Tables 38-67 report the results of the model presented in section 5.3 of this chapter. Tables 38-47 give the F-statistics from performing Granger-causality tests⁵³ on annual data for the South American countries under review. The bidirectional causality test conducted here are:

1. causality between real external public debt disbursement per capita (EPDD) and real gross domestic product per capita (GDP);
2. causality between EPDD and real gross fixed capital formation per capita (GFCF);
3. causality between the adjusted debt service ratio (ADSR) and GDP;
4. causality between ADSR and GFCF;
5. causality between real exports per capita (EXP) and GDP;
6. causality between EXP and GFCF;
7. causality between real gross direct foreign investment per capita (DFI) and GDP;
8. causality between DFI and GFCF;
9. causality between real gross unilateral transfers per capita (UT) and GDP;
10. causality between UT and GFCF.

⁵³ Further reference to the concept of causality in this chapter refers to Granger-causality as developed earlier in this chapter.

Our results suggest that, at conventional levels of statistical significance, the null hypothesis for a lack of a causal relationship between external flows and economic development can be rejected in several cases; however, there is also evidence in other instances for the contrary conclusion. Our results, needless to say, differ from country to country depending on the particular external flow and development indicator. Similar findings hold for the testing of the null hypothesis for a lack of a causal nexus between the adjusted debt service ratio and our economic development indicators. The F-statistics for these tests are recorded in Tables 38-47. These tables are synoptic tables, for they report only the statistically significant results. The results of all causality tests, statistically significant and insignificant, are presented in Appendix B tables 80-89.⁵⁴

Table 38 relates that EPDD unidirectionally caused GDP in Chile and Colombia, in Paraguay this appears to have happened with distributed feedback; while in Ecuador, Peru, and Venezuela GDP caused EPDD with a distributed feedback effect, in Uruguay this causal nexus held without any feedback. Similarly, in Table 39 statistical evidence indicates EPDD caused GFCF in Peru, in Venezuela this

⁵⁴ The results of these tests for some countries should be cautiously interpreted because of the apparent instability in the calculated F-statistics. The reader is advised to review the more detailed tables contained in Appendix B.

occurred with current period feedback; however, the direction of causal priority in Ecuador and Paraguay was one of GFCE causing EPDD with a distributed feedback effect. In Chile, Colombia, and Uruguay all relevant F-statistics are insignificant. Related to this analysis are the results in Tables 40 and 41. First, in Table 40 we find ASDR unidirectionally caused GDP in Paraguay, while in Colombia and Venezuela this occurred with a distributed feedback effect and in Ecuador with current period feedback; in Chile GDP caused ASDR and in Peru and Uruguay no causal relationships held between these two parameters. Second, in Table 41 we find statistical evidence for unidirectional causality from ASDR to GFCE; in particular, this held in Colombia, Paraguay, Peru, and Venezuela and in Ecuador this relationship occurred with a current period feedback effect; in Chile and Uruguay all F-statistics are insignificant.

We turn now to Tables 42 and 43 to examine our empirical results for causality from real exports per capita to our two measures of economic development. First, our conclusions for causality from EXP to GDP (Table 42): only in Brazil and Paraguay can we accept this scenario, in the former country causality was unidirectional and in the latter it occurred with a distributed feedback effect. However, GDP caused EXP in Argentina, Chile, Colombia, and Ecuador; in Bolivia and Peru there was a distributed feedback effect. These parameters, in contrast, exhibited

[Text continued on page 174.]

TABLE 36
GRANGER'S TESTS OF CAUSALITY BETWEEN EPDD AND GDP

Country	F.EPDD.GDP.	F.GDP.EPDD.	d.f.	Sample Period	(N)
Chile	3.54***		2,7	1968-1980	(13)
Colombia	3.07***		4,11	1960-1980	(21)
	2.97***		5,8	1961-1980	(20)
Ecuador		3.02***	2,17	1958-1980	(23)
		4.18**	3,14	1959-1980	(22)
		3.07***	4,11	1960-1980	(21)
	3.98a***		6,5	1962-1980	(19)
Paraguay	6.28**		5,7	1961-1979	(19)
		4.57b***	6,4	1962-1979	(18)
Peru		4.06**	2,17	1958-1980	(23)
	3.63**	2.86***	3,14	1959-1980	(22)
Uruguay		4.58**	5,8	1961-1980	(20)
		13.15a***	7,2	1963-1980	(18)
Venezuela		7.60*	2,16	1958-1979	(22)
		5.93*	3,13	1959-1979	(21)
	3.47***		4,10	1960-1979	(20)
	4.81**		5,7	1961-1979	(19)
	4.93***		6,4	1962-1979	(18)

Table should be read as follows F.EPDD.GDP. is the F-statistic for the test of unidirectional causality from EPDD to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 1st order in the unrestrained equation.

bSignificant negative spike of the 3rd order in the restrained equation.

Source: Table 80 in Appendix B.

TABLE 39

GRANGER'S TESTS OF CAUSALITY BETWEEN EPDD AND GFCF

Country	F.EPDD.GFCF.	F.GFCF.EPDD.	d.f.	Sample Period (N)	
Ecuador		7.29*	2,17	1958-1980	(23)
	3.21***	4.53**	3,14	1959-1980	(22)
	2.86***	4.56**	4,11	1960-1980	(21)
		14.48***	7,2	1963-1980	(18)
Paraguay		8.63*	2,10	1964-1979	(16)
	11.78*		3,7	1965-1979	(15)
Peru	3.42**		3,14	1959-1980	(23)
	3.69***		5,8	1961-1980	(20)
	3.81***		6,5	1962-1980	(19)
Venezuela	2.91***	9.12*	3,13	1959-1979	(21)
		6.22b**	6,4	1962-1979	(18)

Table should be read as follows: F.EPDD.GFCF. is the F-statistic for the test of unidirectional causality from EPDD to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 1st order in the unrestrained equation.

bSignificant negative spike of the 1st, 3rd and 5th order and significant positive spikes of the 2nd and 4th order in the unrestrained equation.

Source: Table 81 in Appendix B.

TABLE 40

GRANGER'S TESTS OF CAUSALITY BETWEEN ADSR AND GDP

Country	F.ADSR.GDP.	F.GDP.ADSR.	d.f.	Sample Period (N)	
Chile		4.71***	2,7	1968-1980	(13)
		4.97***	3,4	1969-1980	(12)
Colombia	4.56**		4,11	1960-1980	(21)
	5.92a**		5,8	1961-1980	(20)
	7.00b**	3.46***	6,5	1962-1980	(19)
Ecuador	4.57**	7.58*	2,17	1958-1980	(23)
	2.70***	7.28*	3,14	1959-1980	(22)
	4.65**	6.24*	4,11	1960-1980	(21)
	4.77**	9.07*	5,8	1961-1980	(20)
		5.79**	6,5	1962-1980	(19)
		16.72c***	7,2	1963-1980	(18)
Paraguay	5.12**		2,16	1958-1979	(22)
	4.77**		3,13	1959-1979	(21)
	4.96**		4,10	1960-1979	(20)
	3.85***		5,7	1961-1979	(19)
Venezuela	29.60*		2,16	1958-1979	(22)
	22.30*		3,13	1959-1979	(21)
	14.06*		4,10	1960-1979	(20)
	53.55c*	3.15***	5,7	1961-1979	(19)
	71.33*		6,4	1962-1979	(18)

Table should be read as follows: F.ADSR.CDP is the F-statistic for the test of unidirectional causality from ADSR to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 2nd order in the unrestrained equation.

bSignificant negative spike of the 8th order in the unrestrained equation.

cSignificant negative spike of the 1st order in the unrestrained equation.

Source: Table 82 in Appendix B.

TABLE 41

GRANGER'S TESTS OF CAUSALITY BETWEEN ADSR AND GFCF

Country	F.ADSR.GFCF.	F.GFCF.ADSR.	d.f.	Sample Period	(N)
Colombia	4.86a**		2,17	1958-1980	(23)
	4.25**		3,14	1959-1980	(22)
	3.65**		4,11	1960-1980	(21)
	5.36***		5,8	1961-1980	(20)
Ecuador	2.90***	8.02*	3,14	1959-1980	(22)
	2.66***	14.90*	4,11	1960-1980	(21)
		12.52*	5,8	1961-1980	(20)
		111.78b*	6,5	1962-1980	(19)
		538.19b***	7,2	1963-1980	(18)
Paraguay	3.05***		2,10	1964-1979	(16)
	3.52***		3,7	1965-1979	(15)
	4.33c***		4,4	1966-1979	(14)
Peru	3.45b***		5,7	1961-1979	(19)
	12.15d**		6,4	1962-1979	(18)
Venezuela	4.30b**		5,7	1961-1979	(19)
	10.06**		6,4	1962-1979	(18)

Table should be read as follows: F.ADSR.GFCF. is the F-statistic for the test of unidirectional causality from ADSR to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 5th order in the restrained equation.

bSignificant negative spike of the 1st order in the unrestrained equation.

cSignificant negative spike of the 2nd order in the unrestrained equation.

dSignificant negative spike of the 3rd order in the unrestrained equation.

Source: Table 83 in Appendix B.

no causal relations in Uruguay and Venezuela. Next, the statistical evidence in Table 43 indicate that EXP caused GFCF in Paraguay, Venezuela, Ecuador, and Peru, in the latter two countries there was a distributed feedback effect. In contrast, in Argentina, Bolivia, and Colombia GFCF unidirectionally caused EXP; but in Brazil, Chile, and Uruguay we accepted the null hypothesis.

Reporting the causal relationship between DFI and GDP in Table 44, we conclude the following: in Argentina, Brazil, and Peru DFI caused GDP, in the first country this occurred with a distributed feedback effect; however, GDP unidirectionally caused DFI in Ecuador and Venezuela, and in Bolivia, Colombia, and Paraguay this held with a distributed feedback effect; in Chile there were no causal nexuses between our external flow and development indicators. On the other hand, turning to the causal relationship from DFI to our other development indicator, GFCF, in Table 45 we observe that only in Paraguay did DFI cause GFCF with a distributed feedback effect; and GFCF caused DFI in Colombia, Ecuador, Peru, Venezuela, and Argentina - in the last country there was a distributed feedback effect. Moreover, the null hypothesis for the absence of a causal relationship between these parameters was accepted in three countries, i.e., in Bolivia, Brazil, and Chile.

[Text continued on page 80.]

TABLE 42
GRANGER'S TESTS OF CAUSALITY BETWEEN EXP AND GDP

Country	F.EXP.GDP.	F.GDP.EXP.	d.f.	Sample Period	(N)
Argentina		5.81**	2,20	1953-1978	(26)
BOLIVIA		3.18***	2,22	1953-1980	(28)
	3.02a,b***		6,10	1957-1980	(24)
	3.21c***		7,7	1958-1980	(23)
Brazil	4.11**		2,14	1960-1979	(20)
	2.90***		3,11	1961-1979	(19)
Chile		3.55***	2,7	1968-1980	(13)
Colombia		10.30b*	2,17	1958-1980	(23)
		5.55**	3,14	1959-1980	(22)
		4.49**	4,11	1960-1980	(21)
		3.82**	5,8	1961-1980	(20)
		4.37d***	6,5	1962-1980	(19)
Ecuador		2.78***	4,16	1955-1980	(26)
Paraguay	4.21**		3,18	1954-1979	(26)
	3.33**		4,15	1955-1979	(25)
		3.85***	7,6	1958-1979	(22)
Peru		5.05**	2,16	1958-1979	(22)
		3.47**	3,13	1959-1979	(21)
		3.50**	4,10	1960-1979	(20)
	2.98***	3.37c***	5,7	1961-1979	(19)

Table should be read as follows: F.EXP.GDP. is the
t-statistic for the test of unidirectional causality from
EXP to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 6th order in the
restrained equation.

bSignificant negative spike of the 7th order in the
restrained equation.

cSignificant negative spike of the 4th order in the
unrestrained equation.

dSignificant negative spike of the 3rd order in the
unrestrained equation.

Source: Table 84 in Appendix B.

TABLE 43

GRANGER'S TESTS OF CAUSALITY BETWEEN EXP AND GFCF

Country	F.EXP.GFCF.	F.GFCF.EXP.	d.f.	Sample Period	(N)
Argentina		3.70**	2,20	1953-1978	(26)
		2.76***	4,14	1955-1978	(24)
		2.60***	5,11	1956-1978	(23)
		57.61**	8,2	1959-1978	(20)
Bolivia		2.63***	2,22	1953-1980	(28)
Colombia		4.44a**	2,17	1958-1980	(23)
		3.66**	3,14	1959-1980	(22)
		2.85***	4,11	1960-1980	(21)
		5.59**	5,8	1961-1980	(20)
		4.13***	6,5	1962-1980	(19)
Ecuador	2.90***		2,22	1953-1980	(28)
		3.01***	3,19	1954-1980	(27)
		5.29*	4,16	1955-1980	(26)
		5.16*	5,13	1956-1980	(25)
		3.65**	6,10	1957-1980	(24)
		2.91***	7,7	1958-1980	(23)
Paraguay	4.15**		2,10	1964-1979	(16)
	9.06*		3,7	1965-1979	(15)
Peru	4.63**		2,16	1958-1979	(22)
Venezuela	3.94**		2,16	1958-1979	(22)
	3.25***		4,10	1960-1979	(20)
	6.89**		5,7	1961-1979	(19)
	5.62***		6,4	1962-1979	(18)

Table should be read as follows: F.EXP.GFCF. is the F-statistic for the test of unidirectional causality from EXP to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 7th order in the restrained equation.

Source: Table 85 in Appendix B.

TABLE 44
GRANGER'S TESTS OF CAUSALITY BETWEEN DFI AND GDP

Country	F.DFI.GDP.	F.GDP.DFI.	d.f.	Sample Period	(N)
Argentina	3.28***		2,20	1953-1978	(26)
		2.44***	4,14	1955-1978	(24)
	4.21**	3.01***	6,8	1957-1978	(22)
Bolivia		2.48***	4,13	1958-1980	(23)
		3.06***	5,10	1959-1980	(22)
	5.41**		6,7	1960-1980	(21)
	5.01a***		7,4	1961-1980	(20)
Brazil	4.68**		2,14	1960-1979	(20)
	4.14**		3,11	1961-1979	(19)
	3.85**		4,8	1962-1979	(16)
	29.38*		5,5	1963-1979	(17)
Colombia		2.94***	3,20	1953-1980	(28)
	11.53b*		8,5	1958-1980	(23)
Ecuador		6.44*	2,22	1953-1980	(28)
		3.50**	3,19	1954-1980	(27)
		3.91**	4,16	1955-1980	(26)
Paraguay		4.35**	3,19	1953-1979	(27)
		8.01a,d*	4,16	1954-1979	(26)
		3.17c**	5,13	1955-1979	(25)
	3.03***		6,10	1956-1979	(24)
	4.22b**		7,7	1957-1979	(23)
		25.33b,e*	8,4	1958-1979	(22)
Peru	3.46**		2,22	1952-1980	(28)
	4.30**		3,19	1953-1980	(27)
	4.05**		4,16	1954-1980	(26)
	3.42**		5,13	1955-1980	(25)
	4.05**		6,10	1956-1980	(24)
	3.79***		7,7	1957-1980	(23)
Venezuela		3.48**	6,10	1956-1979	(24)
		3.97**	7,7	1957-1979	(23)

Table should be read as follows: F.DFI.GDP. is the F-statistic for the test of unidirectional causality from DFI to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 1st order in the unrestrained equation.

bSignificant negative spike of the 2nd order in the unrestrained equation.

cSignificant negative spike of the 8th order in the restrained equation.

dSignificant negative spike of the 1th order in the restrained equation.

eSignificant negative spike of the 5th and 8th order in unrestrained equation.

Source: Table 86 in Appendix B.

TABLE 45

GRANGER'S TESTS OF CAUSALITY BETWEEN DFI AND GFCF

Country	F.DFI.GFCF.	F.GFCF.DFI.	d.f.	Sample Period	(N)
Argentina		4.46**	5,11	1954-1978	(23)
	3.92a**		6,8	1955-1978	(22)
Colombia		2.51b***	5,14	1955-1980	(26)
Ecuador		2.68***	5,13	1956-1980	(25)
		5.42c***	8,4	1959-1980	(22)
Paraguay	3.59***		2,10	1964-1979	(16)
		18.76*	4,4	1966-1979	(14)
Peru		2.82***	2,22	1952-1979	(28)
		2.54***	6,10	1956-1979	(24)
Venezuela		9.12d**	8,4	1958-1979	(22)

Table should be read as follows: F.DFI.GFCF. is the F-statistic for the test of unidirectional causality from DFI to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 2nd order in the unrestrained equation.

bSignificant negative spike of the 9th order in the restrained equation.

cSignificant negative spike of the 3rd order in the unrestrained equation.

dSignificant negative spike of the 1th order in the unrestrained equation.

Source: Table 87 in Appendix B.

We now analyze the results of our statistical tests for causality from gross unilateral transfers per capita to our two development indicators. Table 46 reports that UT unidirectionally caused GDP in three countries, i.e., Bolivia, Brazil, and Ecuador; in contrast, GDP caused UT without feedback in Paraguay and Uruguay and in Colombia with a distributed feedback effect: all F-statistics for Argentina, Chile, Peru, and Venezuela were statistically insignificant. The econometric results, on the other hand, for causality from real gross unilateral transfers per capita to real gross fixed capital formation per capita indicate that in Bolivia, Ecuador, and Uruguay UT unidirectionally caused GFCF; but in Argentina, Chile, Colombia, and Paraguay GFCF unidirectionally caused UT and that this direction of causal priority occurred with distributed feedback in Brazil, Peru, and Venezuela.

To determine the statistical significance of the sign and magnitude of causality for the aforementioned F-statistics we turn to Tables 48-57. Again these tables are synoptic, for they report only the statistically significant results; all statistical tests results using the narrow measure, i.e., r , to determine the sign and magnitude of causality for the F-statistics presented in Tables 38-47 are given in Appendix D Tables 90-99. Our results, for the most part, indicate the sign of causality from our external flow to our development indicators to be statistically significant in

[Text continued on page 185.]

TABLE 46
GRANGER'S TESTS OF CAUSALITY BETWEEN UT AND GDP

Country	F.UT.GDP.	F.GDP.UT.	d.f.	Sample Period	(N)
Bolivia	18.26a*		2,23	1952-1980	(29)
	12.36*		3,20	1953-1980	(28)
	5.15b**		4,17	1954-1980	(27)
	4.84b*		5,14	1955-1980	(26)
brazil	3.39***		2,14	1960-1979	(20)
	4.18**		4,8	1962-1979	(18)
	3.96***		5,5	1963-1979	(17)
Colombia		5.32**	2,22	1953-1980	(28)
		3.13d***	3,19	1954-1980	(27)
		4.40**	4,16	1955-1980	(26)
		7.07e*	5,13	1956-1980	(25)
		3.71e**	6,10	1957-1980	(24)
	4.36c, f**		7,7	1958-1980	(23)
Ecuador	3.34***		2,22	1953-1980	(28)
Paraguay		4.08**	3,19	1953-1979	(27)
		7.31g, h*	4,16	1954-1979	(26)
		4.67c***	8,4	1958-1979	(22)
Uruguay		2.83***	2,17	1957-1979	(23)

Table should be read as follows: F.UT.GDP. is the F-statistic for the test of unidirectional causality from UT to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 4th order in the unrestrained equation.

bSignificant negative spike of the 2nd order in the restrained equation.

cSignificant negative spike of the 2nd order in the unrestrained equation.

dSignificant negative spike of the 3rd order in the unrestrained equation.

eSignificant negative spike of the 8th order in the unrestrained equation.

fSignificant positive spike of the 4th order in the unrestrained equation.

gSignificant negative spike of the 1st order in the

unrestrained equation.
hSignificant negative spike of the 1st order in the
restrained equation.

Source: Table 88 in Appendix B.

TABLE 47

GRANGER'S TESTS OF CAUSALITY BETWEEN UT AND GFCF

Country	F.UT.GFCF.	F.GFCF.UT.	d.f.	Sample Period (N)	
Argentina		3.39a***	2,20	1953-1978	(26)
		10.30b***	8,2	1959-1978	(20)
Bolivia	13.05*		2,23	1952-1980	(29)
	10.40*		3,20	1953-1980	(28)
	7.01*		4,17	1954-1980	(27)
	4.46**		5,14	1955-1980	(26)
Brazil		5.41**	2,14	1960-1979	(20)
		3.69**	3,11	1961-1979	(19)
	3.62***	3.26***	4,8	1962-1979	(18)
	6.07**		5,5	1963-1979	(17)
	9.83***		6,2	1964-1979	(16)
Chile		5.79**	2,7	1968-1980	(13)
Colombia		3.10***	3,19	1954-1980	(27)
		2.89***	4,16	1955-1980	(26)
		3.58**	5,13	1956-1980	(25)
		2.85***	6,10	1957-1980	(24)
		17.41c*	8,4	1959-1980	(22)
Ecuador	3.68**		2,22	1953-1980	(28)
	4.15**		3,19	1954-1980	(27)
Paraguay		4.06***	2,10	1964-1979	(16)
		6.89**	3,7	1965-1979	(15)
		43.95b*	4,4	1966-1979	(14)
Peru		3.03***	2,22	1952-1979	(28)
		3.07***	3,19	1953-1979	(27)
		4.13**	4,16	1954-1979	(26)
	2.94***	3.32**	5,13	1955-1979	(25)
	3.47d***		6,10	1956-1979	(24)
	2.80b***		7,7	1957-1979	(23)
	10.20**		8,4	1958-1979	(22)
Uruguay	3.82**		2,17	1957-1980	(23)
	6.35*		3,14	1958-1980	(22)
	3.02***		5,8	1960-1980	(20)
	4.37***		6,5	1961-1980	(19)
Venezuela		9.43a***	2,22	1952-1979	(28)
		4.83a**	3,19	1953-1979	(27)
		3.26**	4,16	1954-1979	(26)
		2.47***	5,13	1955-1979	(25)

	5.91*	6,10	1956-1979	(24)
	3.72***	7,7	1957-1979	(23)
4.24***		8,4	1958-1979	(22)

Table should be read as follows: F.UT.GFCF. is the F-statistic for the test of unidirectional causality from UT to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 5th order in the unrestrained equation.

bSignificant negative spike of the 1st order in the unrestrained equation.

cSignificant negative spikes of the 4th and 6th order in the unrestrained equation plus a and b.

dSignificant negative spike of the 2nd order in the unrestrained equation.

Source: Table 89 in Appendix B.

the majority of countries exhibiting F-statistics that resulted in the rejection of the null hypothesis of the absence of a causal nexus. The direction of causality, however, is not always the favorable one predicted by neoclassical theory:

1. The sign of causality, either unidirectional or with distributed feedback, from EPDD to GDP is insignificant in all relevant countries; it is, however, significant and positive for GDI causing EPDD unidirectionally in UK and with positive distributed feedback in Ecuador and Venezuela, but in Peru the distributed feedback effect is negative (Table 48). Other results indicate that for Peru and Venezuela EPDD adversely caused GFCF with positive current period feedback in the latter country; in contrast, GFCF positively caused EPDD in Ecuador with a negative distributed feedback and in Paraguay with an insignificant distributed feedback (Table 49).
2. The direction of causality from ADSR to GLP was as follows: ADSR unidirectionally cause GDP in Paraguay with a negative impact; in Ecuador and Venezuela the sign of causality was negative with negative and insignificant current and distributed feedback effects respectively; in Colombia the initial effect is insignificant but with a positive distributed feedback effect; there were, however, no

statistically significant results for the sign and magnitude of causality from GDP to ADSR (Table 50). ADSR, in contrast, caused CFCF positively in Colombia, Peru, and Ecuador, with a negative current period feedback in the latter country; in Paraguay and Venezuela the direction of unidirectional causality was negative (Table 51).

3. Unidirectional causality from EXP to GDP is positive in Brazil and Paraguay, with a positive distributed feedback effect in the latter country; conversely, GDP caused EXP positively in Argentina, Colombia, and Ecuador, in Chile the sign of causation was insignificant; for Bolivia and Peru GDP had a positive and negative causal effect respectively on EXP, also there was an insignificant distributed feedback effect in Bolivia but a positive distributed feedback in Peru (Table 52). We also find that EXP unidirectionally caused GFCF with a positive sign in Paraguay and Venezuela; in Ecuador this happened with a positive distributed feedback effect; in Peru initial and distributed feedback effects were all insignificant; on the other hand, GFCF unidirectionally caused EXP with a positive direction in Argentina and Colombia and with an insignificant sign in Bolivia (Table 53).

4. DFI influenced GDP negatively in Argentina with a positive distributed feedback, but in Brazil and Peru DFI unidirectionally caused GDP with a positive and negative direction respectively; however, GDP positively caused DFI with insignificant distributed feedback in Bolivia and Paraguay, in Colombia GDP negatively caused DFI with a significant positive distributed feedback, also in Ecuador GDP unidirectionally caused DFI and in Venezuela all relevant F coefficients were insignificant (Table 54). We can also conclude the following: DFI positively caused GFCF with a positive distributed feedback; GFCF positively caused DFI with a positive distributed feedback effect in Argentina; in Colombia and Ecuador GFCF negatively influenced DFI; in Venezuela and Peru, furthermore, there were no significant coefficients for the direction of causality (Table 55).
5. Finally, the direction of unidirectional causal priority from UT to GDP was significant and negative in all three relevant countries, i.e., Bolivia, Brazil, and Ecuador; conversely, unidirectional causality from GDP to UT was significant and negative in Paraguay and insignificant in Uruguay, in Colombia both initial and distributed feedback effects were negative (Table 56). A similar negative sign of

causality holds from UT to GFCF: Bolivia, Ecuador, and Uruguay are cases in point; in Colombia, Chile, and Paraguay GFCF negatively caused UT, in Argentina this relationship was positive; in Brazil and Venezuela GFCF negatively influenced UT with also negative distributed feedback effects, in Peru the initial effect was insignificant with a negative distributed feedback effect (Table 57).

The results of the tests for the statistical significance of the sign and magnitude of causality discussed above are tentative solutions and are correct within an order of magnitude. They report, in short, econometric results of the sign and strength of causality in the "narrow sense," i.e., under the steady state assumptions as developed in equations (5.3.9)-(5.3.12) where the sum of the coefficients of the causal variable is allowed to vary while holding the caused variable invariant. As such, in Tables 33-40 we make the results of our model more operational by relating the tests of significance for the sign and magnitude of causality in the "broad sense." We use, in other words, the methodology developed in equations (5.3.13)-(5.3.16) that allows us to let the caused and causal variable to simultaneously vary over time. We find, in principle, that the null hypothesis for a statistically significant causal nexus between our external flow and development indicators holds for roughly a similar set of countries and lag specifications. In this regard, we observe the following:

[Text continued on page 200.]

TABLE 48

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GDP USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Ecuador				
EPDD.GDP.6	.361	.116	3.112**	(5)
GDP.EPDD.2	3.156	1.288	2.450**	(17)
GDP.EPDD.3	4.602	1.379	3.482*	(14)
GDP.EPDD.4	6.500	1.923	3.380*	(11)
Peru				
EPDD.GDP.3	-.074	.033	-2.242**	(14)
GDP.EPDD.2	8.189	3.076	2.662**	(17)
GDP.EPDD.3	11.679	4.552	2.566**	(14)
Uruguay				
GDP.EPDD.5	9.754	1.681	5.802*	(8)
Venezuela				
EPDD.GDP.4	.172	.062	2.774**	(10)
EPDD.GDP.5	.315	.112	2.812**	(7)
EPDD.GDP.6	.442	.132	3.323**	(4)
GDP.EPDD.3	2.632	1.096	2.401**	(13)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 90 in Appendix D.

TABLE 49

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Ecuador				
EPDD.GFCF.3	-.203	.046	-2.071***	(14)
EPDD.GFCF.4	-.332	.126	-2.635**	(11)
GFCF.EPDD.2	1.365	.616	2.216**	(17)
GFCF.EPDD.3	2.049	.711	2.882**	(14)
GFCF.EPDD.4	1.964	.867	2.265**	(11)
Paraguay				
GFCF.EPDD.2	2.170	.646	3.359*	(10)
Peru				
EPDD.GFCF.3	-.133	.052	-2.558**	(14)
EPDD.GFCF.5	-.230	.057	-4.035*	(8)
Venezuela				
EPDD.GFCF.3	-.159	.065	-2.446**	(13)
GFCF.EPDD.3	2.014	.387	5.204*	(13)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9) - (5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 91 in Appendix D.

TABLE 50

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GDP USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
GDP.ADSR.6	.010	.003	3.333*	(19)
Ecuador				
ADSR.GDP.4	-412.101	141.445	-2.914*	(21)
ADSR.GDP.5	-582.923	221.382	-2.633**	(20)
GDP.ADSR.2	-.001	.0004	-2.500**	(23)
GDP.ADSR.3	-.001	.0005	-2.000***	(22)
Paraguay				
ADSR.GDP.4	-8413.890	3452.900	-2.437**	(20)
ADSR.GDP.5	-10223.250	5159.167	-1.982***	(19)
Venezuela				
ADSR.GDP.2	-50.402	14.384	-3.504*	(22)
ADSR.GDP.3	-67.855	27.157	-2.499**	(21)
ADSR.GDP.5	-90.529	24.662	-3.671*	(19)
ADSR.GDP.6	-139.917	34.039	-4.110*	(18)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 92 in Appendix D.

TABLE 51

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colomiba				
ADSR.GFCF.2	98.366	46.130	2.132**	(23)
ADSR.GFCF.3	133.467	44.395	3.006*	(22)
ADSR.GFCF.4	207.988	64.075	3.246*	(21)
ADSR.GFCF.5	278.703	82.984	3.359*	(20)
Ecuador				
ADSR.GFCF.3	125.759	45.749	2.749**	(22)
ADSR.GFCF.4	181.521	57.506	3.157*	(21)
GFCF.ADSR.4	-.002	.001	-2.000***	(21)
GFCF.ADSR.5	-.002	.001	-2.000***	(20)
GFCF.ADSR.6	.006	.001	6.000*	(19)
Paraguay				
ADSR.GFCF.2	-1999.097	1340.895	-14.915*	(16)
ADSR.GFCF.3	-3789.330	1903.576	-1.991***	(15)
Peru				
ADSR.GFCF.5	262.222	64.712	4.052*	(19)
ADSR.GFCF.6	408.639	66.410	6.153*	(18)
Venezuela				
ADSR.GFCF.6	-80.924	29.047	-2.786**	(18)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9) - (5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 93 in Appendix D.

TABLE 52

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GDP USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GDP.EXP.2	.736	.228	3.228*	(20)
Bolivia				
GDP.EXP.2	.857	.354	2.421**	(22)
Brazil				
EXP.GDP.2	.265	.104	2.548**	(14)
EXP.GDP.3	.366	.160	2.288**	(11)
Colombia				
GDP.EXP.2	1.376	.469	2.934*	(17)
GDP.EXP.3	1.670	.628	2.659**	(14)
GDP.EXP.4	2.511	.940	2.671**	(11)
Ecuador				
GDP.EXP.4	5.046	2.138	2.360**	(16)
Paraguay				
EXP.GDP.3	.132	.050	2.640**	(18)
EXP.GDP.4	.115	.062	1.855***	(15)
GDP.EXP.7	5.857	1.685	3.476**	(6)
Peru				
EXP.GDP.5	.304	.098	3.102**	(7)
GDP.EXP.2	-3.751	1.223	-3.067*	(16)
GDP.EXP.5	-6.126	3.223	-1.901***	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9) - (5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 94 in Appendix D.

TABLE 53

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.EXP.2	.375	.132	4.258*	(20)
GFCF.EXP.4	.824	.379	2.174**	(14)
GFCF.EXP.5	1.312	.444	2.955**	(11)
GFCF.EXP.8	3.429	.253	13.553*	(2)
Colombia				
GFCF.EXP.4	.773	.414	1.867***	(11)
Ecuador				
EXP.GFCF.2	.238	.134	1.776***	(22)
GFCF.EXP.3	.885	.313	2.828**	(19)
GFCF.EXP.4	.893	.333	2.682**	(16)
GFCF.EXP.5	1.035	.398	2.600**	(13)
GFCF.EXP.7	1.730	.724	2.390**	(7)
Paraguay				
EXP.GFCF.2	.488	.183	2.667**	(10)
EXP.GFCF.3	1.067	.212	5.033*	(7)
Venezuela				
EXP.GFCF.2	.266	.106	2.509**	(16)
EXP.GFCF.4	.439	.135	3.252*	(10)
EXP.GFCF.5	.521	.216	2.412**	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9) - (5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 95 in Appendix D.

TABLE 54

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GDP USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GDP.6	-.069	.016	-4.313*	(8)
GDP.DFI.6	18.920	7.850	2.410**	(8)
Bolivia				
GDP.DFI.4	7.770	2.998	2.592**	(13)
GDP.DFI.5	12.048	3.684	3.270*	(10)
Brazil				
DFI.GDP.2	.084	.030	2.800**	(14)
DFI.GDP.3	.131	.039	3.359*	(11)
DFI.GDP.4	.198	.056	3.536*	(8)
DFI.GDP.5	.269	.071	3.789*	(5)
Colombia				
DFI.GDP.8	.065	.022	2.955**	(5)
GDP.DFI.3	-8.309	4.370	-1.901***	(20)
Ecuador				
GDP.DFI.2	-4.584	1.543	-2.971*	(22)
GDP.DFI.3	-3.503	1.954	-1.793***	(19)
Paraguay				
GDP.DFI.3	13.456	6.600	2.039***	(19)
GDP.DFI.8	13.815	4.762	2.901**	(4)
Peru				
DFI.GDP.3	-.015	.007	-2.143**	(19)
DFI.GDP.4	-.020	.008	-2.500**	(16)
DFI.GDP.6	-.045	.016	-2.181***	(10)
DFI.GDP.7	-.058	.030	-1.933***	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 96 in Appendix D.

TABLE 55

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GFCF.6	.833	.082	10.158*	(8)
GFCF.DFI.5	9.042	2.564	3.527*	(11)
Colombia				
GFCF.DFI.5	-14.753	4.478	-3.295*	(14)
Ecuador				
GFCF.DFI.8	-6.775	1.947	-3.480**	(4)
Paraguay				
DFI.GFCF.2	.116	.063	1.841***	(10)
GFCF.DFI.4	3.180	.602	5.282*	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 97 in Appendix D.

TABLE 56

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UI AND GDP USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
UT.GDP.3	-.197	.046	-4.283*	(20)
UT.GDP.4	-.154	.072	-2.139**	(17)
UT.GDP.5	-.200	.071	-2.817**	(14)
Brazil				
UT.GDP.4	-.211	.078	-2.705**	(8)
UT.GDP.5	-.406	.118	-3.441**	(5)
Colombia				
UT.GDP.7	-.785	.190	-4.132*	(7)
GDP.UT.2	-5.558	1.746	-3.183*	(22)
GDP.UT.3	-4.574	1.587	2.882*	(19)
GDP.UT.4	-5.996	1.554	-3.858*	(16)
GDP.UT.5	-10.557	3.163	-3.338*	(13)
Ecuador				
UI.GDP.2	-.077	.031	-2.484**	(22)
Paraguay				
GDP.UI.8	-15.114	5.077	-2.977**	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 98 in Appendix D.

TABLE 57

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.UT.2	2.652	1.080	2.456**	(20)
Bolivia				
UT.GFCF.3	-.126	.053	-2.377**	(20)
UT.GFCF.4	-.191	.078	-2.449**	(17)
UT.GFCF.5	-.286	.122	-2.344**	(14)
Brazil				
UT.GFCF.4	-.344	.182	-1.890***	(8)
UT.GFCF.5	-1.219	.347	-3.513***	(5)
GFCF.UT.2	-1.974	.614	-3.215*	(14)
GFCF.UT.3	-2.268	1.100	-2.062***	(11)
GFCF.UT.4	-3.494	1.421	-2.459**	(8)
Chile				
GFCF.UT.2	-1.650	.616	-2.679**	(7)
Colombia				
GFCF.UT.3	-1.723	.812	-2.122**	(19)
GFCF.UT.4	-2.772	.947	-2.927*	(16)
GFCF.UT.5	-2.934	1.144	-2.565**	(13)
Ecuador				
UT.GFCF.2	-.251	.102	-2.461**	(22)
UT.GFCF.3	-.417	.125	-3.336*	(19)
Paraguay				
GFCF.UT.2	-1.653	.612	-2.701**	(10)
GFCF.UT.3	-2.578	.677	-3.808**	(7)
GFCF.UT.4	-6.878	.761	-9.038*	(4)
Peru				
UT.GFCF.8	-.450	.106	-4.245**	(4)
Uruguay				
UT.GFCF.2	-.294	.110	-2.673**	(17)
UT.GFCF.3	-.616	.145	-4.248*	(14)
UT.GFCF.5	-.766	.257	-2.980**	(8)
UT.GFCF.6	-1.474	.383	-3.849**	(5)
Venezuela				
UT.GFCF.8	-2.074	.403	-5.146*	(4)

GFCF.UT.2	-3.134	.949	-3.302*	(22)
GFCF.UT.3	-3.276	1.505	-2.177**	(19)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 99 in Appendix D.

1. The coefficient for the sign and magnitude of causality in the broad sense, θ , is statistically significant from EPDD unidirectionally to GDP in Colombia with a negative sign; in Chile and Paraguay it is insignificant but with a positive distributed feedback in the latter country; on the other hand, for causality from GDP to EPDD we find the following: the sign for unidirectional causality is insignificant in Uruguay, in Ecuador θ is significant and positive with a similar distributed feedback effect, in Peru the sign of causation is positive and significant with insignificant distributed feedback, and in Venezuela the initial direction of causality is insignificant but there is a positive distributed feedback effect (Table 58). We also find that in Peru EPDD unidirectionally caused GFCF with a positive coefficient, in Venezuela this happened with a negative coefficient and a positive current period feedback effect; conversely, in Ecuador and Paraguay the sign of causation was positive from GFCF to EPDD but with insignificant distributed feedback effects (Table 59).
2. ADSR positively affects GDP in Colombia and Venezuela with a positive distributed and insignificant feedback effect, respectively; in Ecuador, however, the sign of causality from ADSR to GDP is negative

and the feedback effect is insignificant; conversely, the direction of unidirectional causality from GDP to ADSR was insignificant for Chile (Table 60). We, moreover, observe that ADSR unidirectionally caused GFCF with a positive sign in Colombia and Peru and a negative sign in Venezuela; in Ecuador ADSR insignificantly caused GFCF with a significant, but negative, feedback effect (Table 61).

3. The direction of causality from EXP to GDP was positive in two countries, Brazil and Paraguay, with a positive distributed feedback in the latter country. On the other hand, GDP caused EXP unidirectionally and with a positive sign in Argentina, Colombia, and Ecuador; in Chile the direction of causation was insignificant; further, GDP caused EXP positively in Bolivia with insignificant feedback and in Peru the initial direction of causality was insignificant but the distributed feedback effect was significant and positive (Table 62). The sign of θ , similarly, was positive for unidirectional causation from EXP to GFCF for Paraguay and Venezuela; in Ecuador this relationship held with a positive distributed feedback effect; in Peru θ had a negative sign and the distributed feedback effect was insignificant; moreover, GFCF unidirectionally caused EXP in

Argentina and Colombia with positive coefficients, but in Bolivia θ was insignificant (Table 63).

4. DFI unidirectionally influenced GDP in Brazil and Peru with a negative and positive sign respectively, in Argentina all relevant coefficients were insignificant; on the other hand, GDP caused DFI with positive signs in Bolivia and Paraguay and a negative direction in Colombia, all distributed feedback effects were insignificant; in Ecuador GDP positively caused DFI, but in Venezuela the sign of causation was insignificant (Table 64). In addition, in Paraguay the relationship for a distributed causal relation from DFI to GFCF was only significant for the distributed feedback effect; in Colombia, however, GFCF unidirectionally caused DFI with a negative sign, in Argentina this occurred with a positive distributed feedback effect, for Ecuador, Peru, and Venezuela all θ coefficients were insignificant (Table 65).
5. In conclusion, the direction of unidirectional causality from UT to GDP is significant and negative in Bolivia, Brazil, and Ecuador; in Paraguay GDP unidirectionally caused UT with a negative coefficient and in Colombia this happened with a negative distributed feedback effect (Table 66). The relationship for unidirectional causation from UT to

GFCF was also negative in Bolivia, Ecuador, and Uruguay; similarly, unidirectional causality from GFCF to UT was negative in Chile, Colombia, and Paraguay - in Argentina θ was insignificant; the direction of causality was also negative from GFCF to UT in Brazil, Peru, and Venezuela with similar distributed feedback effects.

[Text continued on page 215.]

TABLE 58

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
EPDD.GDP.5	-.716	.065	-11.015*	(8)
Ecuador				
EPDD.GDP.6	.326	.049	6.653*	(5)
GDP.EPDD.2	3.623	1.288	2.813**	(17)
GDP.EPDD.3	3.728	.881	4.232*	(14)
GDP.EPDD.4	3.467	.671	5.167*	(11)
Paraguay				
GDP.EPDD.6	.920	.404	2.277***	(4)
Peru				
GDP.EPDD.2	8.214	2.254	3.234*	(17)
GDP.EPDD.3	8.977	2.370	3.788*	(14)
Venezuela				
EPDD.GDP.5	.560	.243	2.304***	(7)
EPDD.GDP.6	.699	.226	3.093**	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two tail.

Source: Table 100 in Appendix E.

TABLE 59

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Ecuador				
GFCF.EPDD.2	1.825	.658	2.774**	(17)
GFCF.EPDD.3	2.110	.641	3.292*	(14)
GFCF.EPDD.4	1.413	.641	2.204**	(11)
Paraguay				
GFCF.EPDD.2	2.633	.508	5.183*	(10)
Peru				
EPDD.GFCF.5	-.561	.132	-4.250*	(8)
EPDD.GFCF.6	-.516	.205	-2.517***	(5)
Venezuela				
EPDD.GFCF.3	-.498	.271	-1.838***	(13)
GFCF.EPDD.3	2.122	.633	3.352*	(13)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13) - (5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 101 in Appendix E.

TABLE 60

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
ADSR.GDP.4	265.857	105.009	2.532**	(21)
GDP.ADSR.6	.002	.0004	5.000*	(19)
Ecuador				
ADSR.GDP.4	-412.101	950.065	-1.928***	(21)
ADSR.GDP.5	-1234.794	280.014	-4.410*	(20)
Venezuela				
ADSR.GDP.5	374.087b	176.810	2.116**	(19)

The methodology use here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).
bStability condition for H is not satisfied.

*Significant at 1% level.
**Significant at 5% level.
***Significant at 10% level.
All tests are two-tail.

Source: Table 102 in Appendix E.

TABLE 61

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
ADSR.GFCF.2	161.786	77.726	2.081**	(23)
ADSR.GFCF.4	157.209	34.241	4.591*	(21)
ADSR.GFCF.5	133.927	22.223	6.027*	(20)
Ecuador				
GFCF.ADSR.4	-.002	.001	-2.000***	(21)
Peru				
ADSR.GFCF.5	206.149	53.680	3.840*	(19)
ADSR.GFCF.6	171.914	18.183	9.455*	(16)
Venezuela				
ADSR.GFCF.5	-156.231	82.965	1.883***	(19)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 103 in Appendix E.

TABLE 62

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GDP.EXP.2	.743	.228	3.259*	(20)
Bolivia				
GDP.EXP.2	1.012	.314	3.223*	(22)
Brazil				
EXP.GDP.2	.329	.084	3.917*	(14)
EXP.GDP.3	.332	.080	4.150*	(11)
Colombia				
GDP.EXP.2	2.925	.785	3.726*	(17)
GDP.EXP.3	2.998	.744	4.030*	(14)
GDP.EXP.4	3.092	.587	5.268*	(11)
GDP.EXP.5	2.976	1.026	2.901**	(8)
Ecuador				
GDP.EXP.4	2.722	.956	2.847**	(16)
Paraguay				
EXP.GDP.3	.380	.124	2.984*	(18)
EXP.GDP.4	.278	.114	2.439**	(15)
GDP.EXP.7	2.972	.573	5.187*	(6)
Peru				
EXP.GDP.5	.104	.024	4.333*	(7)

The methodology use here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 104 in Appendix E.

TABLE 63

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.EXP.2	.562	.317	1.773***	(20)
GFCF.EXP.5	1.489	.677	2.199***	(11)
GFCF.EXP.8	2.574	.600	4.290***	(2)
Colombia				
GFCF.EXP.4	1.802	.830	2.171***	(11)
Ecuador				
EXP.GFCF.2	.500	.191	2.618**	(22)
GFCF.EXP.3	1.323	.275	4.811*	(19)
GFCF.EXP.4	1.114	.221	5.041*	(16)
GFCF.EXP.5	1.262	.623	2.026***	(13)
GFCF.EXP.7	.986	.216	4.565*	(7)
Paraguay				
EXP.GFCF.3	.942	.121	7.785*	(7)
Peru				
EXP.GFCF.2	-.396	.213	-1.859***	(16)
Venezuela				
EXP.GFCF.2	.623	.202	3.084*	(16)
EXP.GFCF.4	.516	.103	5.010*	(10)
EXP.GFCF.5	.408	.130	3.139**	(7)
EXP.GFCF.6	.304	.140	2.171***	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 105 in Appendix E.

TABLE 64

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
GDP.DFI.4	5.663	1.901	2.979**	(13)
GDP.DFI.5	6.067	1.166	5.203*	(10)
Brazil				
DFI.GDP.2	.147	.056	2.625**	(14)
DFI.GDP.3	.160	.061	2.623**	(11)
DFI.GDP.4	.154	.037	4.162*	(8)
DFI.GDP.5	.280	.073	3.836**	(5)
Colombia				
GDP.DFI.3	-8.243	3.451	-2.389**	(20)
Ecuador				
GDP.DFI.2	-5.730	1.774	-3.230*	(22)
GDP.DFI.3	-5.762	2.598	-2.218**	(19)
Paraguay				
GDP.DFI.8	4.194	1.233	3.402**	(4)
Peru				
DFI.GDP.3	-.020	.010	-2.000***	(19)
DFI.GDP.4	-.017	.008	-2.125**	(16)
DFI.GDP.7	-.016	.004	-4.00*	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 106 in Appendix E.

TABLE 65

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GFCF.6	.705	.311	2.267***	(8)
GFCF.DFI.5	8.280	2.722	3.042**	(11)
Colombia				
GFCF.DFI.5	-9.221	2.180	-4.230*	(14)
Paraguay				
GFCF.DFI.4	.828	.109	7.597*	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 107 in Appendix E.

TABLE 66

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
UT.GDP.3	-.341	.069	-4.942*	(20)
UT.GDP.4	-.262	.085	-3.082*	(17)
Brazil				
UT.GDP.2	-.151	.082	-1.841***	(14)
UT.GDP.4	-.201	.051	-3.941*	(8)
UT.GDP.5	-.246	.081	-3.037**	(5)
Colombia				
UT.GDP.7	-.142	.016	-8.875*	(7)
GDP.UT.2	-4.888	1.365	-3.581*	(22)
GDP.UT.3	-5.925	1.640	-3.613*	(19)
GDP.UT.4	-5.358	.946	-5.664*	(16)
GDP.UT.5	-5.504	1.359	-4.050*	(13)
Ecuador				
UT.GDP.2	-.365	.150	-2.433**	(22)
Paraguay				
GDP.UT.8	-2.914	.929	-3.137**	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13) - (5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 108 in Appendix E.

TABLE 67

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
UT.GFCF.2	-.216	.114	-1.895***	(23)
UT.GFCF.3	-.281	.134	-2.097**	(20)
UT.GFCF.4	-.354	.150	-2.360**	(17)
UT.GFCF.5	-.490	.206	-2.379**	(14)
Brazil				
UT.GFCF.4	-.198	.056	-3.536*	(8)
UT.GFCF.5	-.313	.036	-8.694*	(5)
GFCF.UT.2	-2.238	.480	-4.662*	(14)
GFCF.UT.3	-2.032	.532	-3.820*	(11)
GFCF.UT.4	-1.900	.343	-5.539*	(8)
Chile				
GFCF.UT.2	-3.733	1.834	-2.035***	(7)
Colombia				
GFCF.UT.4	-4.284	1.420	-3.017*	(16)
GFCF.UT.5	-3.752	1.115	-3.365*	(13)
GFCF.UT.6	-4.101	1.738	-2.360**	(10)
GFCF.UT.8	-1.793	.657	-2.729***	(4)
Ecuador				
UT.GFCF.2	-.550	.186	-2.957*	(22)
UT.GFCF.3	-.741	.171	-4.175*	(19)
Paraguay				
GFCF.UT.2	-.759	.226	-3.358*	(10)
GFCF.UT.3	-.985	.201	-4.900*	(7)
GFCF.UT.4	-.650	.027	-24.074*	(4)
Peru				
UT.GFCF.8	-.111	.012	-9.250*	(4)
GFCF.UT.3	-.526	.106	-4.962*	(19)
Uruguay				
UT.GFCF.3	-.357	.050	-7.140*	(14)
UT.GFCF.5	-.476	.125	-3.808*	(8)
UT.GFCF.6	-.380	.060	-6.333*	(5)
Venezuela				
UT.GFCF.8	-.189	.003	-63.000*	(4)
GFCF.UT.2	-3.947	.579	-6.817*	(22)

GFCF.UT.3	-3.882	.694	-5.594*	(19)
GFCF.UT.4	-3.527	1.318	-2.676**	(16)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13) - (5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Source: Table 109 in Appendix E.

5.5 CONCLUSIONS

In this chapter the principal theoretical and empirical thrust of this work was presented. A brief review of the concept of causality in economics was discussed. It was shown that the ambiguity inherent in economic theory regarding the categorization of variables as endogenous and exogenous has resulted in the development of theoretical models, concomitant with their empirical analogs, to define a causal nexus between and among variables. These competing methodologies are still, for the most part, surrounded by controversy. The procedure selected to determine causal priority in this study is that developed by Granger (1969) and Granger and Newbold (1977); as cited recent research indicate their methodology gives more robust results in small samples. The Granger and Newbold approach was rigorously presented and extended so as to determine the statistical significance of the direction and magnitude of causal priority between our four external flow measures, as well as the adjusted debt service ratio, and the two development indicators. A narrow and broad measure were developed for this purpose. The former method, to determine the sign and magnitude of causality, took the sum of the coefficients of the causal variable holding the caused variable invariant. While the second method, the broad measure, allows for both caused and causal variable to fluctuate over time. The problem of autocorrelation in cur

econometric model, resulting in biased, inconsistent and inefficient OLS estimators, and an increase in the probability of a type II error, was shown to be eliminated by including a sufficient number of lags in our model specification. Empirically, however, the correlogram was used to detect for serial correlation in the residuals of our model.

The main conclusion of our empirical results is that one cannot accept as a universal rule the hypothesis of a causal relationship between external flows and the recent economic development process for the group of ten South American countries under consideration in this study. Further, the direction of causal priority in some cases is not the one predicted by neoclassical theory. Needless to say, results differ depending on the external flow and economic development indicator. It is, in essence, not always appropriate to consider external inflows as a *modus operandi* for economic development in some countries. Therefore, in some instances, to use external flows as an explanatory variable in a single or simultaneous equation system may result in a specification error.

Before reviewing our econometric results, we noted that the various per capita economic indicators across countries exhibited somewhat large dispersions as measured by the coefficient of variation. On the other hand, the bivariate linear coefficient of correlation between our real per

capita measures of economic development and external flows indicated a strong statistical significance; this finding did not hold between the adjusted debt service ratio and our two development indicators. This statistical measure, it is important to note, only measures the extent to which variations in one variable are linearly related to variations in another variable; it does not relate anything in regard to causal priority between the variables.

Examining here only the direction of causal priority from our external flow/adjusted debt service ratio to our development indicators, we found the following statistically significant F-statistics: first, EPDD caused GDP in three countries, one with a distributed effect, with contrary evidence in four countries. Further, EPDD caused GFCF in two countries, one with a current period feedback effect, and with alternative findings in five countries. Second, ADSR caused GDP in four countries, in one and two countries there was current and distributed feedback linkages respectively; in the remaining three countries this nexus did not hold. In addition, ADSR caused GFCF in five countries, in one of these countries there was also current period feedback; in the other countries the relevant statistics were insignificant. Third, EXP caused GDP in two countries, one with a distributed feedback and in eight countries the evidence indicated otherwise. There were, similarly, distributed feedback linkages between EXP and

GFCF in two countries, in another two countries only unidirectional causality held; alternative relations existed in the remaining six countries. Fourth, we observed DFI causing GDP in three countries, one with distributed feedback, and contrary evidence was present in six countries. On the other hand, statistical results for DFI causing GFCF were valid in one country with a distributed effect and in eight countries results did not support this direction of causality. Finally, there were significant F-statistics for UT causing GDP in three countries, while in seven countries this pattern of causality cannot be accepted; the direction of causality from UT to GFCF was statistically valid in three countries and in seven countries our results did not support such a sequence.

Our empirical analysis continued by using a narrow and broad standard to determine the statistical significance of the sign and magnitude of causal priority. Summarizing these results at various lag specifications for the former and latter measure, we reconfirmed some of the aforementioned findings; however, the direction of causal priority was not always the one predicted by some neoclassical approaches to exogenously induced economic development.

Chapter VI

CONCLUSIONS

The primary objective of this research was to apply relatively new time series techniques to test a hypothesis that in the past, present, and perhaps the future, has and will continue to concern policymakers in LDCs and MDCs. Namely, the hypothesis of exogenously induced economic development. In particular, a model of causal priority based on the work of Granger and Granger and Newbold was developed to test this hypothesis. Four measures of external flows and two measures of economic development were used. The external flows were disbursements of external public debt, exports f.o.b., direct foreign investment, and unilateral transfers. The two development indicators were gross domestic product and gross fixed capital formation. All variables were measured in terms of real gross per capita units. Related empirical investigations were an historical review of the literature, a descriptive overview of the recent economic development experience in the group of ten, and an analysis of the structure of external public indebtedness concomitant with some aggregate ratios to determine the burden of this debt on each country.

The general policy implications of the econometric results are that the null hypothesis for an absence of a causal relationship, either unidirectional or with feedback,

between external flows and economic development can in several cases be rejected at conventional levels of statistical significance. However, there were also cases where the alternative hypothesis could be accepted or where the sign of causal priority was not the one predicted by neoclassical theory. Statistical results, it is important to note, varied depending on the external flow, development indicator, and country. In essence, one can accept the behavioral relationship of external flows unidirectionally, and in some cases with a current or distributed period feedback effect, augmenting economic development in some countries, but not in others. Similarly, there were cases where the direction of causality was from the development indicators to the external flows. Hence, this policy tool should not be considered as a panacea for developing the LDCs as it is currently treated in most neoclassical approaches to underdevelopment. Most importantly, further research is warranted into the domestic conditions that are requisites for an external flow to make a positive contribution to economic development.

Appendix A
COUNTRY DATA STATISTICS

TABLE 68

DEFINITION AND CONSTRUCTION OF VARIABLES BY CCOUNTRY

Argentina

- ARGDP - nominal gross domestic product (GDP) in billions of pesos.
- ARGFCF - nominal gross fixed capital formation (GFCF) in billions of pesos.
- AREXP - nominal exports F.O.B. (EXP) in billions of U.S. dollars.
- ARDFI - nominal gross direct foreign investment (DFI) in billions of U.S. dollars.
- ARUI - nominal gross unilateral transfers (UT) in billions of U.S. dollars.
- ARCPI - consumer price index, 1975 = 100.
- ARPOP - population in millions.
- ARRGDP - real GDP per capita.
- ARRGFCF - real GFCF per capita.
- ARREXP - real EXP per capita.
- ARRDFI - real DFI per capita.
- ARRUT - real UT per capita.

Bolivia

- BOGDP - nominal GDP in millions of pesos bolivianos.
- BOGFCF - nominal GFCF in millions of pesos bolivianos.
- BOEXP - nominal EXP in millions of U.S. dollars.
- BCDFI - nominal DFI in millions of U.S. dollars.
- BOUI - nominal UT in millions of U.S. dollars.
- BOCPI - consumer price index, 1975 = 100.
- BOPOP - population in millions.
- BCRGDP - real GDP per capita.

BORGFCF - real GFCF per capita.
 BOREXP - real EXP per capita.
 BCRDFI - real DFI per capita.
 BORUT - real UT per capita.

Brazil

BRGDP - nominal GDP in billions of cruzeiros.
 BRGFCF - nominal GFCF in billions of cruzeiros.
 BREXP - nominal EXP in billions of U.S. dollars.
 BRDFI - nominal DFI in billions of U.S. dollars.
 BRUT - nominal UT in billions of U.S. dollars.
 BR CPI - consumer price index, 1975 = 100.
 BRPOP - population in millions.
 BRRGDP - real GDP per capita.
 BRRGFCF - real GFCF per capita.
 BRREXP - real EXP per capita.
 BRRDFI - real DFI per capita.
 BRRUT - real UT per capita.

Chile

CHGDP - nominal GDP in millions of pesos.
 CHGFCF - nominal GFCF in millions of pesos.
 CHEFDD - nominal gross external public debt disbursements (EPDD) in millions of U.S. dollars.
 CHEXP - nominal EXP in millions of U.S. dollars.
 CHDFI - nominal DFI in millions of U.S. dollars.
 CHUI - nominal UT in millions of U.S. dollars.
 CHCPI - consumer price index, 1975 = 100.

- CHPCF - population in millions.
- CHRGDP - real GDP per capita.
- CHRGFCF - real GFCF per capita.
- CHREPDD - real EPDD per capita.
- CHREXP - real EXP per capita.
- CHRDFI - real DFI per capita.
- CHROUT - real UT per capita.
- CHAI - sum of nominal amortization and interest payments on external public debt in millions of U.S. dollars.
- CHAM - nominal amortization payments on external public debt in millions of U.S. dollars.
- CHIN - nominal interest payments on external public debt in millions of U.S. dollars.
- CHBGS - nominal external balance on goods and services in millions of U.S. dollars.
- CHADSR - adjusted debt service ratio; the quotient of CHAI to CHBGS.

Colombia

- COGDP - nominal GDP in billions of pesos.
- COGFCF - nominal GFCF in billions of pesos.
- COEPDD - nominal EPDD in billions of U.S. dollars.
- COEXP - nominal EXP in billions of U.S. dollars.
- CODFI - nominal DFI in billions of U.S. dollars.
- COUI - nominal UT in billions of U.S. dollars.
- COCPI - consumer price index, 1975 = 100.
- CCPCF - population in millions.
- CORGDP - real GDP per capita.
- CORGFCF - real GFCF per capita.

- COREPDD - real EPDD per capita.
- COREXP - real EXP per capita.
- CORDFI - real DFI per capita.
- CORUT - real UT per capita.
- COAI - sum of nominal amortization and interest payments on external public debt in billions of U.S. dollars.
- COAM - nominal amortization payments on external public debt in billions of U.S. dollars.
- COIN - nominal interest payments on external public debt in billions of U.S. dollars.
- COBGS - nominal external balance on goods and services in millions of U.S. dollars.
- COADSR - adjusted debt service ratio; the quotient of COAI to COBGS.

Ecuador

- ECGDP - nominal GDP in billions of sucres.
- ECGFCF - nominal GFCF in billions of sucres.
- ECEPDD - nominal EPDD in billions of U.S. dollars.
- ECEXP - nominal EXP in billions of U.S. dollars.
- ECDFI - nominal DFI in billions of U.S. dollars.
- ECUI - nominal UT in billions of U.S. dollars.
- ECCPI - consumer price index, 1975 = 100.
- ECPCF - population in millions.
- ECRGDP - real GDP per capita.
- ECRGFCF - real GFCF per capita.
- ECREPDD - real EPDD per capita.
- ECREXP - real EXP per capita.
- ECRDFI - real DFI per capita.
- ECRUI - real UT per capita.

- ECAI - sum of nominal amortization and interest payments on external public debt in billions of U.S. dollars.
- ECAM - nominal amortization payments on external public debt in billions of U.S. dollars.
- ECIN - nominal interest payments on external public debt in billions of U.S. dollars.
- ECBGS - nominal external balance on goods and services in millions of U.S. dollars.
- ECADSR - adjusted debt service ratio; the quotient of ECAI to ECBGS.

Paraguay

- PAGDP - nominal GDP in billions of guaranies.
- PAGECF - nominal GFCF in billions of guaranies.
- PAEPDD - nominal EPDD in billions of U.S. dollars.
- PAEXP - nominal EXP in billions of U.S. dollars.
- PADEFI - nominal DFI in billions of U.S. dollars.
- PAUI - nominal UT in billions of U.S. dollars.
- PACPI - consumer price index, 1975 = 100.
- PAPOP - population in millions.
- PARGDP - real GDP per capita.
- PARGFCF - real GFCF per capita.
- PAEPDD - real EPDD per capita.
- PAEXP - real EXP per capita.
- PARDFI - real DFI per capita.
- PARUT - real UT per capita.
- PAAI - sum of nominal amortization and interest payments on external public debt in billions of U.S. dollars.
- PAAM - nominal amortization payments on external

public debt in billions of U.S. dollars.

- PAIN - nominal interest payments on external public debt in billions of U.S. dollars.
- PABGS - nominal external balance on goods and services in millions of U.S. dollars.
- PAADSR - adjusted debt service ratio; the quotient of PAAI to PAEGS.

PERU

- PEGDF - nominal GDP in billions of soles.
- PEGFCF - nominal GFCF in billions of soles.
- PEEPDD - nominal EPDD in billions of U.S. dollars.
- PEEXF - nominal EXP in billions of U.S. dollars.
- PEDFI - nominal DFI in billions of U.S. dollars.
- PEUI - nominal UT in billions of U.S. dollars.
- PECPI - consumer price index, 1975 = 100.
- PEPOF - population in millions.
- PERGDP - real GDP per capita.
- PERGFCF - real GFCF per capita.
- PEREPDD - real EPDD per capita.
- PEREXP - real EXP per capita.
- PERDFI - real DFI per capita.
- PERUI - real UT per capita.
- PEAI - sum of nominal amortization and interest payments on external public debt in billions of U.S. dollars.
- PEAM - nominal amortization payments on external public debt in billions of U.S. dollars.
- PEIN - nominal interest payments on external public debt in billions of U.S. dollars.
- PEBGS - nominal external balance on goods and services in millions of U.S. dollars.

PEADSR - adjusted debt service ratio; the quotient of
PEAI to PEBGS.

Uruguay

URGDP - nominal GDP in millions of new pesos.
 URGFCF - nominal GFCF in millions of new pesos.
 UREPDD - nominal EPDD in millions of U.S. dollars.
 UREXP - nominal EXP in millions of U.S. dollars.
 URUT - nominal UT in millions of U.S. dollars.
 URCEI - consumer price index, 1975 = 100.
 URPOP - population in millions.
 URGDP - real GDP per capita.
 URGFCF - real GFCF per capita.
 URREPDD - real EPDD per capita.
 URREXP - real EXP per capita.
 URRUT - real UT per capita.
 URAI - sum of nominal amortization and interest
payments on external public debt in
millions of U.S. dollars.
 URAM - nominal amortization payments on external
public debt in millions of U.S. dollars.
 URIN - nominal interest payments on external public
debt in millions of U.S. dollars.
 URBGS - nominal external balance on goods and
services in millions of U.S. dollars.
 URADSR - adjusted debt service ratio; the quotient of
URAI to URBGS.

Venezuela

VEGDP - nominal GDP in billions of bolivares.
 VEGFCF - nominal GFCF in billions of bolivares.

- VEEPDD - nominal EPDD in billions of U.S. dollars.
- VEEXP - nominal EXP in billions of U.S. dollars.
- VEDFI - nominal DFI in billions of U.S. dollars.
- VEUT - nominal UT in billions of U.S. dollars.
- VECPI - consumer price index, 1975 = 100.
- VEPCF - population in millions.
- VERGDP - real GDP per capita.
- VERGFCF - real GFCF per capita.
- VEREPDD - real EPDD per capita.
- VEREXP - real EXP per capita.
- VERDFI - real DFI per capita.
- VERUI - real UT per capita.
- VEAI - sum of nominal amortization and interest payments on external public debt in billions of U.S. dollars.
- VEAM - nominal amortization payments on external public debt in billions of U.S. dollars.
- VEIN - nominal interest payments on external public debt in billions of U.S. dollars.
- VEBGS - nominal external balance on goods and services in millions of U.S. dollars.
- VEADSR - adjusted debt service ratio; the quotient of VEA1 to VEBGS.

Other Variables

- USFGI - U.S. finished goods index, 1975 = 100.

Note: All real per capita development indicators, i.e., real GDP and GFCF per capita, were constructed by deflating the nominal gross variables by each country's CPI. Then these figures were divided by each country's population. Similarly, all real per capita external flow indicators, i.e., real EPDD, EXP, DFI and UT per capita, were constructed by deflating their gross

nominal values by the US\$GI and these values were divided by each country's respective population. See text of Chapter V for further detail.

TABLE 69

COUNTRY DATA FOR ARGENTINA

YEAR	ARGDP	ARGFCF	AREXP	ARDFI	ARUT	ARCPY
1950.00	0.700000	0.100000E 00	***	***	***	***
1951.00	2.600000	0.200000	1.16900	0.240000E-02	0.799998E-03	0.100000E 00
1952.00	1.600000	0.200000	0.678000	0.399999E-02	0.399999E-03	0.200000
1953.00	1.700000	0.200000	1.10200	0.419999E-02	0.499999E-03	0.200000
1954.00	1.400000	0.200000	1.02700	0.140000E-02	0.399999E-03	0.200000
1955.00	2.500000	0.300000	0.929000	0.499999E-03	0.200000E-03	0.200000
1956.00	2.000000	0.400000	0.944000	0.627999E-01	0.999999E-03	0.700000
1957.00	2.800000	0.500000	0.974000	0.695999E-01	0.799998E-03	0.400000
1958.00	4.000000	0.800000	0.994000	0.120100	0.180000E-02	0.500000
1959.00	8.400000	1.200000	1.00900	0.244300	0.150000E-02	1.000000
1960.00	10.1000	2.10000	1.07900	0.331999	0.180000E-02	1.200000
1961.00	11.6000	2.70000	0.964000	-0.180000E-01	0.599999E-02	1.400000
1962.00	14.9000	3.20000	1.21600	0.719998E-01	0.140000E-01	1.800000
1963.00	19.0000	3.00000	1.36500	0.779998E-01	0.899998E-02	2.200000
1964.00	26.0000	4.00000	1.41000	0.270000E-01	0.110000E-01	2.700000
1965.00	36.0000	6.00000	1.49300	0.429999E-01	0.399999E-02	3.400000
1966.00	45.0000	8.00000	2.10700	0.399999E-01	0.300000E-02	4.600000
1967.00	60.0000	11.0000	1.46400	0.999998E-02	0.200000E-02	5.900000
1968.00	69.0000	13.0000	1.36800	0.699999E-02	0.200000E-02	6.800000
1969.00	81.0000	17.0000	1.61200	0.130000E-01	0.300000E-02	7.400000
1970.00	95.0000	19.0000	1.77300	0.110000E-01	0.0	8.300000
1971.00	133.000	26.0000	1.74000	0.110327E-01	0.0	11.2000
1972.00	220.000	44.0000	1.94100	0.977136E-02	0.0	17.8000
1973.00	365.000	71.0000	3.26600	0.953700E-02	0.107291E-01	28.7000
1974.00	482.000	116.000	3.93000	0.962109E-02	0.0	35.4000
1975.00	1450.00	357.000	2.96100	0.0	0.230688E-01	100.000
1976.00	8030.00	1779.00	3.91600	0.0	0.311719E-01	543.200
1977.00	20858.0	4879.00	5.65200	0.817261E-01	0.443656E-01	1499.60
1978.00	51310.0	10610.0	6.39900	0.250399	0.851358E-01	4131.40

YEAR	ARRCMP	ARRGFCF	ARRXP	ARRDFI	ARRT	ARNP
1950.00	...	...	...	...	...	17.0900
1951.00	149340.	11497.7	126.929	0.260389	0.868632E-01	17.4100
1952.00	45197.8	5649.73	72.8234	0.429636	0.429636E-01	17.7000
1953.00	47327.5	5567.94	117.997	0.449717	0.535378E-01	17.9600
1954.00	38377.3	5482.46	107.864	0.147039	0.420111E-01	18.2400
1955.00	67458.3	8095.00	95.8604	0.515933E-01	0.206373E-01	18.5300
1956.00	35461.1	7092.21	93.3325	6.20897	0.988690E-01	18.8000
1957.00	36649.3	6544.52	91.3886	6.53043	0.750624E-01	19.1000
1958.00	41279.8	8255.95	89.9826	10.8721	0.162946	19.3800
1959.00	42726.4	6103.77	90.1973	21.8387	0.134090	19.6600
1960.00	42252.4	8785.16	94.3672	29.0360	0.157424	19.9200
1961.00	40937.4	9528.53	83.1213	-1.55206	0.517352	20.2400
1962.00	40300.9	8655.22	102.959	6.09627	1.18539	20.5400
1963.00	41421.5	6540.24	114.055	6.51744	0.752012	20.8500
1964.00	45487.3	6990.04	115.632	2.21422	0.902090	21.1700
1965.00	47737.9	7956.31	115.065	3.31399	0.308278	22.1800
1966.00	43497.7	7732.92	155.625	2.95443	0.221582	22.4900
1967.00	44603.1	8172.24	104.919	0.716661	0.143332	22.8000
1968.00	43907.7	8272.47	94.1100	0.481557	0.137588	23.1100
1969.00	46717.7	9804.95	105.361	0.849685	0.196081	23.4300
1970.00	48192.2	9638.57	110.597	0.686160	0.0	23.7500
1971.00	49335.4	9644.50	104.013	0.659513	0.0	24.0700
1972.00	50674.8	10135.0	110.993	0.558760	0.0	24.3900
1973.00	51447.4	10007.6	168.951	0.493353	0.555022	24.7200
1974.00	54354.7	13081.2	173.932	0.425805	0.0	25.0500
1975.00	57486.3	14066.2	116.667	0.0	0.908937	25.3800
1976.00	57475.9	12733.4	146.259	0.0	1.16424	25.7200
1977.00	53373.2	12484.8	196.275	2.83808	1.54067	26.0600
1978.00	47061.6	9731.49	203.764	7.97348	2.71098	26.3900

TABLE 70

COUNTRY DATA FOR BOLIVIA

YEAR	RGDGRP	RGDFCF	ROFXP	RODFI	BDLT	PCCPI
1950.00	46.0000	5.00000	...	...	0.400000	0.207000
1951.00	80.0000	12.0000	124.500	...	0.400000	0.274000
1952.00	107.000	17.0000	95.1000	...	1.000000	0.341000
1953.00	327.000	33.0000	64.0000	...	2.600000	0.680000
1954.00	637.000	85.0000	72.3000	1.00000	14.7000	1.52700
1955.00	1501.00	308.000	81.0000	2.60000	20.6000	2.76600
1956.00	2757.00	551.000	84.6000	3.00000	20.4000	7.71100
1957.00	2960.00	558.000	76.9000	6.90000	28.2000	16.5900
1958.00	3361.00	449.000	51.3000	16.6000	29.1000	17.1050
1959.00	3862.00	526.000	61.6000	15.5000	22.8000	20.5760
1960.00	4479.00	637.000	54.4000	16.5000	13.2000	22.5500
1961.00	4877.00	532.000	63.8000	11.4000	22.7000	24.6850
1962.00	5327.00	835.000	63.6000	10.1000	21.1000	26.1360
1963.00	5736.00	924.000	71.9000	5.80000	30.3000	25.5520
1964.00	6463.00	958.000	100.100	1.50000	26.1000	28.5540
1965.00	7180.00	1051.00	115.100	12.5000	16.4000	29.4120
1966.00	7950.00	949.000	11.5000	2.00000	21.5000	31.4560
1967.00	8979.00	1155.00	21.3000	0.500000	13.3000	34.5800
1968.00	10172.0	1574.00	115.500	6.50000	7.00000	36.8980
1969.00	11044.0	1741.00	177.800	9.10000	8.10000	37.7160
1970.00	12374.0	1792.00	190.400	-75.9000	4.20000	39.1950
1971.00	13534.0	1927.00	181.600	1.90566	7.22144	40.4100
1972.00	17218.0	2567.00	201.300	-10.5314	14.5485	43.2530
1973.00	26150.0	4433.00	260.800	4.64929	17.7627	56.5050
1974.00	43829.0	6469.00	556.500	25.8567	15.2735	92.6080
1975.00	49468.0	8830.00	444.700	53.4225	15.4197	100.000
1976.00	57787.0	10597.0	563.100	-8.08162	16.0478	104.493
1977.00	66743.0	12374.0	634.200	-1.16752	17.9798	112.960
1978.00	80594.0	16493.0	627.200	11.5184	30.0480	124.662
1979.00	102279.	21781.0	761.800	17.9588	55.0391	149.261
1980.00	149506.	26050.0	941.900	42.0393	60.1306	210.755

VFAP	RNRGCP	RNRGCF	ROREXP	ROREFI	ROBRUT	ROPOP
1950.00	7358.36	799.821	...	...	0.274224	3.02000
1951.00	9410.45	1426.57	76.6611	...	0.246301	3.07000
1952.00	10025.0	1592.76	57.7631	...	0.607393	3.13000
1953.00	14864.7	1510.19	38.5821	...	1.56740	3.19000
1954.00	12613.2	166.40	42.4864	0.587641	8.63832	3.26000
1955.00	16247.3	3333.90	46.3700	1.48642	11.7929	3.34000
1956.00	10654.4	2089.37	45.9792	1.63047	11.0872	3.42000
1957.00	5097.74	960.993	39.3753	3.53303	14.4393	3.50000
1958.00	5473.33	796.328	25.0696	8.11220	14.2208	3.59000
1959.00	5072.03	690.913	29.2595	7.36237	10.8298	3.70000
1960.00	5108.99	726.597	24.8098	7.52503	6.02003	3.92000
1961.00	5034.88	549.785	28.4040	5.07533	10.1061	3.92000
1962.00	5070.11	794.733	27.5146	4.36946	9.12826	4.02000
1963.00	5364.65	864.180	30.4032	2.45255	12.8125	4.12000
1964.00	5343.42	792.046	41.0838	0.615642	10.7122	4.23000
1965.00	5637.83	825.259	45.4393	4.93476	6.47440	4.33000
1966.00	5679.42	677.958	4.29280	0.746575	8.02567	4.45000
1967.00	5729.68	737.028	7.76873	0.182364	4.85090	4.49000
1968.00	6124.63	945.957	40.7150	2.29132	2.46758	4.51000
1969.00	6435.61	1014.52	59.8421	3.06279	2.72622	4.55000
1970.00	6893.09	998.256	61.5882	-24.5512	1.35856	4.58000
1971.00	7213.58	1027.09	56.5573	0.593496	2.24904	4.62000
1972.00	8579.23	1279.06	60.5071	-3.16554	4.37301	4.64000
1973.00	9840.21	1668.13	71.4140	1.27310	4.86390	4.67000
1974.00	9963.68	1470.37	129.887	6.03494	3.56483	4.75000
1975.00	10116.2	1805.73	90.9406	10.9248	3.15331	4.89000
1976.00	10994.0	2016.08	107.539	-1.54340	3.06476	5.03000
1977.00	11450.7	2122.93	111.228	-0.204763	3.15335	5.16000
1978.00	12198.1	2496.26	99.4450	1.82629	4.76422	5.30000
1979.00	12573.1	2677.53	105.734	2.49258	7.63912	5.45000
1980.00	12148.8	2116.81	112.356	5.01471	7.17274	5.60000

TABLE 71

COUNTRY DATA FOR BRAZIL

YEAR	BPCDP	BRGFCF	BREXP	BRDFI	BRUT	BRCP1
1950.00	...	...	...	0.389999E-01	0.200000E-02	...
1951.00	...	...	1.77000	0.629999E-01	0.200000E-02	...
1952.00	...	...	1.41600	0.939998E-01	0.300000E-02	...
1953.00	...	...	1.53900	0.599999E-01	0.799999E-02	...
1954.00	...	...	1.55800	0.509999E-01	0.130000E-01	...
1955.00	...	...	1.41900	0.819998E-01	0.120000E-01	...
1956.00	...	...	1.48300	0.140000	0.130000E-01	...
1957.00	...	...	1.39200	0.238000	0.180000E-01	...
1958.00	1.50000	0.200000	1.24400	0.227000	0.180000E-01	0.580000
1959.00	2.00000	0.400000	1.28200	0.158000	0.200000E-01	0.810000
1960.00	2.80000	0.500000	1.27000	0.138000	0.320000E-01	1.05000
1961.00	4.10000	0.700000	1.40500	0.147000	0.320000E-01	1.39000
1962.00	6.60000	1.200000	1.21500	0.132000	0.569999E-01	2.10000
1963.00	14.1000	2.100000	1.40600	0.869998E-01	0.599999E-01	3.52000
1964.00	27.3000	3.800000	1.43000	0.859998E-01	0.599999E-01	6.88000
1965.00	44.1000	8.100000	1.59600	0.154000	0.849999E-01	11.4100
1966.00	63.8000	12.50000	1.74100	0.159000	0.929998E-01	16.1200
1967.00	86.2000	16.70000	1.65600	0.124000	0.107000	21.0300
1968.00	122.400	26.00000	1.88100	0.150000	0.749999E-01	25.6600
1969.00	161.900	35.80000	2.31100	0.252000	0.829998E-01	31.4900
1970.00	208.300	46.40000	2.73900	0.420999	0.869998E-01	38.5100
1971.00	276.800	63.30000	2.89100	0.536593	0.942797E-01	46.2800
1972.00	363.200	83.30000	3.94100	0.597139	0.104228	53.9300
1973.00	498.300	114.700	6.09300	1.37810	0.128749	60.7600
1974.00	719.500	174.400	7.81400	1.32651	0.137101	77.5500
1975.00	1009.40	255.900	8.49200	1.30278	0.132342	100.000
1976.00	1560.30	370.200	9.96100	1.55398	0.110833	147.040
1977.00	2321.40	515.900	11.9230	1.82950	0.127259	204.080
1978.00	3492.60	766.700	12.4720	2.00069	0.252903	283.060
1979.00	5782.10	1244.70	15.2440	2.41474	0.231267	432.240

YEAR	RRRCGP	RRRCFCF	RRREXP	BRDDFI	BRUT	BPPDP
1950.00	...	...	...	1.55459	0.797225E-01	51.9400
1951.00	...	...	62.5409	2.22603	0.706676E-01	53.5000
1952.00	...	...	48.8569	3.26332	0.103510	55.1000
1953.00	...	...	52.1610	2.03357	0.271142	56.7400
1954.00	...	...	51.0725	1.67182	0.426150	58.4400
1955.00	...	...	45.0847	2.60531	0.381265	60.1800
1956.00	...	...	44.4742	4.19850	0.389861	61.9800
1957.00	...	...	39.0824	6.68218	0.505375	63.8300
1958.00	3934.00	524.533	33.1983	6.05789	0.460361	65.7400
1959.00	3647.18	729.436	33.2803	4.10163	0.519194	67.7000
1960.00	3824.83	683.005	31.7348	3.44834	0.799615	69.7200
1961.00	4100.15	700.026	34.0841	3.56609	0.776292	71.9400
1962.00	4237.38	770.433	28.4892	3.09512	1.33653	74.1700
1963.00	5132.08	764.353	32.0068	1.98050	1.36586	76.5300
1964.00	5040.04	701.545	31.5336	1.89642	1.32309	78.7300
1965.00	4771.06	876.317	33.6774	3.24957	1.79359	81.0100
1966.00	4772.49	935.049	34.8731	3.18485	1.86283	82.9300
1967.00	4808.67	931.611	31.7060	2.37699	2.05111	85.2400
1968.00	5444.05	1156.42	34.1299	2.72168	1.36084	87.6200
1969.00	5709.96	1262.61	39.2923	4.28457	1.41119	90.0700
1970.00	5846.30	1302.30	43.8584	6.74129	1.39309	92.5200
1971.00	6294.53	1437.18	43.7083	8.11261	1.42539	95.1700
1972.00	6882.64	1578.54	56.1729	8.51131	1.48561	97.8500
1973.00	8155.46	1877.24	77.4818	17.5246	1.63725	100.560
1974.00	8977.16	2175.99	83.8218	14.2296	1.47069	103.350
1975.00	9502.04	2408.93	79.9398	12.2638	1.24581	106.230
1976.00	10061.3	2387.17	87.6415	13.6726	0.975164	109.180
1977.00	10134.5	2252.26	96.1339	14.7510	1.02608	112.240
1978.00	10692.2	2347.16	90.8205	14.5689	1.84163	115.400
1979.00	11274.4	2427.02	97.1853	15.3947	1.47440	118.650

TABLE 72
COUNTRY DATA FOR CHILE

YEAR	CHGDP	CHGFCF	CHPEP	CHEXP	CHDFI	CHUT	CHCPI
1950.00	...	...	...	...	-4.80000	0.700000	...
1951.00	...	...	...	...	36.00000	0.700000	...
1952.00	...	...	...	...	53.80000	0.900000	...
1953.00	...	...	...	...	56.50000	2.200000	...
1954.00	...	...	...	...	-54.00000	1.900000	...
1955.00	...	...	...	...	1.600000	2.300000	...
1956.00	...	...	...	...	32.90000	12.40000	...
1957.00	...	...	...	...	45.60000	17.90000	...
1958.00	...	...	...	...	46.50000	31.70000	...
1959.00	...	...	...	...	54.30000	35.70000	...
1960.00	...	...	...	...	29.00000	47.10000	...
1961.00	...	...	...	...	51.90000	24.20000	...
1962.00	...	...	...	...	36.00000	15.00000	...
1963.00	...	...	...	...	-30.00000	7.000000	...
1964.00	...	...	...	...	-14.00000	11.00000	...
1965.00	...	...	...	...	-38.00000	13.00000	...
1966.00	26.00000	4.000000	161.554	860.000	-30.00000	17.00000	0.140000
1967.00	34.00000	5.000000	183.377	883.000	3.000000	9.000000	0.170000
1968.00	46.00000	7.000000	446.052	908.000	142.000	7.000000	0.210000
1969.00	67.00000	10.00000	428.300	1172.00	85.00000	4.000000	0.270000
1970.00	97.00000	13.00000	398.500	1113.00	-79.00000	6.000000	0.360000
1971.00	129.000	17.00000	190.500	1000.00	-66.1966	7.07005	0.430000
1972.00	239.000	28.00000	1520.40	851.000	-1.08571	7.59096	0.770000
1973.00	1211.00	163.0000	314.600	1316.00	-4.76851	14.3055	3.48000
1974.00	9661.00	1202.00	539.500	2152.00	-556.822	15.6343	21.0900
1975.00	42091.0	4268.00	282.800	1591.00	52.2083	15.7830	100.000
1976.00	146640.	12814.0	555.600	2116.00	-1.15452	32.3265	311.810
1977.00	321188.	28830.0	721.500	2186.00	21.0153	80.5487	598.500
1978.00	407510.	71500.0	1483.20	2460.00	181.540	100.160	838.430
1979.00	762130.	116470.	1321.20	3835.00	244.188	117.572	1118.37
1980.00	0.109513E 07	187870.	868.600	4706.00	217.355	110.630	1511.34

YFAR	CHRGDP	CHRGFCF	CHREPOD	CHREXP	CHRD F1	CHROUT	CHPOD
1950.00	...	...	...	...	-1.63992	0.239154	6.06000
1951.00	...	...	...	...	11.0118	0.214118	6.18000
1952.00	...	...	...	...	16.2351	0.271591	6.30000
1953.00	...	...	...	...	16.8195	0.654918	6.46000
1954.00	...	...	...	...	-15.6266	0.520897	6.62000
1955.00	...	...	...	...	0.450556	0.647674	6.79000
1956.00	...	...	...	...	8.78627	3.31154	6.96000
1957.00	...	...	...	...	11.4454	4.49284	7.14000
1958.00	...	...	...	...	11.1447	7.59754	7.32000
1959.00	...	...	...	...	12.7411	8.37672	7.49000
1960.00	...	...	...	...	6.66526	10.8253	7.58000
1961.00	...	...	...	...	11.6722	5.44251	7.76000
1962.00	...	...	...	...	7.87531	3.28138	7.95000
1963.00	...	...	...	...	-6.42074	1.49817	8.14000
1964.00	...	...	...	...	-2.91783	2.29258	8.33000
1965.00	...	...	...	...	-7.63305	2.61131	8.51000
1966.00	2139.57	329.164	30.9173	164.582	-5.74123	3.25336	8.68000
1967.00	2259.89	332.336	33.8571	163.029	0.553894	1.66168	8.85000
1968.00	2425.78	369.140	78.5320	159.863	25.0006	1.23242	9.03000
1969.00	2697.26	402.576	71.2930	195.086	14.1487	0.665823	9.20000
1970.00	2875.61	385.391	63.0064	175.975	-12.4906	0.948654	9.37000
1971.00	3147.95	414.847	28.7619	150.981	-9.99442	1.06001	9.53000
1972.00	3199.39	374.883	218.608	122.360	-0.156107	1.09275	9.70000
1973.00	3529.30	475.041	40.8014	170.676	-0.618442	1.85532	9.86000
1974.00	4567.14	568.233	59.6326	237.867	-61.5472	1.72811	10.0300
1975.00	4126.57	418.431	27.7254	155.980	5.11846	1.54744	10.2000
1976.00	4535.35	396.292	51.4674	196.014	-0.106948	2.99453	10.3700
1977.00	5086.78	456.592	61.8901	187.515	1.80269	6.91032	10.5500
1978.00	5618.97	795.767	116.159	192.659	14.2176	7.84417	10.7300
1979.00	6280.52	953.687	91.5197	265.651	16.9149	8.14422	10.9200
1980.00	6528.30	1119.88	52.2727	283.209	13.0805	6.65775	11.1000

YEAR	CHAI	CHAM	CHIN	CHGS	CHDSR
1950.00	...	...	...	...	...
1951.00	...	...	...	-45.0000	...
1952.00	...	...	...	16.0000	...
1953.00	...	...	...	-60.0000	...
1954.00	...	...	...	1.00000	...
1955.00	...	...	...	24.0600	...
1956.00	...	...	...	-24.0000	...
1957.00	...	...	...	-109.000	...
1958.00	...	...	...	-107.000	...
1959.00	...	...	...	-42.0000	...
1960.00	...	...	...	-177.000	...
1961.00	...	...	...	-302.000	...
1962.00	...	...	...	-226.000	...
1963.00	...	...	...	-208.000	...
1964.00	...	...	...	-143.000	...
1965.00	...	...	...	-52.0000	...
1966.00	129.728	94.6990	35.6290	-62.0000	-2.09239
1967.00	122.939	85.9660	36.5730	21.0000	5.85424
1968.00	172.563	127.854	44.7090	-145.000	-1.19009
1969.00	216.400	164.100	54.3000	85.0000	2.56941
1970.00	241.500	163.500	78.0000	-97.0000	-2.48969
1971.00	242.200	161.800	80.4000	-205.000	-1.18146
1972.00	438.100	411.600	26.5000	-479.000	-0.914613
1973.00	156.600	119.900	36.7000	-293.000	-0.534471
1974.00	278.600	198.900	79.1000	-306.000	-0.908456
1975.00	501.500	344.900	156.600	-503.000	-0.997017
1976.00	756.500	548.000	208.900	119.000	6.36050
1977.00	885.800	684.500	201.300	-629.000	-1.40827
1978.00	1215.60	925.800	289.800	-1159.00	-1.04863
1979.00	1273.90	914.700	359.200	-1271.00	-1.00228
1980.00	1408.80	914.800	494.000	-1855.00	-0.759461

TABLE 73

COUNTRY DATA FOR COLOMBIA

YEAR	CNGCP	CNGCF	COEPD	COEXP	COEFI	COUT	CNCP1
1950.00	7.86000	1.11000	...	...	-0.110000E-02	...	7.90000
1951.00	8.94000	1.19000	...	...	-0.122000E-01	0.153000E-01	8.60000
1952.00	9.65000	1.33000	...	...	0.78998E-02	0.0	8.90000
1953.00	10.73000	1.73000	...	...	0.140000E-02	0.110000E-02	9.10000
1954.00	12.75000	2.16000	...	...	0.147000E-01	0.0	9.80000
1955.00	13.25000	2.38000	...	...	0.39999E-03	0.32999E-02	9.80000
1956.00	14.86000	2.53000	0.499069E-01	0.6544000	0.120000E-01	0.34999E-02	10.40000
1957.00	17.81000	2.64000	0.206308	0.5900000	0.40999E-02	0.64999E-02	12.00000
1958.00	20.68000	3.34000	0.129239	0.527000	-0.79998E-03	0.64999E-02	13.80000
1959.00	23.65000	3.91000	0.742429E-01	0.514000	0.89998E-03	0.83999E-02	14.70000
1960.00	26.75000	4.84000	0.217630E-01	0.4800000	0.250000E-02	0.83999E-02	15.30000
1961.00	30.42000	5.59000	0.919688E-01	0.462000	0.61999E-02	0.114000E-01	16.60000
1962.00	34.20000	6.14000	0.157406	0.462000	0.104000E-01	0.220000E-01	17.10000
1963.00	43.53000	7.17000	0.127291	0.474000	0.180000E-01	0.180000E-01	22.50000
1964.00	53.76000	8.65000	0.131600	0.623000	0.65999E-01	0.180000E-01	26.50000
1965.00	60.80000	9.50000	0.156367	0.581000	0.99998E-02	0.160000E-01	27.40000
1966.00	73.61000	12.30000	0.150968	0.560000	0.39999E-01	0.37999E-01	32.80000
1967.00	83.08000	14.73000	0.167877	0.552000	0.41999E-01	0.280000E-01	35.50000
1968.00	96.42000	19.82000	0.222845	0.605000	0.49999E-01	0.56999E-01	37.60000
1969.00	110.950	21.23000	0.196500	0.672000	0.53999E-01	0.69999E-01	41.40000
1970.00	130.360	26.44000	0.235000	0.788000	0.42999E-01	0.46999E-01	44.20000
1971.00	152.260	31.60000	0.222300	0.754000	0.431280E-01	0.461360E-01	47.90000
1972.00	186.090	34.52000	0.337500	0.979000	0.184570E-01	0.45599E-01	54.30000
1973.00	243.240	42.54000	0.408100	1.262000	0.238425E-01	0.453000E-01	65.50000
1974.00	329.160	63.86000	0.377900	1.495000	0.408897E-01	0.613345E-01	81.40000
1975.00	412.830	77.57000	0.390200	1.717000	0.400668E-01	0.55897E-01	100.00000
1976.00	534.020	97.08000	0.261600	2.243000	0.253993E-01	0.704254E-01	120.40000
1977.00	718.480	139.780	0.371100	2.713000	0.642133E-01	0.700509E-01	160.20000
1978.00	916.560	187.720	0.319200	3.206000	0.105168	0.051350E-01	188.70000
1979.00	1193.63	247.380	1.04060	3.836000	0.127908	0.113696	235.20000
1980.00	1547.87	361.0000	1.13060	4.113000	0.243385	0.165294	297.60000

YEAR	CNRCNP	CNRCFCF	CNRCPOD	COREXP	CORDFI	CDRUT	CDPOP
1930.00	8781.45	1240.13	...	...	0.201009	...	11.3300
1951.00	9000.31	1198.03	...	...	-1.99674	2.50411	11.5500
1952.00	9727.44	1340.67	...	...	1.27172	0.0	11.8100
1953.00	9769.03	1620.58	...	...	0.223058	0.175260	12.0700
1954.00	10543.1	1786.13	...	...	2.28208	0.0	12.3400
1955.00	10424.4	1972.45	...	...	0.589682E-01	0.486488	12.9700
1956.00	10514.0	1790.06	6.82590	89.4492	1.64127	0.478703	13.5900
1957.00	10578.5	1568.07	26.3527	75.3634	0.523711	0.574805	14.0300
1958.00	10349.1	1671.47	15.6585	63.8510	0.787535	0.787535	14.4800
1959.00	10768.7	1780.37	8.73358	60.4645	-0.969273E-01	0.482304	14.9400
1950.00	11338.3	2051.49	2.45880	54.2307	0.105872	0.949037	15.4200
1951.00	11518.1	2112.79	10.0883	50.6778	0.282451	1.25049	15.9100
1952.00	12180.3	2186.76	16.6717	48.9330	0.680091	1.84293	16.4200
1953.00	11420.7	1881.15	13.0910	48.7476	1.10152	2.26255	16.9400
1954.00	11605.8	1867.37	13.0705	61.8764	1.85117	2.26255	17.4800
1955.00	12300.3	1921.93	14.8168	55.0534	6.55511	1.51610	18.0400
1956.00	12150.6	2030.32	13.5776	47.3067	0.947562	1.43899	18.4700
1957.00	12343.3	2189.45	14.4678	47.5718	3.59747	2.41306	18.9600
1958.00	13177.6	2572.11	18.2058	49.4268	3.61959	3.10449	19.4600
1959.00	13413.2	2566.58	15.0610	51.5064	4.08485	4.36894	19.9800
1970.00	14365.9	2913.74	16.9580	56.8636	3.10296	3.60807	20.5300
1971.00	15072.1	3120.06	15.1663	51.4411	2.94238	3.14766	21.0900
1981.00	14814.8	2933.68	21.7218	63.0094	1.18791	2.93484	21.6700
1973.00	16623.1	2907.19	23.3602	72.2387	1.36478	2.59308	22.3400
1974.00	17596.8	3413.94	18.2314	72.1248	1.97268	2.95903	22.9800
1975.00	17463.2	3281.31	16.5059	72.6312	1.69488	2.36256	23.6400
1976.00	18230.1	3314.07	10.3287	88.5599	1.00284	2.70059	24.3300
1977.00	17933.8	3358.58	13.4067	98.0122	2.31983	2.53072	25.0500
1978.00	18944.0	3979.91	10.4616	105.075	3.44682	2.79028	25.6400
1979.00	19252.5	3990.09	29.8612	110.078	3.67046	3.26263	26.3600
1980.00	18899.7	4407.85	27.4435	99.8365	5.90779	4.01224	27.5200

YEAR	COA1	COA4	CUIN	COBGS	COA5R
1950.00	...	...	...	...	...
1951.00	...	...	...	...	...
1952.00	...	...	...	...	...
1953.00	...	...	...	...	...
1954.00	...	...	...	...	...
1955.00	...	...	...	...	...
1956.00	0.368239E-C1	0.304250E-C1	0.839898E-C2	-43.0000	-0.902884
1957.00	0.151030	0.625988E-01	0.864308E-01	67.0000	2.25418
1958.00	0.126613	0.112323	0.142900E-01	47.0000	2.69389
1959.00	0.129015	0.111510	0.175050E-01	46.0000	2.60467
1960.00	0.820078E-01	0.684138E-01	0.135940E-01	-99.0000	-0.828363
1961.00	0.743439E-01	0.602259E-01	0.141180E-01	-158.000	-0.470531
1962.00	0.745489E-01	0.556969E-01	0.188520E-01	-169.000	-0.394439
1963.00	0.890798E-01	0.685236E-01	0.205560E-01	-157.000	-0.557388
1964.00	0.961217E-01	0.725578E-01	0.235640E-01	-156.000	-0.616166
1965.00	0.101905	0.795116E-01	0.223930E-01	-33.0000	-3.08803
1966.00	0.109143	0.863516E-01	0.227910E-01	-298.000	-0.366251
1967.00	0.994728E-C1	0.740818E-01	0.245910E-01	-95.0000	-1.04708
1968.00	0.101358	0.726648E-01	0.264930E-01	-195.000	-0.519784
1969.00	0.102400	0.667999E-01	0.356000E-01	-213.000	-0.440751
1970.00	0.118400	0.749999E-01	0.434000E-01	-329.000	-0.359878
1971.00	0.141900	0.923998E-01	0.494999E-01	-489.000	-0.290184
1972.00	0.154500	0.962999E-01	0.561999E-01	-225.000	-0.686667
1973.00	0.209600	0.131400	0.781999E-01	-90.0000	-2.32889
1974.00	0.310400	0.207600	0.102600	-402.000	-0.772140
1975.00	0.249000	0.135300	0.113700	-152.000	-1.63816
1976.00	0.278300	0.152900	0.125400	147.000	1.89320
1977.00	0.313100	0.178800	0.137300	381.000	0.821785
1978.00	0.358200	0.227200	0.171000	249.000	1.59920
1979.00	0.605200	0.434500	0.230700	280.000	2.37572
1980.00	0.568200	0.266300	0.299900	-146.000	-3.89178

TABLE 74
COUNTRY DATA FOR ECUADOR

YEAR	FCGDP	ECGFCF	ECPPDD	ECXP	ECDFI	ECNT	ECPI
1950.00	7.24000	0.620000	...	...	0.140000E-02	0.130000E-02	...
1951.00	7.76000	0.850000	...	0.704999E-01	0.200000E-02	0.499999E-03	32.2000
1952.00	8.85000	0.810000	...	0.101700	0.999999E-03	0.140000E-02	33.3000
1953.00	9.35000	1.000000	...	0.922999E-01	0.659999E-02	0.130000E-02	33.5000
1954.00	10.4500	1.380000	...	0.125100	0.659999E-02	0.180000E-02	34.7000
1955.00	11.0500	1.540000	...	0.114900	0.300000E-02	0.210000E-02	35.2000
1956.00	11.2700	1.560000	0.872198E-02	0.117800	0.879999E-02	0.250000E-02	33.5000
1957.00	12.0100	1.560000	0.590299E-02	0.137100	0.619999E-02	0.349999E-02	33.8000
1958.00	12.3600	1.520000	0.604599E-02	0.136900	0.629999E-02	0.379999E-02	34.3000
1959.00	13.0100	1.730000	0.125910E-01	0.146200	0.709999E-02	0.449999E-02	34.4000
1960.00	14.1400	1.900000	0.202060E-01	0.146300	0.799999E-02	0.729999E-02	34.8000
1961.00	15.0700	2.050000	0.187630E-01	0.132000	0.839999E-02	0.749999E-02	36.3000
1962.00	16.1000	1.960000	0.237110E-01	0.149100	0.339999E-02	0.269999E-02	37.3000
1963.00	17.4400	2.150000	0.945197E-02	0.150900	0.359999E-02	0.739999E-02	39.5000
1964.00	18.4100	2.340000	0.121260E-01	0.191900	0.102000E-01	0.124000E-01	40.9000
1965.00	20.1500	2.410000	0.149700E-01	0.181000	0.739999E-02	0.949999E-02	42.2000
1966.00	22.8500	2.960000	0.182740E-01	0.187300	0.160000E-01	0.959999E-02	43.9000
1967.00	25.4700	3.710000	0.315780E-01	0.198900	0.164000E-01	0.129000E-01	45.6000
1968.00	27.3800	4.380000	0.486359E-01	0.210700	0.292000E-01	0.134000E-01	47.6000
1969.00	29.9200	4.510000	0.246000E-01	0.193400	0.385999E-01	0.127000E-01	50.6000
1970.00	34.6600	5.210000	0.419000E-01	0.234900	0.885999E-01	0.177000E-01	53.2000
1971.00	40.7600	9.880000	0.408000E-01	0.238000	0.162081	0.169503E-01	57.7000
1972.00	46.8600	8.440000	0.101000	0.323200	0.807765E-01	0.160685E-01	62.2000
1973.00	62.2300	10.8900	0.524999E-01	0.584700	0.523343E-01	0.280149E-01	70.3000
1974.00	92.7600	16.8600	0.706999E-01	1.22540	0.768484E-01	0.339143E-01	86.7000
1975.00	107.740	24.9100	0.166400	1.01280	0.953104E-01	0.343603E-01	100.000
1976.00	132.910	29.4700	0.217300	1.30710	-0.199731E-01	0.326729E-01	110.700
1977.00	162.380	39.1500	0.3577900	1.40070	0.344417E-01	0.421473E-01	125.100
1978.00	188.970	48.5600	0.533200	1.52920	0.485775E-01	0.433191E-01	139.700
1979.00	231.720	56.9100	1.06410	2.17950	0.660210E-01	0.316539E-01	154.000
1980.00	284.430	66.7300	0.742900	2.52950	0.800438E-01	0.399569E-01	174.100

YEAR	FCRGDP	ECRGFCF	ECREPDO	ECREXP	ECRDFI	ECRUT	ECPOP
1950.00	...	792.719	...	...	0.697384	0.833285	3.23000
1951.00	7237.06	709.165	...	40.0211	1.13535	0.283888	3.33000
1952.00	7748.23	845.632	...	56.3692	0.554268	0.775976	3.43000
1953.00	7906.66	1092.57	...	50.2833	3.59555	0.708215	3.53000
1954.00	8273.44	1166.67	...	65.8393	3.47354	0.947428	3.64000
1955.00	8371.22	1203.29	...	58.5851	1.52964	1.07075	3.75000
1956.00	8692.98	1159.65	4.18912	56.5786	4.22658	1.20073	3.87000
1957.00	8927.79	1078.22	2.65830	61.7335	2.79174	1.57998	3.98000
1958.00	8767.66	1183.91	2.58078	58.4369	2.68921	2.04982	4.11000
1959.00	8940.96	1252.24	5.23128	59.9119	2.94989	1.86985	4.23000
1960.00	9319.33	1252.24	8.07388	58.4583	3.19662	2.91892	4.36000
1961.00	9225.61	1254.98	7.27555	51.1926	3.25771	2.90867	4.50000
1962.00	9282.57	1130.04	8.86808	55.7644	1.27162	3.62787	4.65000
1963.00	9236.81	1130.71	3.44495	54.9984	1.31209	2.69707	4.78000
1964.00	9626.22	1160.50	4.27020	67.5781	3.59196	4.36669	4.93000
1965.00	9417.72	1126.41	5.04729	61.0261	2.49498	3.20302	5.07000
1966.00	9971.29	1291.69	5.81522	59.6034	5.09158	3.05495	5.22000
1967.00	10343.6	1506.66	9.55520	60.1852	4.96247	3.90341	5.40000
1968.00	10308.4	1649.05	13.8571	60.0316	8.31952	3.81786	5.58000
1969.00	10247.9	1544.72	6.52900	51.3286	22.0234	4.39970	5.77000
1970.00	10931.3	1643.16	10.4151	58.3893	10.2447	3.37066	5.96000
1971.00	11449.2	2775.21	9.51460	55.5018	37.7975	3.95283	6.17000
1972.00	11808.4	2126.83	22.0791	70.6532	17.6582	3.51265	6.38000
1973.00	13417.2	2347.09	10.1721	113.288	10.1400	5.42799	6.60000
1974.00	15664.7	2947.20	11.4760	198.907	12.4741	5.50499	6.83000
1975.00	15260.6	3529.33	23.5694	143.456	13.5001	4.86690	7.06000
1976.00	16424.5	3641.80	28.5557	171.767	-2.62469	4.29357	7.31000
1977.00	17169.4	4139.55	69.1782	167.672	4.12288	5.04530	7.56000
1978.00	17319.9	4450.73	57.3710	164.538	5.22682	4.66103	7.81000
1979.00	18627.2	4573.59	99.6184	204.040	6.18073	2.98336	8.08000
1980.00	19565.5	4590.25	59.4323	202.361	6.40354	3.19656	8.35000

YEAR	ECAI	ECAM	ECIN	ECBGS	ECAOSR
1950.00	...	...	...	...	...
1951.00	...	...	...	-0.300000	...
1952.00	...	...	...	19.0000	...
1953.00	...	...	...	-1.90000	...
1954.00	...	...	...	-16.9000	...
1955.00	...	...	...	-22.3000	...
1956.00	0.634498E-02	0.416599E-02	0.215900E-02	-24.7000	-0.256882
1957.00	0.765798E-02	0.566098E-02	0.199700E-02	-6.00000	-1.27633
1958.00	0.997498E-02	0.799598E-02	0.198300E-02	-13.0000	-0.767615
1959.00	0.887096E-02	0.703198E-02	0.183900E-02	-4.90000	-1.61041
1960.00	0.114970E-01	0.931898E-02	0.217800E-02	-20.2000	-0.569158
1961.00	0.123770E-01	0.992098E-02	0.245600E-02	-28.2000	-0.438900
1962.00	0.186680E-01	0.150440E-01	0.362399E-02	-10.5000	-1.77790
1963.00	0.140550E-01	0.101890E-01	0.390599E-02	-9.50000	-1.48368
1964.00	0.123650E-01	0.866798E-02	0.361699E-02	-30.6000	-0.402124
1965.00	0.124310E-01	0.853698E-02	0.389399E-02	-28.2000	-0.440815
1966.00	0.129790E-01	0.915096E-02	0.382799E-02	-33.5000	-0.387433
1967.00	0.137570E-01	0.878598E-02	0.497099E-02	-66.6000	-0.206561
1968.00	0.187410E-01	0.126950E-01	0.604599E-02	-104.200	-0.179656
1969.00	0.209000E-01	0.141000E-01	0.679999E-02	-107.800	-0.193878
1970.00	0.232000E-01	0.161000E-01	0.709999E-02	-129.900	-0.178599
1971.00	0.329000E-01	0.246000E-01	0.809998E-02	-172.000	-0.191279
1972.00	0.382000E-01	0.274000E-01	0.108000E-01	-92.7000	-0.412082
1973.00	0.466999E-01	0.311000E-01	0.156000E-01	-20.3000	-2.30049
1974.00	0.943998E-01	0.775999E-01	0.166000E-01	6.60000	14.3030
1975.00	0.503999E-01	0.329000E-01	0.175000E-01	-252.300	-0.199762
1976.00	0.816999E-01	0.563999E-01	0.253000E-01	-37.1000	-2.20216
1977.00	0.117200	0.721999E-01	0.450000E-01	-377.500	-0.310464
1978.00	0.205000	0.108100	0.976999E-01	-742.300	-0.277247
1979.00	0.730500	0.573200	0.157300	-646.800	-1.12941
1980.00	0.408300	0.178100	0.230200	-616.200	-0.662610

YEAR	PACDP	PACFCF	PAEPDD	PAEXP	PADFI	PAUT	PACPI
1950.00	1.41000	...	...	0.333000E-01	0.110000E-01	0.410999	3.00000
1951.00	2.38000	...	...	0.318000E-01	0.731999	1.42200	4.20000
1952.00	4.39000	...	...	0.254000E-01	0.819998E-01	1.24700	9.20000
1953.00	7.88000	...	...	0.348000E-01	0.811999	1.55300	14.9000
1954.00	10.8400	...	...	0.348000E-01	0.515999	1.22800	19.1000
1955.00	14.3100	...	...	0.367000E-01	0.999998E-04	0.210000E-02	23.7000
1956.00	17.9300	...	0.308500E-02	0.368000E-01	0.190000E-02	0.230000E-02	28.7000
1957.00	23.0000	...	0.695598E-02	0.369000E-01	0.599999E-03	0.230000E-02	33.3000
1958.00	26.2300	...	0.511599E-02	0.334000E-01	0.489999E-03	0.210000E-02	35.4000
1959.00	29.4500	...	0.256000E-02	0.366000E-01	0.250000E-02	0.349999E-02	38.9000
1960.00	34.5200	...	0.523799E-02	0.365000E-01	0.280000E-02	0.399999E-02	42.1000
1961.00	39.7300	...	0.196500E-02	0.431000E-01	0.130000E-02	0.529999E-02	49.9000
1962.00	45.3900	5.24000	0.150500E-02	0.460000E-01	0.269999E-02	0.469999E-02	50.6000
1963.00	48.3700	4.94000	0.454899E-02	0.395000E-01	0.369999E-02	0.669999E-02	51.7000
1964.00	51.4500	5.64000	0.458499E-02	0.461999E-01	0.349999E-02	0.539999E-02	52.4000
1965.00	55.8900	7.99000	0.811498E-02	0.607999E-01	0.309999E-02	0.479999E-02	54.4000
1966.00	58.7600	9.09000	0.141290E-01	0.535999E-01	0.210000E-02	0.509999E-02	55.9000
1967.00	62.0800	10.0900	0.181340E-01	0.503999E-01	0.280000E-02	0.529999E-02	56.7000
1968.00	65.2200	10.0400	0.179350E-01	0.560000E-01	0.269999E-02	0.509999E-02	57.1000
1969.00	70.0900	10.8100	0.228000E-01	0.551999E-01	0.569999E-02	0.579999E-02	57.9000
1970.00	74.9200	10.8800	0.146000E-01	0.652999E-01	0.379999E-02	0.642500E-02	60.8000
1971.00	83.7400	11.8000	0.178000E-01	0.664999E-01	0.712113E-02	0.642500E-02	60.8000
1972.00	96.9000	13.2700	0.163000E-01	0.855998E-01	0.293141E-02	0.705709E-02	66.4000
1973.00	125.440	20.4100	0.199000E-01	0.128000	0.917936E-02	0.607999E-02	74.9000
1974.00	168.020	30.9000	0.247000E-01	0.173200	0.206853E-01	0.565299E-02	93.7000
1975.00	190.440	39.5400	0.418000E-01	0.168000	0.244043E-01	0.160267E-01	100.000
1976.00	214.070	48.7500	0.586999E-01	0.202000	0.220512E-01	0.727944E-02	104.500
1977.00	263.610	62.9200	0.109100	0.327100	0.217158E-01	0.385280E-02	114.200
1978.00	322.540	81.2600	0.125300	0.356100	0.246643E-01	0.851358E-02	126.500
1979.00	430.510	116.140	0.141200	0.384400	0.502587E-01	0.100776E-01	162.000

YEAR	PARGDP	PARGCF	PARPDD	PAREXP	PARDFI	PARUT	PAPDP
1950..00	33571.5	...	...	...	16.2674	607.808	1.40000
1951..00	39627.1	...	...	50.6299	967.652	1979.78	1.43000
1952..00	32683.2	...	...	41.4084	1046.776	1623.78	1.46000
1953..00	35257.3	...	...	32.5641	1041.03	1991.03	1.50000
1954..00	37004.2	...	...	43.5730	646.082	1537.59	1.53000
1955..00	38454.5	...	...	47.1313	0.121786	2.55751	1.57000
1956..00	38803.7	...	3.56162	42.4854	2.19354	2.65534	1.61000
1957..00	41112.6	...	7.42020	39.3625	0.640041	2.45369	1.68000
1958..00	44104.9	...	5.34252	34.8769	5.11696	2.19298	1.68000
1959..00	44273.2	...	2.63107	36.3827	2.56940	3.59716	1.75000
1950..00	46854.5	...	5.21453	36.3365	2.78746	5.13865	1.80000
1961..00	44233.0	...	1.90518	41.7879	1.26042	4.41833	1.85000
1962..00	48484.5	...	1.41491	37.9769	2.53819	6.11124	1.91000
1963..00	48983.8	5597.70	4.14925	36.0290	3.37487	4.04193	1.97000
1964..00	49841.2	5463.64	4.04064	40.7149	3.08446	4.75888	2.03000
1965..00	50610.4	7235.23	6.83339	51.1979	2.61042	4.07264	2.07000
1966..00	50729.0	7847.01	11.3382	43.0128	1.68520	4.06579	2.13000
1967..00	51402.1	8354.67	13.9111	38.6634	2.14796	3.71931	2.18000
1968..00	52394.9	8065.59	13.0796	36.4639	1.96905	4.10195	2.24000
1969..00	53579.1	8263.52	15.5874	37.7379	3.89685	3.73591	2.30000
1970..00	56259.0	8170.01	9.40419	42.0612	2.44766	5.13658	2.36000
1971..00	58360.4	8223.70	10.8523	40.5438	4.34163	4.05043	2.43000
1972..00	60055.1	8224.26	9.35540	49.1302	1.68248	3.10989	2.50000
1973..00	66099.7	10899.9	10.1790	65.4732	4.69533	2.43833	2.57000
1974..00	69773.2	12831.8	10.6551	74.7151	8.92327	6.04783	2.65000
1975..00	71864.3	14920.8	15.7736	70.9435	9.20919	2.56875	2.72000
1976..00	75313.3	17151.0	20.7339	71.3399	7.78779	1.24525	2.80000
1977..00	82439.9	19677.3	35.2618	103.545	7.01869	2.47553	2.89000
1978..00	88225.8	22227.4	36.4340	97.9030	7.17175	2.56666	2.97000
1979..00	89477.1	24138.5	35.9623		12.8004		

YEAR	PAI	PAH	PAIN	PABGS	PAADSR
1950.00	...	...	...	...	...
1951.00	...	...	...	8.00000	...
1952.00	...	...	...	-6.30000	...
1953.00	...	...	...	-5.30000	...
1954.00	...	...	...	-5.40000	...
1955.00	...	...	...	-2.60000	...
1956.00	0.198400E-C2	0.161400E-C2	0.369999E-C3	-7.50000	-0.264533
1957.00	0.212800E-C2	0.165700E-C2	0.470999E-C3	-9.60000	-0.221667
1958.00	0.244599E-C2	0.176500E-C2	0.660998E-C3	-16.2000	-0.150968
1959.00	0.368799E-C2	0.276500E-C2	0.902998E-C3	-5.70000	-0.647016
1960.00	0.272600E-C2	0.200000E-C2	0.725998E-C3	-13.2000	-0.206515
1961.00	0.330199E-C2	0.251000E-C2	0.791998E-C3	-13.2000	-0.250151
1962.00	0.306799E-C2	0.245100E-C2	0.616998E-C3	-9.40000	-0.326383
1963.00	0.354099E-C2	0.274200E-C2	0.796998E-C3	-11.5000	-0.307513
1964.00	0.368999E-C2	0.303100E-C2	0.856998E-C3	-11.4000	-0.341226
1965.00	0.443599E-C2	0.345899E-C2	0.976998E-C3	-13.5000	-0.328592
1966.00	0.350199E-C2	0.250800E-C2	0.993998E-C3	-22.6000	-0.154556
1967.00	0.449599E-C2	0.327099E-C2	0.122900E-C2	-29.8000	-0.151007
1968.00	0.644599E-C2	0.486698E-C2	0.155900E-C2	-36.3000	-0.177576
1969.00	0.719998E-C2	0.489999E-C2	0.230000E-C2	-38.0000	-0.189474
1970.00	0.969998E-C2	0.695999E-C2	0.290000E-C2	-21.6000	-0.458333
1971.00	0.129000E-C1	0.829998E-C2	0.459999E-C2	-30.0000	-0.430000
1972.00	0.136000E-C1	0.869998E-C2	0.469999E-C2	-11.6000	-1.15254
1973.00	0.158000E-C1	0.101000E-C1	0.569999E-C2	-21.7000	-0.728111
1974.00	0.167000E-C1	0.106000E-C1	0.609999E-C2	-56.5000	-0.295575
1975.00	0.217000E-C1	0.142000E-C1	0.749999E-C2	-86.1000	-0.252032
1976.00	0.198000E-C1	0.120000E-C1	0.779998E-C2	-72.8000	-0.271978
1977.00	0.266000E-C1	0.161000E-C1	0.105000E-C1	-60.0000	-0.443333
1978.00	0.361000E-C1	0.203000E-C1	0.158000E-C1	-118.600	-0.304385
1979.00	0.620699E-C1	0.360000E-C1	0.269000E-C1	-213.400	-0.294752

TABLE 76

COUNTRY DATA FOR PERU

YEAR	PEGDP	PEGFCF	PEEPDD	PEEXP	PEDFI	PEUT	PECFI
1950.00	15.9000	2.30000	...	...	-0.839999E-02	0.389999E-02	10.7000
1951.00	10.9000	3.60000	...	...	0.302000E-01	0.399999E-02	11.8000
1952.00	21.2000	4.40000	...	...	0.502999E-01	0.869999E-02	12.6000
1953.00	22.9000	5.30000	...	...	0.373999E-01	0.689999E-02	13.8000
1954.00	26.7000	4.50000	...	...	0.280999E-01	0.969999E-02	14.5000
1955.00	29.6000	5.50000	...	...	0.242000E-01	0.819999E-02	15.2000
1956.00	33.0000	7.70000	0.356860E-01	0.321000	0.489999E-01	0.135000E-01	16.0000
1957.00	36.1000	8.90000	3.219830E-01	0.332000	0.836998E-01	0.761000E-01	17.2000
1958.00	40.3000	9.20000	0.249400E-01	0.292000	0.943998E-01	0.179000E-01	18.2000
1959.00	47.4000	8.40000	3.270840E-01	0.323000	0.661999E-01	0.144000E-01	20.9000
1960.00	55.6000	9.50000	3.180810E-01	0.445000	0.182000E-01	0.649999E-02	22.7000
1961.00	63.9000	12.3000	0.279080E-01	0.510000	-0.999999E-04	0.839999E-02	24.1000
1962.00	73.4000	15.1000	3.854468E-01	0.556000	0.399999E-02	0.899999E-02	25.7000
1963.00	78.7000	15.1000	0.539529E-01	0.555000	0.170000E-01	0.120000E-01	27.2000
1964.00	96.7000	15.4000	0.834678E-01	0.685000	0.999999E-03	0.110000E-01	29.9000
1965.00	114.900	19.2000	0.167308	0.685000	0.379999E-01	0.170000E-01	34.7000
1966.00	136.800	22.6000	3.208915	0.789000	0.180000E-01	0.210000E-01	37.9000
1967.00	156.900	24.1000	3.171426	0.742000	-0.180000E-01	0.300000E-01	41.6000
1968.00	209.000	29.8000	0.267435	0.850000	-0.200000E-01	0.330000E-01	49.5000
1969.00	240.700	25.9000	0.246000E-01	0.881000	0.599999E-02	0.839999E-01	55.2000
1970.00	264.400	33.2000	0.419000E-01	1.03400	-0.699999E-01	0.411220E-01	59.0000
1971.00	294.700	37.8000	3.147700	0.890000	-0.581727E-01	0.412569E-01	63.2000
1972.00	359.200	45.5000	0.101000	0.945000	0.238856E-01	0.453000E-01	69.2000
1973.00	447.500	68.1000	3.671700	1.11200	0.703354E-01	0.517144E-01	80.9000
1974.00	555.600	96.8000	3.706999E-01	1.50600	0.577266E-01	0.534224E-01	100.000
1975.00	769.000	127.800	1.10640	1.29100	0.315678	0.623438E-01	133.500
1976.00	1052.10	153.500	0.889700	1.36000	0.169714	0.537057E-01	184.300
1977.00	1670.90	234.500	1.29810	1.72600	0.537057E-01	0.595433E-01	290.900
1978.00	3056.30	434.400	0.841400	1.94100	0.250399E-01	0.600959E-01	484.900
1979.00	4955.30	821.200	1.10830	3.47500	0.697678E-01	0.125324	772.000
1980.00			1.23070	...	...	...	

YEAR	PERGDP	PERFCCF	PEREPND	PEREXP	PERDFI	PERUT	PEPOP
1950.00	19374.0	2902.52	...	...	-2.21346	1.05274	7.67000
1951.00	20769.0	3757.21	...	...	7.03065	0.93121	8.12000
1952.00	20345.1	4222.57	...	...	11.5632	1.97999	8.27000
1953.00	19684.7	4555.85	...	...	8.53179	1.57405	8.43000
1954.00	21411.4	3608.67	...	...	6.25946	2.16074	8.60000
1955.00	22154.4	4116.52	...	...	5.26411	1.78371	8.79000
1956.00	22916.7	5347.23	...	...	10.1198	2.78810	9.00000
1957.00	22739.3	5606.09	4.26826	64.4618	16.2513	5.06762	9.23000
1958.00	23357.5	5332.23	4.61544	54.0381	17.4698	3.31260	9.48000
1959.00	23261.0	4122.20	4.88198	58.2218	11.9328	2.59565	9.75000
1960.00	24444.5	4176.67	3.14371	77.3715	3.16440	1.13014	10.0200
1961.00	25692.4	4945.49	4.71949	86.2455	-0.169109E-01	1.42051	10.3200
1962.00	26867.7	5527.27	13.9796	90.9650	0.654424	1.47245	10.6300
1963.00	26399.5	5065.21	8.57616	88.2208	2.70225	1.90747	10.9600
1964.00	28620.5	4557.97	12.8239	105.242	0.153638	1.67002	11.3000
1965.00	28427.7	4749.48	24.5491	100.510	5.57573	2.99440	11.6500
1966.00	30054.1	4965.09	28.8955	109.128	2.48962	2.90456	12.0100
1967.00	30638.8	4569.46	22.7545	98.4906	-2.38926	3.98209	12.3100
1968.00	29625.4	3942.69	33.5576	106.658	-2.50959	4.76822	12.6700
1969.00	30447.4	3773.15	2.88677	103.384	0.704089	3.87249	13.0500
1970.00	32420.2	4013.80	4.61518	113.492	-7.71031	9.25237	13.4500
1971.00	32403.2	4068.78	15.3665	92.5941	-6.05219	4.27827	13.8300
1972.00	32745.6	4200.15	9.89219	92.5556	2.33941	4.04080	14.2400
1973.00	35486.2	4494.29	58.7117	97.1972	6.14785	3.95963	14.6300
1974.00	36778.8	5596.95	5.21153	111.012	4.25521	3.81197	15.0400
1975.00	35914.7	6257.28	71.5190	83.4518	20.4058	3.45330	15.4700
1976.00	36205.6	6017.00	53.7184	82.1142	10.2470	3.76420	15.9100
1977.00	34893.7	5090.97	71.8063	95.4763	2.97082	3.29373	16.3600
1978.00	34149.3	4792.63	42.0369	96.9736	1.25101	3.00243	16.8200
1979.00	36444.4	5181.36	48.4785	152.030	3.05232	5.48286	17.2900
1980.00	36101.2	5982.75	46.2381	...	...	...	17.7800

YEAR	PEAI	PEAH	PEIN	PEBG	PEASK
1950.00	...	...	...	...	...
1951.00	...	...	...	...	...
1952.00	...	...	...	...	...
1953.00	...	...	...	...	...
1954.00	...	...	...	...	...
1955.00	...	...	...	...	...
1956.00	0.287640E-01	0.240690E-01	0.469499E-02	-100.000	-0.287640
1957.00	0.279550E-01	0.22820E-01	0.507299E-02	-156.000	-0.179199
1958.00	0.273390E-01	0.219610E-01	0.537799E-02	-117.000	-0.233667
1959.00	0.269210E-01	0.226470E-01	0.607399E-02	-39.0000	-0.741564
1960.00	0.519489E-01	0.450239E-01	0.692498E-02	2.00000	25.9745
1961.00	0.383889E-01	0.319310E-01	0.645798E-02	-16.0000	-2.39931
1962.00	0.297164E-01	0.26060E-01	0.691098E-02	46.0000	0.863413
1963.00	0.398559E-01	0.332110E-01	0.664498E-02	-93.0000	-0.428559
1964.00	0.419509E-01	0.331990E-01	0.875198E-02	5.00000	8.39020
1965.00	0.529489E-01	0.303250E-01	0.146240E-01	-164.000	-0.322860
1966.00	0.8E3508E-01	0.247918E-01	0.195590E-01	-253.000	-0.349213
1967.00	0.938124E-01	0.6E518E-01	0.309610E-01	-311.000	-0.301649
1968.00	0.214636	0.171835	0.428030E-01	-59.0000	-3.63793
1969.00	0.124400	0.776999E-01	0.466999E-01	-29.0000	-4.28966
1970.00	0.168000	0.122100	0.458999E-01	120.000	1.40000
1971.00	0.170000	0.115600	0.503999E-01	-72.0000	-2.36111
1972.00	0.182400	0.130400	0.519999E-01	-71.0000	-2.56902
1973.00	0.399000	0.305500	0.934999E-01	-305.000	-1.30820
1974.00	0.431500	0.318700	0.113200	-773.000	-0.558733
1975.00	0.440600	0.253700	0.186900	-1590.00	-0.277107
1976.00	0.455000	0.256000	0.199000	-1251.00	-0.363709
1977.00	0.653400	0.404900	0.248500	-976.000	-0.669468
1978.00	0.752600	0.432700	0.319900	-249.000	-3.02249
1979.00	0.923100	0.483000	0.440100	496.000	1.86109
1980.00	1.506020	0.953500	0.546700	...	...

TABLE 77

COUNTRY DATA FOR URUGUAY

YFAP	URGDP	URGCF	UREPDD	UREXP	URUT	URCPI
1950.00	...	...	...	...	0.600000	...
1951.00	...	...	...	...	0.400000	0.400000E-01
1952.00	...	...	...	...	0.400000	0.500000E-01
1953.00	...	...	...	...	0.300000	0.500000E-01
1954.00	...	...	...	...	0.400000	0.599999E-01
1955.00	5.00000	1.00000	...	...	0.400000	0.699999E-01
1956.00	5.00000	1.00000	5.83700	...	2.00000	0.699999E-01
1957.00	6.00000	1.00000	7.59000	...	2.20000	0.899999E-01
1958.00	7.00000	1.00000	7.74500	...	1.40000	0.100000E 00
1959.00	9.00000	1.00000	7.71600	108.300	4.10000	0.140000
1960.00	14.0000	2.00000	2.03700	129.400	2.00000	0.190000
1961.00	17.0000	3.00000	4.93700	174.700	5.40000	0.230000
1962.00	19.0000	3.00000	15.2800	153.500	5.40000	0.260000
1963.00	22.0000	3.00000	15.3820	166.200	5.20000	0.310000
1964.00	33.0000	3.00000	79.5400	183.600	6.60000	0.450000
1965.00	53.0000	6.00000	36.2160	196.300	4.30000	0.700000
1966.00	100.000	11.0000	35.0820	190.300	10.3000	1.20000
1967.00	170.000	23.0000	47.2160	159.800	13.2000	2.23000
1968.00	375.000	38.0000	95.6430	179.300	7.50000	5.13000
1969.00	506.000	56.0000	74.3000	199.200	9.40000	6.21000
1970.00	612.000	69.0000	36.6000	224.100	11.1000	7.22000
1971.00	736.000	83.0000	62.0000	196.800	9.82919	8.95000
1972.00	1239.00	121.000	122.100	281.600	12.2685	15.7900
1973.00	2538.00	229.000	83.6000	327.600	19.9085	31.1200
1974.00	4604.00	464.000	289.400	381.400	22.2488	55.1300
1975.00	8369.00	1059.00	284.600	384.900	10.8059	100.000
1976.00	13027.0	1683.00	224.100	565.000	11.4297	150.650
1977.00	19915.0	3030.00	225.700	611.500	8.40613	238.320
1978.00	30580.0	4852.00	416.000	686.100	8.88919	344.470
1979.00	55129.0	9487.00	169.100	788.100	9.17319	574.720
1980.00	90357.0	16244.0	244.400	...	...	939.580

YEAR	URRGDP	URRGFCF	URRE PDD	URREXP	URRUT	URPOP
1950.00	...	...	...	...	0.567231	2.19000
1951.00	...	...	...	...	0.339078	2.27000
1952.00	...	...	...	...	0.336485	2.26000
1953.00	...	...	...	...	0.250836	2.30000
1954.00	...	...	...	...	0.328877	2.33000
1955.00	3026.64	605.328	...	...	0.324076	2.36000
1956.00	2076.10	595.239	4.52060	...	1.54895	2.40000
1957.00	2743.49	457.248	5.59759	...	1.62249	2.43000
1958.00	2845.53	406.504	5.52346	...	0.998431	2.46000
1959.00	2871.43	295.714	5.42425	76.1336	2.88225	2.50000
1960.00	2900.95	414.422	1.39716	88.7542	1.37178	2.54000
1961.00	2864.85	505.561	3.33956	118.173	3.65275	2.58000
1962.00	2799.80	442.087	10.1816	102.282	3.59820	2.61000
1963.00	2678.03	365.186	10.1124	109.263	3.41858	2.65000
1964.00	2736.32	248.756	51.5262	118.937	4.27550	2.68000
1965.00	2793.80	316.299	22.8442	123.821	2.71234	2.71000
1966.00	3030.30	333.333	21.1912	114.950	6.22168	2.75000
1967.00	2771.80	375.008	28.6804	97.0673	8.01808	2.69000
1968.00	2707.39	274.348	56.3169	105.576	4.41618	2.70000
1969.00	3006.70	332.757	41.9852	112.566	5.31185	2.71000
1970.00	3104.93	350.065	19.8616	121.612	6.02361	2.73000
1971.00	3001.26	338.458	32.5579	103.345	5.16158	2.74000
1972.00	2853.36	278.657	61.9247	142.817	6.22214	2.75000
1973.00	2954.90	266.616	38.7338	151.785	9.22408	2.76000
1974.00	3014.86	303.844	115.828	152.649	8.90472	2.77000
1975.00	2957.24	374.205	100.565	136.007	3.81834	2.83000
1976.00	3044.79	393.366	75.8006	191.108	3.86604	2.84000
1977.00	2921.87	444.545	71.4173	193.494	2.65991	2.86000
1978.00	3093.18	490.781	121.805	200.890	2.60275	2.87000
1979.00	3330.67	573.286	44.4140	206.994	2.40933	2.88000
1980.00	3316.12	596.158	56.2965	...	...	2.90000

YEAR	URAI	URAM	URIN	URBS	URASR
1950.00	...	...	...	...	...
1951.00	...	...	...	...	...
1952.00	...	...	...	...	...
1953.00	...	...	...	...	...
1954.00	...	...	...	...	...
1955.00	...	...	...	...	...
1956.00	11.4570	7.13800	4.35900	...	...
1957.00	10.9430	6.64200	4.30100	...	...
1958.00	11.4050	6.78900	4.61600	...	...
1959.00	11.1290	6.66100	4.44800	-49.7000	-0.223924
1960.00	10.1860	5.73700	4.42900	-75.2000	-0.135452
1961.00	10.5370	6.13200	4.40500	-22.7000	-0.464185
1962.00	10.9440	6.57800	4.36600	-72.0000	-0.152000
1963.00	12.6670	8.22500	4.44200	-4.10000	-3.08951
1964.00	13.8510	9.10900	4.74200	-6.30000	-2.19857
1965.00	16.9770	11.8220	5.15500	68.8000	0.246759
1966.00	30.5160	21.9270	8.56900	49.6000	0.615241
1967.00	41.8760	32.3970	9.47900	-16.2000	-2.58494
1968.00	48.5680	38.5200	10.0680	16.3000	-2.98086
1969.00	51.7000	36.6000	14.9000	-27.2000	-1.90073
1970.00	62.7000	47.6000	15.7000	-54.4000	-1.15257
1971.00	57.0000	41.5000	15.5000	-71.8000	-0.793872
1972.00	107.100	88.4000	18.7000	47.5000	2.25474
1973.00	94.3000	72.7000	21.6000	18.2000	5.18132
1974.00	156.100	125.200	30.9000	-135.000	-1.15630
1975.00	228.500	182.200	46.3000	-196.200	-1.16463
1976.00	206.000	148.600	57.4000	-81.4000	-2.53071
1977.00	245.000	167.200	57.8000	-106.600	-1.46882
1978.00	426.500	366.000	60.5000	-133.800	-3.18759
1979.00	123.300	54.8000	69.0000	-323.800	-0.362335
1980.00	186.500	90.6000	98.5000	...	...

TABLE 78

COUNTRY DATA FOR VENEZUELA

YEAR	VE GDP	VEGCF	VEEPD	VEEXP	VEDFI	VEFIT	VECFI
1950.00	11.8300	2.76000	...	...	0.165000E-01	0.00	57.4000
1951.00	13.0100	3.16000	...	...	-0.999998E-04	0.200000E-03	61.5000
1952.00	13.9800	4.01000	...	...	0.155000	0.999999E-04	62.2000
1953.00	14.8100	4.28000	...	...	0.169200	0.999999E-04	61.3000
1954.00	16.3800	4.99000	...	...	0.437999E-01	0.200000E-03	61.4000
1955.00	17.8900	4.41000	...	...	-0.409999E-02	0.200000E-03	61.2000
1956.00	20.4000	5.10000	0.409999E-02	2.22100	0.591999	0.999999E-04	61.7000
1957.00	23.8500	5.95000	0.182308	2.76400	0.981098	0.200000E-03	60.5000
1958.00	24.8500	5.96000	0.121580E-01	2.50800	0.792999E-01	0.999999E-04	63.3000
1959.00	25.5600	6.06000	0.219200E-01	2.32600	0.530999E-01	0.999999E-04	66.5000
1960.00	25.6700	4.80000	0.165353	2.38400	-0.126000	0.999999E-04	68.8000
1961.00	27.0000	4.29000	0.929938E-01	2.45300	-0.250000E-01	0.0	67.0000
1962.00	29.5200	4.63000	0.628419E-01	2.59400	-0.241000	0.300000E-02	66.7000
1963.00	32.1900	5.00000	0.416819E-01	2.46400	-0.839999E-01	0.699999E-02	67.4000
1964.00	35.6400	6.27000	0.445919E-01	2.48000	-0.240000E-01	0.799999E-02	68.9000
1965.00	37.9200	6.97000	0.101476	2.48200	-0.120000E-01	0.599999E-02	70.0000
1966.00	39.5200	7.43000	0.950798E-01	2.40400	-0.489999E-01	0.399999E-02	71.3000
1967.00	41.6200	7.93000	0.771898E-01	2.49500	-0.399999E-02	0.300000E-02	71.3000
1968.00	44.9800	10.4500	0.105801	2.46800	0.184000	0.200000E-02	72.2000
1969.00	46.9200	11.0700	0.164800	2.40900	0.224000	0.200000E-02	73.9000
1970.00	51.4400	11.3200	0.224400	2.60200	-0.230000E-01	0.200000E-02	75.8000
1971.00	57.0900	13.2300	0.355400	3.12100	-0.211628	0.200595E-02	78.3000
1972.00	63.1100	15.7800	0.542700	3.15300	0.375655	0.217141E-02	80.5000
1973.00	76.1000	18.6200	0.285000	4.70500	-0.846409E-01	0.238495E-02	83.8000
1974.00	112.510	20.9800	0.179800	11.0930	-0.429341	0.240527E-02	90.8000
1975.00	118.280	30.6000	0.229700	8.85400	0.417666	0.262829E-02	100.000
1976.00	132.500	42.6500	1.05360	9.31400	-0.888977	0.270903E-02	107.700
1977.00	155.880	60.4800	2.02920	9.56900	-0.350255E-02	0.116752E-02	116.000
1978.00	170.960	71.0100	2.67850	9.08600	-0.676078E-01	0.125200E-02	124.300
1979.00	210.220	67.6600	3.84390	14.1990	0.878558E-01	0.129200E-02	139.600

YEAR	VERGCP	VERGCF	VEREPD	VEREXP	VERDF1	VERUT	VERPOP
1950.00	4155.29	969.429	...	...	6.88739	0.00	4.96000
1951.00	4091.73	993.853	...	...	-0.365640E-01	0.731280E-01	5.17000
1952.00	4169.93	1176.10	...	...	54.6710	0.352716E-01	5.39000
1953.00	4298.91	1242.36	...	...	57.8976	0.342718E-01	5.62000
1954.00	4560.26	1389.24	...	...	14.3433	0.658943E-01	5.85000
1955.00	4800.00	1183.23	...	...	-1.28725	0.627930E-01	6.09000
1956.00	5223.26	1305.82	...	...	173.834	0.293639E-01	6.33000
1957.00	6002.23	1496.91	1.20245	652.174	267.617	0.545545E-01	6.57000
1958.00	5747.00	1378.55	3.12296	753.944	20.3694	0.256865E-01	6.83000
1959.00	5421.17	1285.30	5.43353	644.217	13.1624	0.247880E-01	7.03000
1960.00	5076.34	949.218	39.1934	576.569	-29.8656	0.247880E-01	7.35000
1961.00	5295.47	841.392	21.3148	565.077	-5.73325	0.237029E-01	7.61000
1962.00	5630.77	843.147	13.9046	562.947	-5.33245	0.0	7.86000
1963.00	5881.73	913.597	8.94295	528.656	-18.0223	0.663790	8.12000
1964.00	6158.00	1083.35	9.21627	512.567	-4.96032	1.50186	8.40000
1965.00	6219.46	1143.19	19.9154	487.112	-2.35509	1.17754	8.71000
1966.00	6138.13	1156.02	17.4906	442.232	-9.01388	0.735827	9.03000
1967.00	6269.94	1194.63	13.5475	437.895	-0.702035	0.526526	9.31000
1968.00	6476.01	1504.54	17.4849	407.868	30.4083	0.330525	9.62000
1969.00	6319.39	1507.01	25.3897	371.140	34.5103	0.308127	9.94000
1970.00	6601.45	1452.73	32.3390	374.982	-3.31460	0.288226	10.2800
1971.00	6872.01	1592.51	48.1967	423.247	28.6995	0.272033	10.6100
1972.00	7166.14	1791.82	69.1869	401.965	-47.8909	0.276826	10.9400
1973.00	8050.67	1967.82	32.3094	533.389	-9.59544	0.270294	11.2800
1974.00	10654.3	1986.74	17.1397	1057.46	-40.9277	0.229287	11.6300
1975.00	9864.89	2552.13	19.1576	738.449	34.8345	0.202527	11.9900
1976.00	9053.64	3203.95	81.8854	723.882	-69.0911	0.179457	12.3600
1977.00	10547.8	4092.46	144.143	679.728	-0.248801	0.427338E-01	12.7400
1978.00	10483.1	4354.27	171.558	581.959	4.33029	0.801905E-01	13.1200
1979.00	11138.1	3584.85	215.062	794.420	4.91544	0.722860E-01	13.5200

YEAR	VEAI	VEAM	VEIN	VERGS	VEADSR
1950.00	...	...	...	...	...
1951.00	...	...	...	...	...
1952.00	...	...	...	...	...
1953.00	...	...	...	...	...
1954.00	...	...	...	...	...
1955.00	...	...	...	...	...
1956.00	C.130490E-C1	0.117650E-01	0.128400E-02	-45.0000	-0.269978
1957.00	C.863197E-C2	0.762798E-02	0.100400E-C2	-505.000	-0.170930E-C1
1958.00	0.366440E-01	0.379000E-01	0.743998E-03	-46.0000	-0.840087
1959.00	0.472499E-01	0.463399E-01	0.909998E-C3	-77.0000	-0.613037
1960.00	0.694788E-C1	0.685368E-01	0.941998E-C3	482.000	0.144147
1961.00	0.110735	0.933348E-01	0.174000E-C1	557.000	0.198606
1962.00	0.124001	0.112570	0.115110E-01	462.000	0.268574
1963.00	0.865368E-C1	0.761008E-01	0.104380E-01	555.000	0.155926
1964.00	0.743567E-01	0.644808E-01	0.987598E-02	276.000	0.269409
1965.00	0.422059E-01	0.335040E-01	0.870194E-C2	105.000	0.401962
1966.00	0.640589E-C1	0.540319E-01	0.100670E-01	107.000	0.599056
1967.00	0.486149E-C1	0.358450E-01	0.127700E-01	244.000	0.199242
1968.00	0.496529E-C1	0.360360E-C1	0.135570E-C1	-114.000	-0.435553
1969.00	0.507999E-C1	0.294000E-01	0.214000E-01	-123.000	-0.413008
1970.00	0.821599E-C1	0.410000E-01	0.404000E-C1	-12.0000	-6.85000
1971.00	0.126000	0.790999E-01	0.470999E-C1	70.0000	1.61143
1972.00	0.213100	0.140700	0.643998E-C1	-6.00000	-35.5167
1973.00	0.308400	0.705900	0.102500	972.000	0.317284
1974.00	0.505700	0.383700	0.122000	6004.00	0.842272E-C1
1975.00	0.539300	0.435800	0.103500	2344.00	0.230077
1976.00	0.406600	0.280000	0.101600	488.000	0.833197
1977.00	0.827000	0.604600	0.222600	-2898.00	-0.285439
1978.00	0.749000	0.350300	0.393300	-5329.00	-0.140064
1979.00	1.54050	0.885800	0.656700	119.000	13.0126

TABLE 79
UNITED STATES FINISHED GOODS INDEX

YEAR	USFGI
1950.00	48.3000
1951.00	52.9000
1952.00	52.6000
1953.00	52.0000
1954.00	52.2000
1955.00	52.3000
1956.00	53.8000
1957.00	55.8000
1958.00	57.0000
1959.00	56.9000
1960.00	57.4000
1961.00	57.3000
1962.00	57.5000
1963.00	57.4000
1964.00	57.6000
1965.00	58.5000
1966.00	60.2000
1967.00	61.2000
1968.00	62.9000
1969.00	65.3000
1970.00	67.5000
1971.00	69.5000
1972.00	71.7000
1973.00	78.2000
1974.00	90.2000
1975.00	100.000
1976.00	104.100
1977.00	110.500
1978.00	119.000
1979.00	132.200
1980.00	149.700

A.1 SOURCES OF THE STATISTICAL APPENDIX

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Appendix B
GRANGER'S TESTS OF CAUSALITY

TABLE 80

GRANGER'S TESTS OF CAUSALITY BETWEEN EPDD AND GDP

Country	F.EPDD.GDP.	F.GDP.EPDD.	d.f.	Sample Period	(N)
Chile	3.54***	.69	2,7	1968-1980	(13)
	1.49	.17	3,4	1969-1980	(12)
Colombia	.35a,b	.70	2,17	1958-1980	(23)
	2.22b	1.94	3,14	1959-1980	(22)
	3.07***	2.01	4,11	1960-1980	(21)
	2.97***	2.23c	5,8	1961-1980	(20)
	1.55	1.75	6,5	1962-1980	(19)
	.47	1.98	7,2	1963-1980	(18)
Ecuador	.57	3.02***	2,17	1958-1980	(23)
	.84	4.18**	3,14	1959-1980	(22)
	.85	3.07***	4,11	1960-1980	(21)
	.82	2.22	5,8	1961-1980	(20)
	3.98d***	1.53	6,5	1962-1980	(19)
	3.18e	2.03	7,2	1963-1980	(18)
Paraguay	.86	.00	2,16	1958-1979	(22)
	2.49e	.49	3,13	1959-1979	(21)
	1.86e	.08f	4,10	1960-1979	(20)
	6.28**	2.03	5,7	1961-1979	(19)
	2.95	4.57g***	6,4	1962-1979	(18)
Peru	.14	4.08**	2,17	1958-1980	(23)
	3.63**	2.86***	3,14	1959-1980	(22)
	1.56	1.75	4,11	1960-1980	(21)
	.96	.89	5,8	1961-1980	(20)
	1.25	1.03	6,5	1962-1980	(19)
	1.39d	.45	7,2	1963-1980	(18)
Uruguay	1.11	.16	2,17	1958-1980	(23)
	1.41	.14	3,14	1959-1980	(22)
	1.56	.96	4,11	1960-1980	(21)
	2.10	4.58**	5,8	1961-1980	(20)
	1.37	3.17c	6,5	1962-1980	(19)
	2.10d	13.15d***	7,2	1963-1980	(18)
Venezuela	1.12	7.60*	2,16	1958-1979	(22)
	.87	5.93*	3,13	1959-1979	(21)
	3.47***	1.56	4,10	1960-1979	(20)
	4.81**	2.25e	5,7	1961-1979	(19)
	4.93***	1.42e	6,4	1962-1979	(18)

Table should be read as follows F.EPDD.GDP. is the F-statistic for the test of unidirectional causality from EPDD to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 7th order in the unrestrained equation.

bSignificant negative spike of the 7th order in the restrained equation.

cSignificant negative spike of the 3rd order in the unrestrained equation.

dSignificant negative spike of the 1st order in the unrestrained equation.

eSignificant negative spike of the 2nd order in the unrestrained equation.

fSignificant positive spike of the 4th order in the unrestrained and restrained equations.

gSignificant negative spike of the 3rd order in the restrained equation.

TABLE 81

GRANGER'S TESTS OF CAUSALITY BETWEEN EPDD AND GFCF

Country	F.EPDD.GFCF.	F.GFCF.EPDD.	d.f.	Sample Period	(N)
Chile	1.13	1.24	2,7	1968-1980	(13)
	3.25	.64	3,4	1969-1980	(12)
Colombia	.24a,b	.06	2,17	1958-1980	(23)
	.92a	.10	3,14	1959-1980	(22)
	1.15	.43	4,11	1960-1980	(21)
	.62	.31c	5,8	1961-1980	(20)
	.38	.29c	6,5	1962-1980	(19)
	.53	.49	7,2	1963-1980	(18)
Ecuador	1.46d	7.29*	2,17	1958-1980	(23)
	3.21***	4.53**	3,14	1959-1980	(22)
	2.86***	4.56**	4,11	1960-1980	(21)
	1.75	2.63	5,8	1961-1980	(20)
	1.13	2.25	6,5	1962-1980	(19)
	1.17	14.48***	7,2	1963-1980	(18)
Paraguay	2.44	6.63*	2,10	1964-1979	(16)
	11.78*	3.05	3,7	1965-1979	(15)
	3.30	2.49	4,4	1966-1979	(14)
Peru	1.10	.79	2,17	1958-1980	(23)
	3.42**	.44	3,14	1959-1980	(22)
	2.37	.47	4,11	1960-1980	(21)
	3.69***	.45c	5,8	1961-1980	(20)
	3.81***	.26c	6,5	1962-1980	(19)
	6.77e	2.65e	7,2	1963-1980	(18)
Uruguay	.23	.32	2,17	1958-1980	(23)
	.43	.46	3,14	1959-1980	(22)
	.28	2.37	4,11	1960-1980	(21)
	.29	1.56	5,8	1961-1980	(20)
	.55e	1.61	6,5	1962-1980	(19)
	.22f	3.70e	7,2	1963-1980	(18)
Venezuela	.19	1.30	2,16	1958-1979	(22)
	2.91***	9.12*	3,13	1959-1979	(21)
	1.49	2.56c	4,10	1960-1979	(20)
	1.19	1.29	5,7	1961-1979	(19)
	.60	6.22e**	6,4	1962-1979	(18)

Table should be read as follows: F.EPDD.GFCF. is the F-statistic for the test of unidirectional causality from EPDD to GFCF, etc.

*Significant at 1% level.
**Significant at 5% level.
***Significant at 10% level.
aSignificant negative spike of the 5th order in the unrestrained equation.
bSignificant negative spike of the 5th order in the restrained equation.
cSignificant negative spike of the 3rd order in the unrestrained equation.
dSignificant negative spike of the 2nd order in the unrestrained equation.
eSignificant negative spike of the 1st order in the unrestrained equation.
fSignificant negative spike of the 4th order in the restrained equation.

TABLE 82

GRANGER'S TESTS OF CAUSALITY BETWEEN ADSR AND GDP

Country	F.ADSR.GDP.	F.GDP.ADSR.	d.f.	Sample Period	(N)
Chile	.12	4.71***	2,7	1968-1980	(13)
	.76	4.97***	3,4	1969-1980	(12)
Colombia	1.63a	.90	2,17	1958-1980	(23)
	.90	.56	3,14	1959-1980	(22)
	4.56**	.52	4,11	1960-1980	(21)
	5.92b**	1.09	5,8	1961-1980	(20)
	7.00c**	3.46***	6,5	1962-1980	(19)
	7.33b	4.57	7,2	1963-1980	(18)
Ecuador	4.57**	7.56*	2,17	1958-1980	(23)
	2.70***	7.28*	3,14	1959-1980	(22)
	4.65**	6.24*	4,11	1960-1980	(21)
	4.77**	9.07*	5,8	1961-1980	(20)
	2.54	5.79**	6,5	1962-1980	(19)
	.95	16.72d***	7,2	1963-1980	(18)
Paraguay	5.12**	.53	2,16	1958-1979	(22)
	4.77**	.86	3,13	1959-1979	(21)
	4.96**	.71	4,10	1960-1979	(20)
	3.85***	.69	5,7	1961-1979	(19)
	2.16	1.16	6,4	1962-1979	(18)
Peru	.31	.64	2,16	1958-1979	(22)
	.36	.40	3,13	1959-1979	(21)
	1.44	.41	4,10	1960-1979	(20)
	1.26	.96	5,7	1961-1979	(19)
	3.76	1.26	6,4	1962-1979	(18)
Uruguay	.66	.84	2,13	1961-1979	(19)
	.62	1.11	3,10	1962-1979	(18)
	.37	.79	4,7	1963-1979	(17)
	.57	.61	5,4	1964-1979	(16)
Venezuela	29.60*	1.73	2,16	1958-1979	(22)
	22.30*	1.15	3,13	1959-1979	(21)
	14.06*	1.13	4,10	1960-1979	(20)
	53.55d*	3.15***	5,7	1961-1979	(19)
	71.33*	1.75	6,4	1962-1979	(18)

Table should be read as follows: F.ADSR.GDP is the F-statistic for the test of unidirectional causality from ADSR to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.
***Significant at 10% level.
aSignificant negative spike of the 7th order in the restrained equation.
bSignificant negative spike of the 2nd order in the unrestrained equation.
cSignificant negative spike of the 8th order in the unrestrained equation.
dSignificant negative spike of the 1st order in the unrestrained equation.

TABLE 83

GRANGER'S TESTS OF CAUSALITY BETWEEN ADSR AND GFCF

Country	F.ALSR.GFCF.	F.GFCF.ADSR.	d.f.	Sample Period (N)	
Chile	1.40	1.91	2,7	1968-1980	(13)
	.61	.90	3,4	1969-1980	(12)
Colombia	4.86a**	.00	2,17	1958-1980	(23)
	4.25**	.32	3,14	1959-1980	(22)
	3.65**	.15	4,11	1960-1980	(21)
	5.36***	.16	5,8	1961-1980	(20)
	1.91	.16	6,5	1962-1980	(19)
	1.13	.24	7,2	1963-1980	(18)
Ecuador	.97	1.51	2,17	1958-1980	(23)
	2.90***	8.02*	3,14	1959-1980	(22)
	2.66***	14.90*	4,11	1960-1980	(21)
	1.75	12.52*	5,8	1961-1980	(20)
	1.16	111.78b*	6,5	1962-1980	(19)
	14.16	538.19b***	7,2	1963-1980	(18)
Paraguay	3.05***	2.90c	2,10	1964-1979	(16)
	3.52***	1.78	3,7	1965-1979	(15)
	4.33d***	.99	4,4	1966-1979	(14)
Peru	2.21	1.49	2,16	1958-1979	(22)
	.54	.64	3,13	1959-1979	(21)
	.54	2.05e	4,10	1960-1979	(20)
	3.45b***	1.06	5,7	1961-1979	(19)
	12.15c**	.53	6,4	1962-1979	(16)
Uruguay	.50f	.62	2,13	1961-1979	(19)
	.28	.46	3,10	1962-1979	(16)
	.37	1.51	4,7	1963-1979	(17)
	.29	1.04	5,4	1964-1979	(16)
Venezuela	.69	1.50	2,16	1958-1979	(22)
	1.76g	1.07	3,13	1959-1979	(21)
	1.33g	1.98	4,10	1960-1979	(20)
	4.30b**	2.52	5,7	1961-1979	(19)
	10.06**	1.92	6,4	1962-1979	(16)

Table should be read as follows: F.ADSR.GFCF. is the F-statistic for the test of unidirectional causality from ADSR to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

- aSignificant negative spike of the 5th order in the restrained equation.
- bSignificant negative spike of the 1st order in the unrestrained equation.
- cSignificant negative spike of the 3rd order in the unrestrained equation.
- dSignificant negative spike of the 2nd order in the unrestrained equation.
- eSignificant positive spike of the 1st order in the unrestrained equation.
- fSignificant positive spike of the 4th order and negative spike of the 7th order in the unrestrained and restrained equation respectively.
- gSignificant negative spike of the 8th order in the unrestrained equation.

TABLE 84

GRANGER'S TESTS OF CAUSALITY BETWEEN EXP AND GDP

Country	F.EXP.GDP.	F.GDP.EXP.	d.f.	Sample Period	(N)
Argentina	.04	5.81**	2,20	1953-1978	(26)
	1.80	.41	3,17	1954-1978	(25)
	.70	.54	4,14	1955-1978	(24)
	1.03a	.77	5,11	1956-1978	(23)
	2.14	.79	6,8	1957-1978	(22)
	1.51	.44	7,5	1958-1978	(21)
	.52	.37	8,2	1959-1978	(20)
Bolivia	.46	3.16***	2,22	1953-1980	(28)
	.36b,c	1.34	3,19	1954-1980	(27)
	.51b,c	.86	4,16	1955-1980	(26)
	.36d	.50	5,13	1956-1980	(25)
	3.02e,f***	.34	6,10	1957-1980	(24)
	3.21g***	.59	7,7	1958-1980	(23)
	2.75d	1.46d	8,4	1959-1980	(22)
Brazil	4.11**	.28	2,14	1960-1979	(20)
	2.90***	.39	3,11	1961-1979	(19)
	2.68	.87	4,8	1962-1979	(18)
	3.34	.40	5,5	1963-1979	(17)
	5.00h	4.66h	6,2	1964-1979	(16)
Chile	2.96	3.55***	2,7	1968-1980	(13)
	3.56	2.99	3,4	1969-1980	(12)
Colombia	.78f	10.30f*	2,17	1958-1980	(23)
	.63f	5.55**	3,14	1959-1980	(22)
	1.03	4.49**	4,11	1960-1980	(21)
	.81b	3.82**	5,8	1961-1980	(20)
	.69	4.37i***	6,5	1962-1980	(19)
	2.10i	1.93i	7,2	1963-1980	(18)
Ecuador	.12	.96	2,22	1953-1980	(28)
	1.42	2.28	3,19	1954-1980	(27)
	1.93	2.78***	4,16	1955-1980	(26)
	1.47	1.90	5,13	1956-1980	(25)
	.83	1.60	6,10	1957-1980	(24)
	.73	1.93	7,7	1958-1980	(23)
	1.15d	2.16d	8,4	1959-1980	(22)
Paraguay	1.90	1.60	2,21	1953-1979	(27)
	4.21**	.91	3,18	1954-1979	(26)
	3.33**	.57	4,15	1955-1979	(25)
	1.85	.86	5,12	1956-1979	(24)
	1.48	1.27	6,9	1957-1979	(23)
	.65	3.85***	7,6	1958-1979	(22)

	3.20d	2.56	8,3	1959-1979	(21)
Peru	1.51	5.05**	2,16	1958-1979	(22)
	.79	3.47**	3,13	1959-1979	(21)
	1.00	3.50**	4,10	1960-1979	(20)
	2.98***	3.37g***	5,7	1961-1979	(19)
	1.83	1.38	6,4	1962-1979	(18)
Uruguay	.08	.74	2,13	1951-1979	(19)
	.21	1.95	3,10	1962-1979	(18)
	1.08g	1.53	4,7	1963-1979	(17)
	.85g	.64	5,4	1964-1979	(16)
Venezuela	.38	.11	2,16	1958-1979	(22)
	1.41	.31	3,13	1959-1979	(21)
	1.25	.40	4,10	1960-1979	(20)
	.94	.36	5,7	1961-1979	(19)
	.76	.61	6,4	1962-1979	(18)

Table should be read as follows: F.EXP.GDP. is the F-statistic for the test of unidirectional causality from EXP to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 8th order in the unrestrained equation.

bSignificant negative spike of the 2nd order in the unrestrained equation.

cSignificant negative spike of the 2nd order in the restrained equation.

dSignificant negative spike of the 1st order in the unrestrained equation.

eSignificant negative spike of the 6th order in the restrained equation.

fSignificant negative spike of the 7th order in the restrained equation.

gSignificant negative spike of the 4th order in the unrestrained equation.

hSignificant negative spike of the 5th order in the unrestrained equation.

iSignificant negative spike of the 3rd order in the unrestrained equation.

TABLE 85

GRANGER'S TESTS OF CAUSALITY BETWEEN EXP AND GFCF

Country	F.EXP.GFCF.	F.GFCF.EXP.	d.f.	Sample Period	(N)
Argentina	.30	3.70**	2,20	1953-1978	(26)
	.16	.34	3,17	1954-1978	(25)
	.04	2.76***	4,14	1955-1978	(24)
	.09	2.60***	5,11	1956-1978	(23)
	.09	2.09	6,8	1957-1978	(22)
	.44	1.27	7,5	1958-1978	(21)
	.61	57.61**	8,2	1959-1978	(20)
Bolivia	.12	2.63***	2,22	1953-1980	(28)
	.97	1.10	3,19	1954-1980	(27)
	.70	.71	4,16	1955-1980	(26)
	.34	.83	5,13	1956-1980	(25)
	.56	.53	6,10	1957-1980	(24)
	.78	.54	7,7	1958-1980	(23)
	.46	.41	8,4	1959-1980	(22)
Brazil	.34	.91a	2,14	1960-1979	(20)
	2.57b	.43	3,11	1961-1979	(19)
	1.66	1.16	4,8	1962-1979	(18)
	1.65	1.77	5,5	1963-1979	(17)
	.82	1.25	6,2	1964-1979	(16)
Chile	.20	.80	2,7	1968-1980	(13)
	.58	.39	3,4	1969-1980	(12)
Colombia	.81c,d	4.44g**	2,17	1958-1980	(23)
	1.36d	3.68**	3,14	1959-1980	(22)
	1.33d	2.85***	4,11	1960-1980	(21)
	.69	5.59**	5,8	1961-1980	(20)
	1.55e	4.13***	6,5	1962-1980	(19)
	1.26f	3.84f,h	7,2	1963-1980	(18)
Ecuador	2.90***	1.28	2,22	1953-1980	(28)
	1.19	3.01***	3,19	1954-1980	(27)
	1.11	5.29*	4,16	1955-1980	(26)
	.59	5.16*	5,13	1956-1980	(25)
	1.17	3.65**	6,10	1957-1980	(24)
	.88	2.91***	7,7	1958-1980	(23)
	1.07f	2.06	8,4	1959-1980	(22)
Paraguay	4.15**	.83	2,10	1964-1979	(16)
	9.06*	2.46	3,7	1965-1979	(15)
	3.00	1.79	4,4	1966-1979	(14)
Peru	4.63**	2.45	2,16	1958-1979	(22)
	2.44	2.73***	3,13	1959-1979	(21)

	2.09	2.59	4,10	1960-1979	(20)
	1.96	1.93	5,7	1961-1979	(19)
	1.77	.93	6,4	1962-1979	(18)
Uruguay	1.75e,i	.60	2,13	1961-1979	(19)
	2.60	1.88	3,10	1962-1979	(18)
	1.06	2.01	4,7	1963-1979	(17)
	3.54j	3.79	5,4	1964-1979	(16)
Venezuela	3.94**	.72	2,16	1958-1979	(22)
	2.38	.45	3,13	1959-1979	(21)
	3.25***	.54	4,10	1960-1979	(20)
	6.89**	1.23	5,7	1961-1979	(19)
	5.62***	.61	6,4	1962-1979	(18)

Table should be read as follows: F.EXP.GFCF. is the F-statistic for the test of unidirectional causality from EXP to GFCF, etc.

- *Significant at 1% level.
- **Significant at 5% level.
- ***Significant at 10% level.
- aSignificant negative spike of the 6th order in the unrestrained equation.
- bSignificant negative spike of the 2nd order in the unrestrained equation.
- cSignificant negative spike of the 5th order in the restrained equation.
- dSignificant negative spike of the 5th order in the unrestrained equation.
- eSignificant negative spike of the 3rd order in the unrestrained equation.
- fSignificant negative spike of the 1st order in the unrestrained equation.
- gSignificant negative spike of the 7th order in the restrained equation.
- hSignificant negative spike of the 7th order in the unrestrained equation.
- iSignificant positive spike of the 4th order in the restrained equation.
- jSignificant negative spike of the 4th order and significant positive spike of the 5th order in the unrestrained equation.

TABLE 86
GRANGER'S TESTS OF CAUSALITY BETWEEN DFI AND GDP

Country	F.DFI.GDP.	F.GDP.DFI.	d.f.	Sample Period	(N)
Argentina	3.28***	2.59	2,20	1953-1978	(26)
	2.42	2.43	3,17	1954-1978	(25)
	1.15	2.44***	4,14	1955-1978	(24)
	1.62	2.11	5,11	1956-1978	(23)
	4.21**	3.01***	6,8	1957-1978	(22)
	1.47	3.17a,b	7,5	1958-1978	(21)
	4.84	4.26c	8,2	1959-1978	(20)
Bolivia	.12a,d	.93	2,19	1956-1980	(25)
	.77e,f	.98	3,16	1957-1980	(24)
	.25	2.48***	4,13	1958-1980	(23)
	1.44	3.06***	5,10	1959-1980	(22)
	5.41**	1.93	6,7	1960-1980	(21)
	5.01a***	1.23c	7,4	1961-1980	(20)
Brazil	4.68**	.07	2,14	1960-1979	(20)
	4.14**	2.12	3,11	1961-1979	(19)
	3.85**	1.62	4,8	1962-1979	(18)
	29.38*	1.07	5,5	1963-1979	(17)
	.73	.52	6,2	1964-1979	(16)
Chile	.32	.73	2,7	1968-1980	(13)
	.26	2.74	3,4	1969-1980	(12)
Colombia	.00	2.40	2,23	1952-1980	(29)
	.44	2.94***	3,20	1953-1980	(28)
	1.30	1.66	4,17	1954-1980	(27)
	1.55	1.60g	5,14	1955-1980	(26)
	1.55	.86	6,11	1956-1980	(25)
	1.01	.80	7,8	1957-1980	(24)
	11.53c*	1.58	8,5	1958-1980	(23)
Ecuador	1.42	6.44*	2,22	1953-1980	(28)
	1.66	3.50**	3,19	1954-1980	(27)
	1.11	3.91**	4,16	1955-1980	(26)
	1.00	2.04	5,13	1956-1980	(25)
	.94	2.31	6,10	1957-1980	(24)
	.63	2.68	7,7	1958-1980	(23)
	1.16a	2.49a	8,4	1959-1980	(22)
Paraguay	.26	.96	2,22	1952-1979	(28)
	.22	4.35**	3,19	1953-1979	(27)
	2.02	8.01a,d	4,16	1954-1979	(26)
	1.17	3.17h**	5,13	1955-1979	(25)
	3.03***	.87	6,10	1956-1980	(24)
	4.22c**	1.79i	7,7	1957-1979	(23)

	1.84c	25.33c,j*	8,4	1958-1979	(22)
Peru	3.46**	.93	2,22	1952-1980	(28)
	4.30**	.44	3,19	1953-1980	(27)
	4.05**	1.14	4,16	1954-1980	(26)
	3.42**	.88	5,13	1955-1980	(25)
	4.05**	.77	6,10	1956-1980	(24)
	3.79***	.44	7,7	1957-1980	(23)
	3.41	.37	8,4	1958-1980	(22)
Venezuela	.07	2.24	2,22	1952-1979	(28)
	.22	1.59	3,19	1953-1979	(27)
	.25	1.04	4,16	1954-1979	(26)
	1.81	.80	5,13	1955-1979	(25)
	1.81	3.48**	6,10	1956-1979	(24)
	2.69	3.97**	7,7	1957-1979	(23)
	1.13	2.18	8,4	1958-1979	(22)

Table should be read as follows: F.DFI.GDP. is the F-statistic for the test of unidirectional causality from DFI to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 1st order in the unrestrained equation.

bSignificant positive spike of the 2nd order in the unrestrained equation.

cSignificant negative spike of the 2nd order in the unrestrained equation.

dSignificant negative spike of the 1st order in the restrained equation.

eSignificant negative spike of the 6th order in the unrestrained equation.

fSignificant negative spike of the 6th and 7th order in the restrained equation.

gSignificant negative spike of the 9th order in the restrained equation.

hSignificant negative spike of the 8th order in the restrained equation.

iSignificant negative spike of the 3rd order in the unrestrained equation.

jSignificant negative spike of the 5th and 8th order in the unrestrained equation.

TABLE 87

GRANGER'S TESTS OF CAUSALITY BETWEEN DFI AND GFCF

Country	F.DFI.GFCF.	F.GFCF.DFI.	d.f.	Sample Period	(N)
Argentina	.58	2.39	2,20	1951-1978	(26)
	1.92	2.14	3,17	1952-1978	(25)
	1.24	1.51	4,14	1953-1978	(24)
	1.49	4.46**	5,11	1954-1978	(23)
	3.92a**	2.63	6,8	1955-1978	(22)
	3.29a	1.42	7,5	1956-1978	(21)
	3.21	.30	8,2	1957-1978	(20)
Bolivia	.10	1.09	2,19	1956-1980	(25)
	.55	1.09	3,16	1957-1980	(24)
	.65	.88	4,13	1958-1980	(23)
	.70	1.92	5,10	1959-1980	(22)
	1.10	1.02	6,7	1960-1980	(21)
	1.42	.80b	7,4	1961-1980	(20)
Brazil	.72	.07	2,14	1960-1979	(20)
	.74	.45	3,11	1961-1979	(19)
	1.16c	.13	4,8	1962-1979	(18)
	2.74	.17	5,5	1963-1979	(17)
	3.06	1.22	6,2	1964-1979	(16)
Chile	.19	.86	2,7	1968-1980	(13)
	.40	.69	3,4	1969-1980	(10)
Colombia	.44	.52	2,23	1952-1980	(29)
	.42	.39	3,20	1953-1980	(28)
	.97	1.00	4,17	1954-1980	(27)
	1.03	2.51d***	5,14	1955-1980	(26)
	.75	2.39	6,11	1956-1980	(25)
	1.08	1.49	7,8	1957-1980	(24)
	.59	1.38c	8,5	1958-1980	(23)
Ecuador	.06	1.70	2,22	1953-1980	(28)
	.21	1.06	3,19	1954-1980	(27)
	.25	.66	4,16	1955-1980	(26)
	.29	2.68***	5,13	1956-1980	(25)
	.21	1.81e	6,10	1957-1980	(24)
	.91b	1.71c	7,7	1958-1980	(23)
	.45b	5.43e***	8,4	1959-1980	(22)
Paraguay	3.59***	.01	2,10	1964-1979	(16)
	1.92	1.90c	3,7	1965-1979	(15)
	2.37a	18.76*	4,4	1966-1979	(14)
Peru	.39	2.82***	2,22	1952-1979	(28)
	.42	1.35	3,19	1953-1979	(27)

	.83	1.23	4,16	1954-1979	(26)
	.47	2.11	5,13	1955-1979	(25)
	.63	2.54***	6,10	1956-1979	(24)
	.82	2.15	7,7	1957-1979	(23)
	.37	2.26	8,4	1958-1979	(22)
Venezuela	.85	1.75	2,22	1952-1979	(28)
	.51	.92	3,19	1953-1979	(27)
	.36	.70	4,16	1954-1979	(26)
	.24	.36	5,13	1955-1979	(25)
	.42	1.26	6,10	1956-1979	(24)
	.36	.76	7,7	1957-1979	(23)
	.58	9.12c**	8,4	1958-1979	(22)

Table should be read as follows: F.DFI.GFCF. is the F-statistic for the test of unidirectional causality from DFI to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 2nd order in the unrestrained equation.

bSignificant negative spike of the 4th order in the unrestrained equation.

cSignificant negative spike of the 1st order in the unrestrained equation.

dSignificant negative spike of the 9th order in the restrained equation.

eSignificant negative spike of the 3rd order in the restrained equation.

TABLE 88

GRANGER'S TESTS OF CAUSALITY BETWEEN UT AND GDP

Country	F.UT.GDP.	F.GDP.UT.	d.f.	Sample Period	(N)
Argentina	.57	.79	2,20	1953-1978	(26)
	.38	1.31	3,17	1954-1978	(25)
	.57	1.84	4,14	1955-1978	(24)
	.19a	.60	5,11	1956-1978	(23)
	.13	.29	6,8	1957-1978	(22)
	1.45b	.64	7,5	1958-1978	(21)
	2.65	.33	8,2	1959-1978	(20)
Bolivia	18.26c*	.96	2,23	1952-1980	(29)
	12.36*	.52	3,20	1953-1980	(28)
	5.15d**	.35	4,17	1954-1980	(27)
	4.84d*	1.41	5,14	1955-1980	(26)
	1.71e	1.25	6,11	1956-1980	(25)
	2.49	1.77a	7,8	1957-1980	(24)
	2.09f	1.08	8,5	1958-1980	(23)
Brazil	3.39***	.55	2,14	1960-1979	(20)
	2.30	1.18	3,11	1961-1979	(19)
	4.18**	.64	4,8	1962-1979	(18)
	3.96***	.43	5,5	1963-1979	(17)
	.43b	1.20	6,2	1964-1979	(16)
Chile	.19	1.56	2,7	1968-1980	(13)
	.67	1.00	3,4	1969-1980	(14)
Colombia	1.88	5.32**	2,22	1953-1980	(28)
	1.36	3.13a***	3,19	1954-1980	(27)
	.74	4.40**	4,16	1955-1980	(26)
	.60	7.07i*	5,13	1956-1980	(25)
	1.04g	3.71i**	6,10	1957-1980	(24)
	4.36f,h**	1.73	7,7	1958-1980	(23)
	2.58f	2.62	8,4	1959-1980	(22)
Ecuador	3.34***	2.17j	2,22	1953-1980	(28)
	1.97	1.36j	3,19	1954-1980	(27)
	.96	.98	4,16	1955-1980	(26)
	1.33	1.23	5,13	1956-1980	(25)
	.85	1.39	6,10	1957-1980	(24)
	1.16a	1.78	7,7	1958-1980	(23)
	1.12	1.86f	8,4	1959-1980	(22)
Paraguay	.36	.40	2,22	1952-1979	(28)
	.46	4.08**	3,19	1953-1979	(27)
	.90	7.31b,k*	4,16	1954-1979	(26)
	.66	1.68	5,13	1955-1979	(25)
	1.37	2.38f	6,10	1956-1979	(24)

	1.53	1.96	7,7	1957-1979	(23)
	1.27	4.671***	8,4	1958-1979	(22)
Peru	.12	.20	2,22	1952-1979	(28)
	.62	.44	3,19	1953-1979	(27)
	.46	.68	4,16	1954-1979	(26)
	.82	.62	5,13	1955-1979	(25)
	.44	1.76	6,10	1956-1979	(24)
	.23	1.55	7,7	1958-1979	(23)
	1.55b	.72	8,4	1958-1979	(22)
Uruguay	1.60g	2.83***	2,17	1957-1979	(23)
	1.51	1.39a	3,14	1958-1979	(22)
	.49	.95	4,11	1959-1979	(21)
	.56	.86	5,8	1960-1979	(20)
	2.1e	.61	6,5	1961-1979	(19)
	5.97	3.64m	7,2	1962-1979	(18)
Venezuela	.70	1.66	2,22	1952-1979	(28)
	.63	1.56	3,19	1953-1979	(27)
	.77	1.94	4,16	1954-1979	(26)
	.66	1.99	5,13	1955-1979	(25)
	.62	1.81	6,10	1956-1979	(24)
	1.63n	.93	7,7	1957-1979	(23)
	1.87	3.16	8,4	1958-1979	(22)

Table should be read as follows: F.UT.GDP. is the F-statistic for the test of unidirectional causality from UT to GDP, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 3rd order in the unrestrained equation.

bSignificant negative spike of the 1st order in the unrestrained equation.

cSignificant negative spike of the 4th order in the unrestrained equation.

dSignificant negative spike of the 2nd order in the restrained equation.

eSignificant negative spike of the 5th order in the unrestrained equation.

fSignificant negative spike of the 2nd order in the unrestrained equation.

gSignificant negative spike of the 7th order in the unrestrained equation.

hSignificant positive spike of the 4th order in the unrestrained equation.

iSignificant negative spike of the 8th order in the unrestrained equation.

jSignificant negative spike of the 5th order in the restrained equation.

- kSignificant negative spike of the 1st order in the restrained equation.
- lSignificant positive spike of the 2nd order in the unrestrained equation.
- mSignificant negative spikes as described in parts a, b, and l.
- nSignificant negative spike of the 6th order in the unrestrained equation.

TABLE 89

GRANGER'S TESTS OF CAUSALITY BETWEEN UI AND GFCF

Country	F.UT.GFCF.	F.GFCF.UI.	d.f.	Sample Period	(N)
Argentina	1.04	3.39a***	2,20	1953-1978	(26)
	.92	2.15	3,17	1954-1978	(25)
	.78	1.51	4,14	1955-1978	(24)
	.95	.96	5,11	1956-1978	(23)
	1.94	.41	6,8	1957-1978	(22)
	1.43b	.40	7,5	1958-1978	(21)
	1.70c	10.30c***	8,2	1959-1978	(20)
Bolivia	13.05*	1.00	2,23	1952-1980	(29)
	10.40*	.68	3,20	1953-1980	(28)
	7.01*	.56	4,17	1954-1980	(27)
	4.46**	1.50	5,14	1955-1980	(26)
	.76	2.18	6,11	1956-1980	(25)
	.88c	1.66d	7,8	1957-1980	(24)
	1.38c	2.16	8,5	1958-1980	(23)
Brazil	.25	5.41**	2,14	1960-1979	(20)
	.18	3.69**	3,11	1961-1979	(19)
	3.62***	3.26***	4,8	1962-1979	(18)
	6.07**	1.81	5,5	1963-1979	(17)
	9.63***	2.27	6,2	1964-1979	(16)
Chile	3.00	5.79**	2,7	1968-1980	(13)
	1.70	2.55	3,4	1969-1980	(12)
Colombia	.24	.06	2,22	1953-1980	(28)
	.83	3.10***	3,19	1954-1980	(27)
	1.36	2.89***	4,16	1955-1980	(26)
	1.23e	3.58**	5,13	1956-1980	(25)
	.55	2.85***	6,10	1957-1980	(24)
	1.05d	1.99	7,7	1958-1980	(23)
	.91f	17.41h*	8,4	1959-1980	(22)
Ecuador	3.68**	.94i	2,22	1953-1980	(28)
	4.15**	.38i	3,19	1954-1980	(27)
	2.12	.31	4,16	1955-1980	(26)
	2.30	.67	5,13	1956-1980	(25)
	2.26	.68	6,10	1957-1980	(24)
	1.54	1.16	7,7	1958-1980	(23)
	1.47g	.63	8,4	1959-1980	(22)
Paraguay	.28	4.06***	2,10	1964-1979	(16)
	.30	6.89**	3,7	1965-1979	(15)
	.85	43.95c*	4,4	1966-1979	(14)
Peru	1.06	3.03***	2,22	1952-1979	(26)

	1.98	3.07***	3,19	1953-1979	(27)
	1.70	4.13**	4,16	1954-1979	(26)
	2.94***	3.32**	5,13	1955-1979	(25)
	3.47b***	1.44	6,10	1956-1979	(24)
	2.80c***	.78	7,7	1957-1979	(23)
	10.20**	.83	8,4	1958-1979	(22)
Uruguay	3.82**	2.23	2,17	1957-1980	(23)
	6.35*	.86	3,14	1958-1980	(22)
	2.30	.57	4,11	1959-1980	(21)
	3.02***	.59	5,8	1960-1980	(20)
	4.37***	.54	6,5	1961-1980	(19)
	1.19i	.09	7,2	1962-1980	(18)
Venezuela	.72	9.43a***	2,22	1952-1979	(28)
	.05	4.63a**	3,19	1953-1979	(27)
	.16	3.26**	4,16	1954-1979	(26)
	.20	2.47***	5,13	1955-1979	(25)
	.93	5.91*	6,10	1956-1979	(24)
	.46	3.72***	7,7	1957-1979	(23)
	4.24***	2.23	8,4	1958-1979	(22)

 Table should be read as follows: F.UT.GFCF. is the F-statistic for the test of unidirectional causality from UT to GFCF, etc.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

aSignificant negative spike of the 5th order in the unrestrained equation.

bSignificant negative spike of the 2nd order in the unrestrained equation.

cSignificant negative spike of the 1st order in the unrestrained equation.

dSignificant negative spike of the 3rd order in the unrestrained equation.

eSignificant negative spike of the 6th order in the restrained equation.

fSignificant positive spike of the 5th order in the unrestrained equation.

gSignificant negative spike of the 4th order in the unrestrained equation.

hSignificant negative spike of the 6th order in the unrestrained equation plus c, f, g.

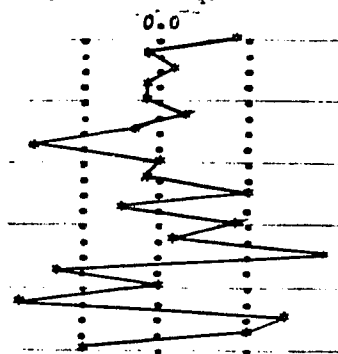
iSignificant negative spike of the 5th order in the restrained equation.

Appendix C
SELECTED PLOTS OF THE RESIDUALS

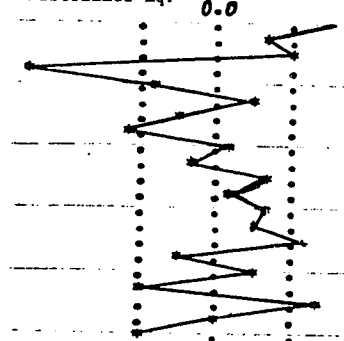
COLOMBIA

F.EPDD.GDP.4 : 1960-1980

Unrestrained Eq.

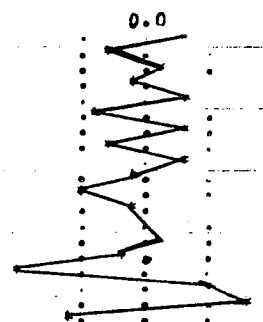


Restrained Eq.

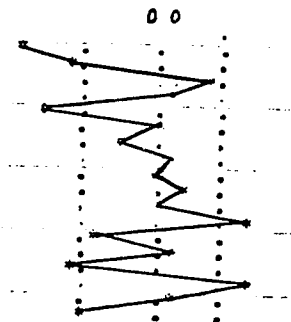


F.EPDD.GDP.6 : 1962-1980

Unrestrained Eq.



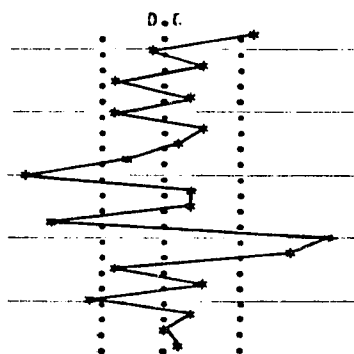
Restrained Eq.



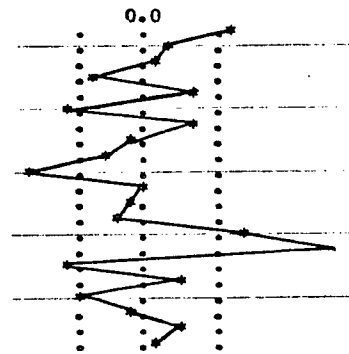
ECUADOR

F.EPDD.GDP.4 : 1960-1980

Unrestrained Eq.

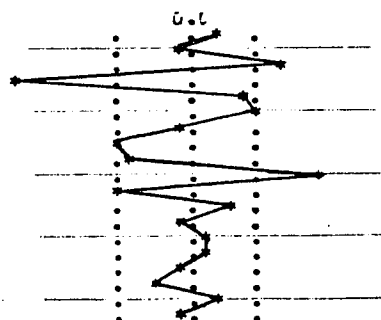


Restrained Eq.

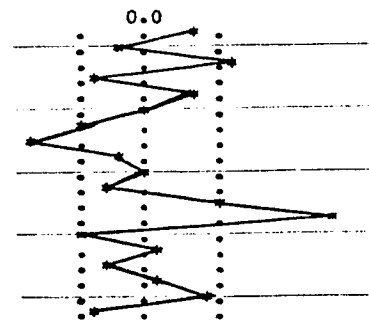


F.EPDD.GDP.6 : 1962-1980

Unrestrained Eq.

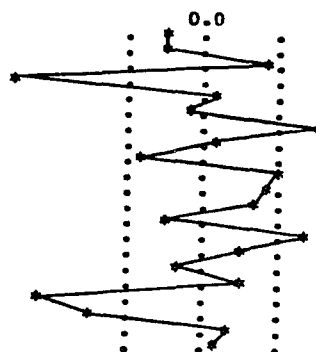


Restrained Eq.

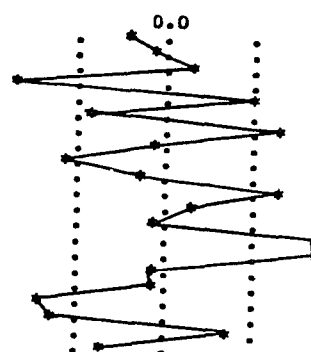


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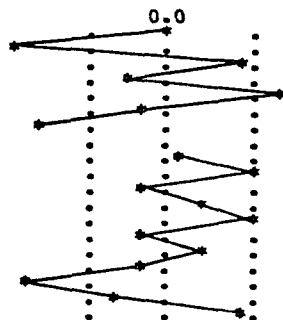
F.EPDD.GDP.4 : 1960-1980
Unrestrained Eq.



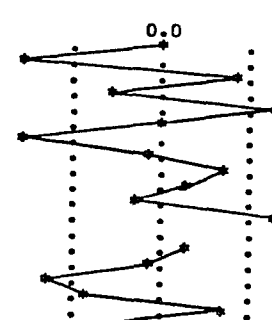
Restrained Eq.



F.EPDD.GDP.6 : 1962-1980
Unrestrained Eq.

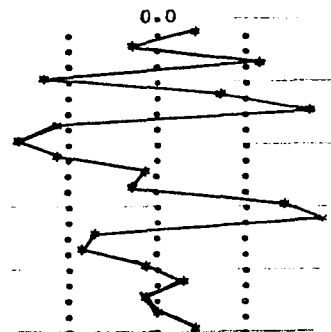


Restrained Eq.

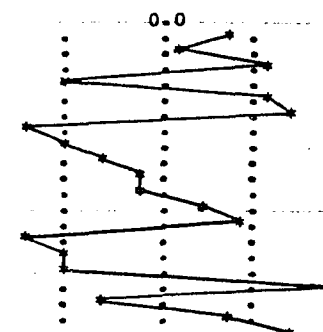


VENEZUELA

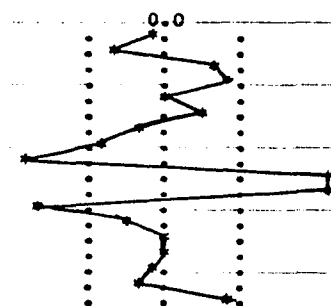
F.EPDD.GDP.4 : 1960-1979
Unrestrained Eq.



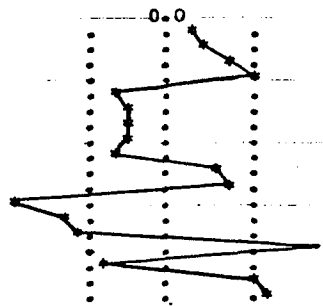
Restrained Eq.



F.EPDD.GDP.6 : 1962-1979
Unrestrained Eq.



Restrained Eq.

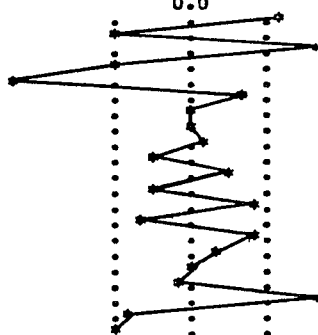


COLOMBIA

F.ADSR.GDP.4 : 1960-1980

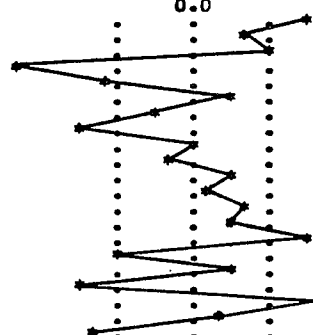
Unrestrained Eq.

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Restrained Eq.

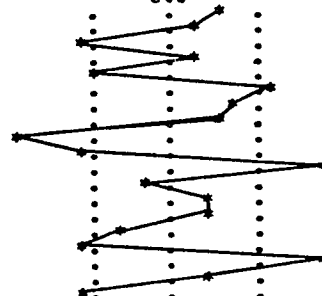
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F.ADSR.GDP.6: 1962-1980

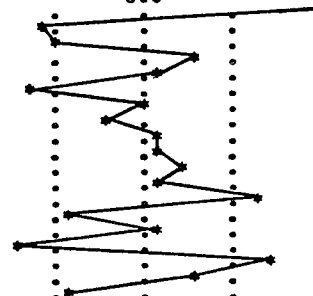
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0.0



Restrained Eq.

0.0

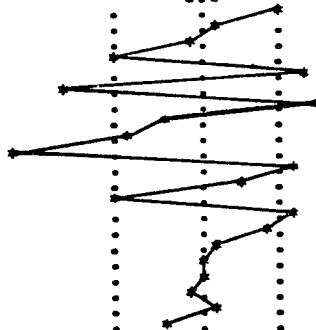


ECUADOR

F.ADSR.GDP.4: 1960-1980

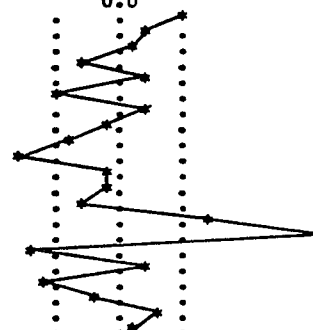
Unrestrained Eq.

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Restrained Eq.

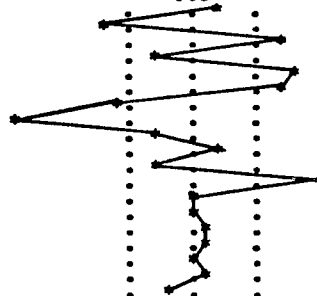
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F.ADSR.GDP.6: 1962-1980

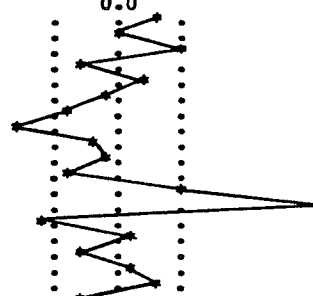
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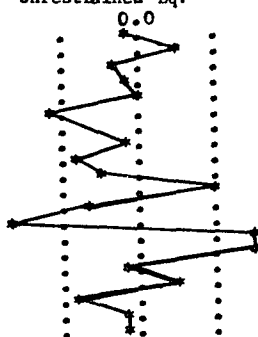
Restrained Eq.

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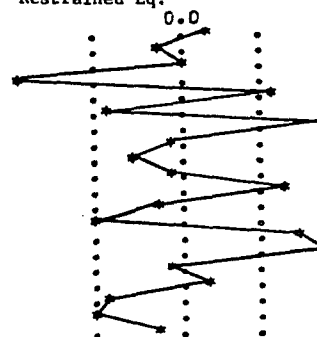


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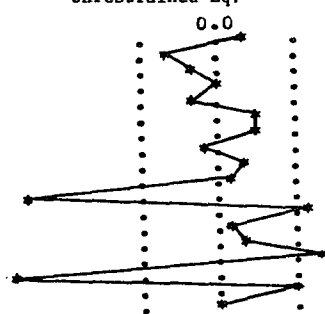
F.ADSR.GDP.4 : 1960-1979
Unrestrained Eq.



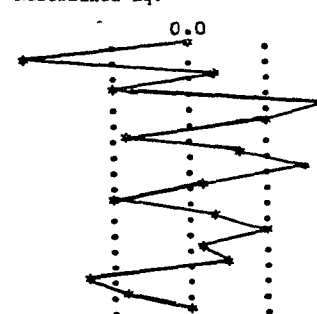
Restrained Eq.



F.ADSR.GDP.6 : 1962-1979
Unrestrained Eq.

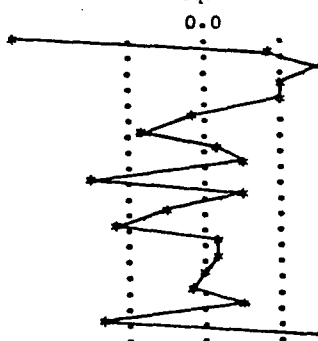


Restrained Eq.

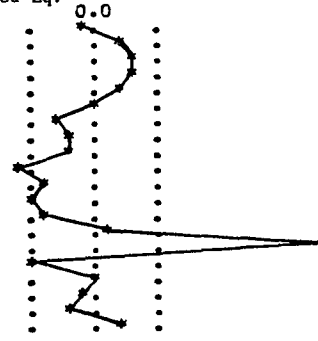


VENEZUELA

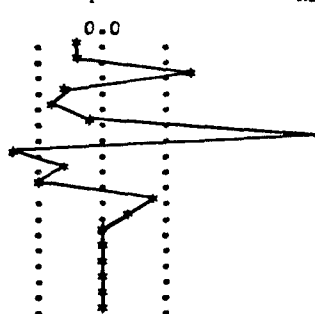
F.ADSR.GDP.4 : 1960-1979
Unrestrained Eq.



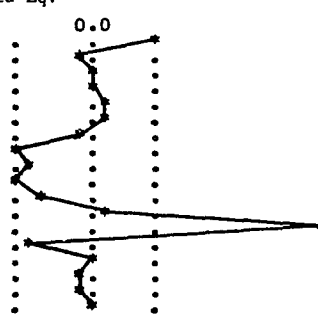
Restrained Eq.



F.ADSR.GDP.6 : 1962-1979
Unrestrained Eq.

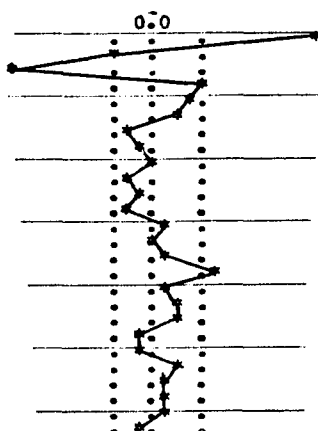


Restrained Eq.

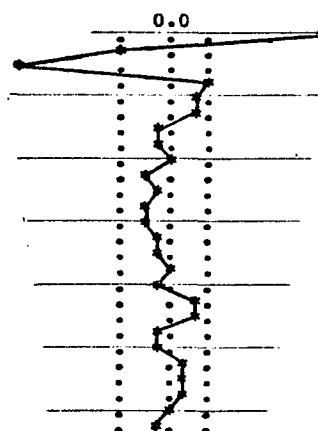


BOLIVIA

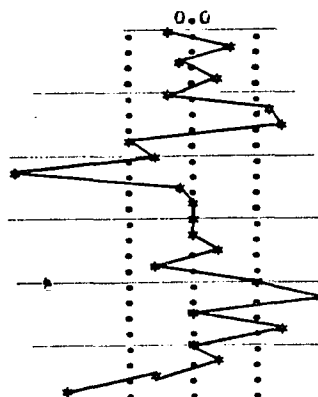
F.EXP.GDP.4 : 1955-1980
Unrestrained Eq.



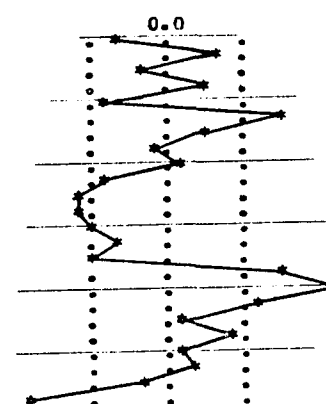
Restrained



F.EXP.GDP.6 : 1957-1980
Unrestrained Eq.

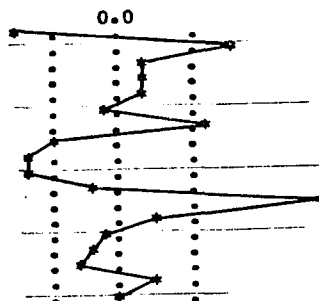


Restrained Eq.

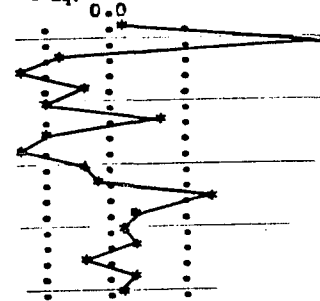


BRAZIL

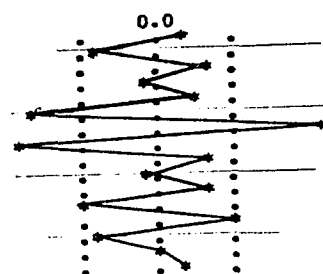
F.EXP.GDP.4 : 1962-1979
Unrestrained Eq.



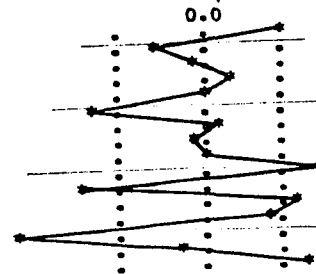
Restrained Eq.



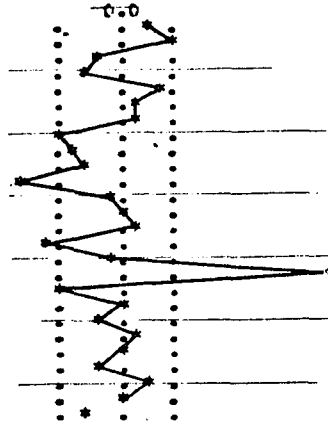
F.EXP.GDP.6 : 1964-1979



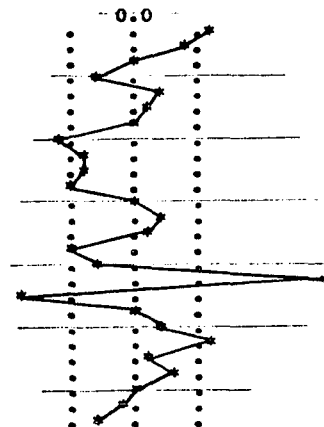
Restrained Eq.



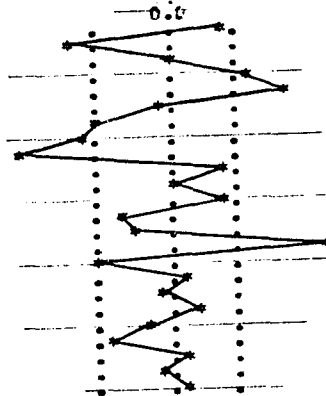
F.EXP.GFCF.4 : 1955-1980
Unrestrained Eq.



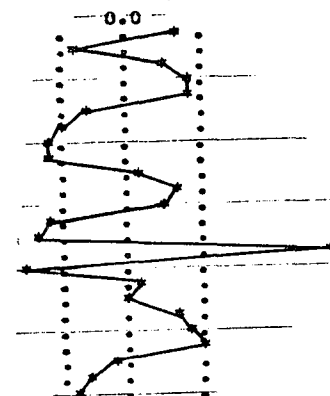
Restrained Eq.



F.EXP.GFCF.6 : 1957-1980
Unrestrained Eq.

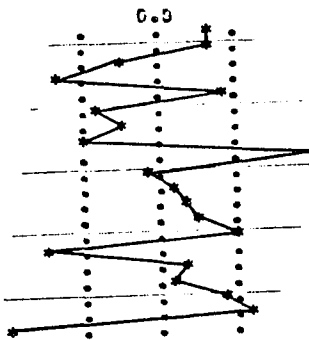


Restrained Eq.

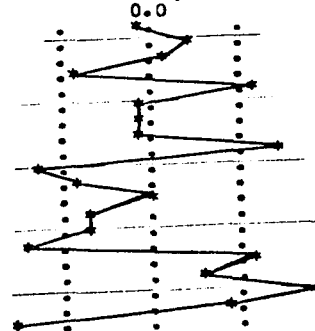


F.EXP.GFCF.4 : 1960-1979
Unrestrained Eq.

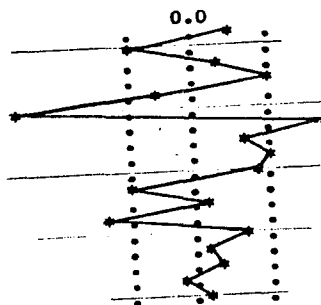
VENEZUELA



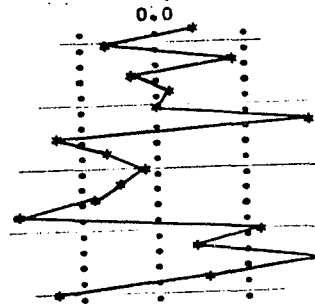
Restrained Eq.



F.EXP.GFCF.6 : 1962-1979
Unrestrained Eq.

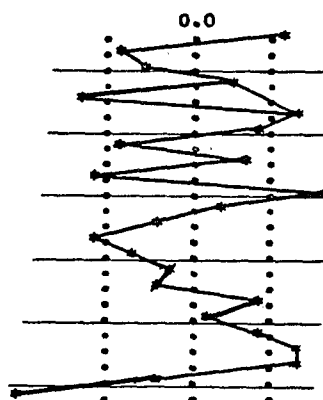


Restrained Eq.

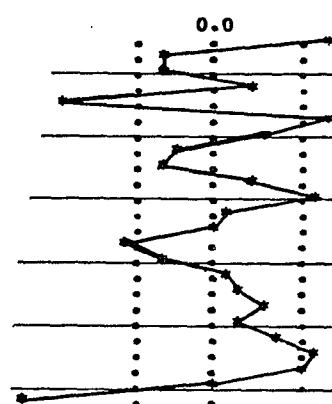


ARGENTINA

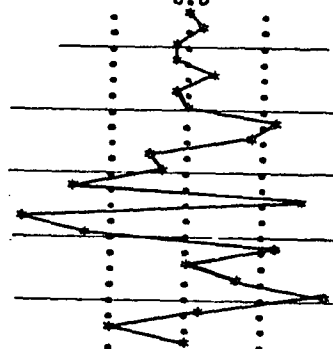
F.DFI.GDP.4 : 1955-1978
Unrestrained Eq.



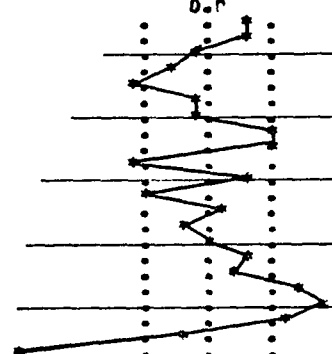
Restrained Eq.



F.DFI.GDP.6 : 1957-1978
Unrestrained Eq.

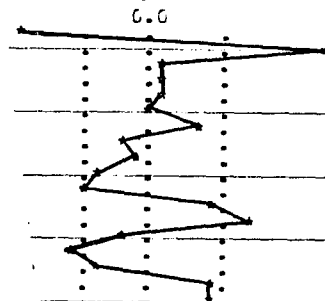


Restrained Eq.

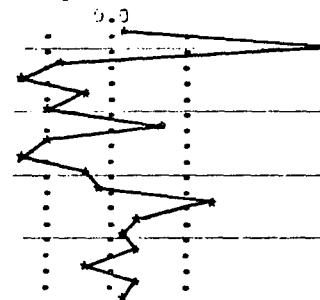


BRAZIL

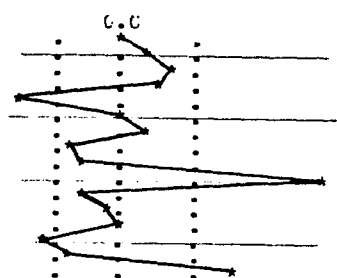
F.DFI.GDP.4 : 1962-1979
Unrestrained Eq.



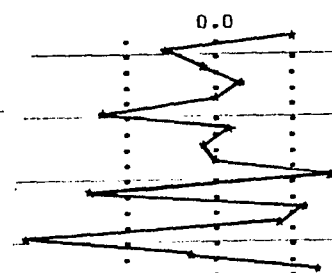
Restrained Eq.



F.DFI.GDP.6 : 1964-1979
Unrestrained Eq.

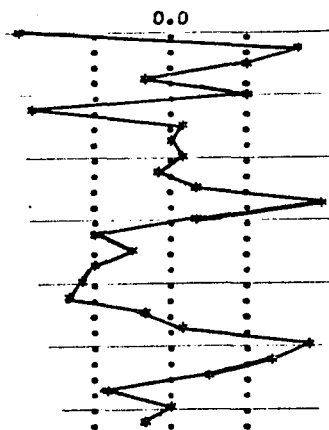


Restrained Eq.

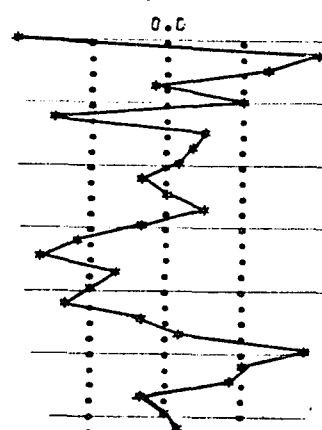


PERU

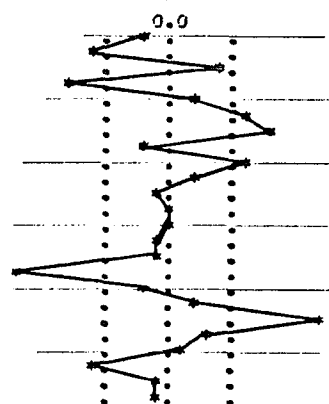
F.DFI.GFCF.4 : 1954-1979
Unrestrained Eq.



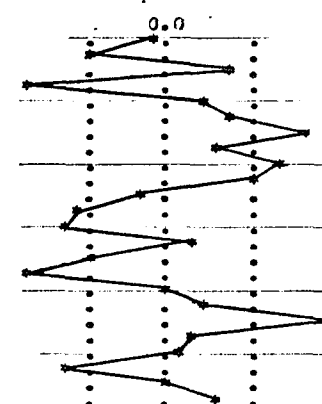
Restrained Eq.



F.DFI.GFCF.6 : 1956-1979
Unrestrained Eq.

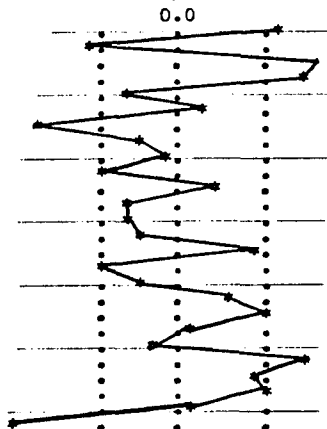


Restrained Eq.

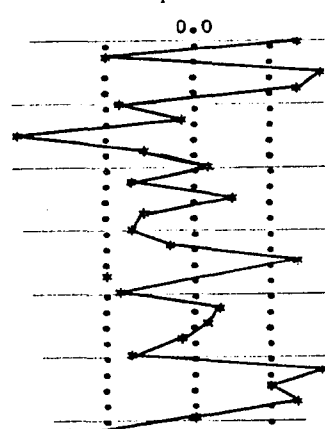


VENEZUELA

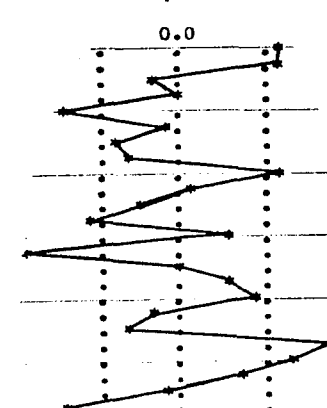
F.DFI.GFCF.4 : 1954-1979
Unrestrained Eq.



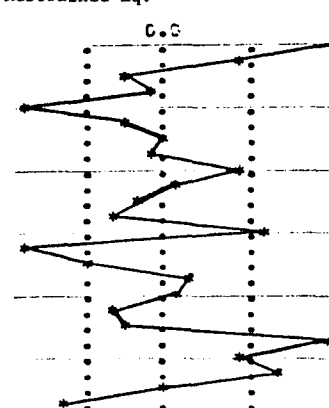
Restrained Eq.



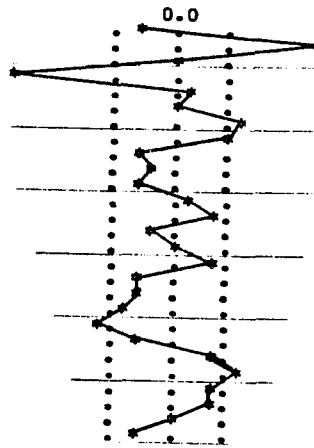
F.DFI.GFCF.6 : 1956-1979
Unrestrained Eq.



Restrained Eq.

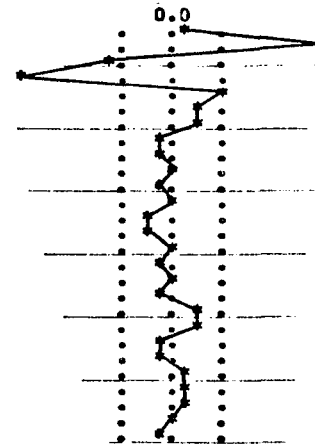


F.UT.GDP.4 : 1954-1980
Unrestrained Eq.

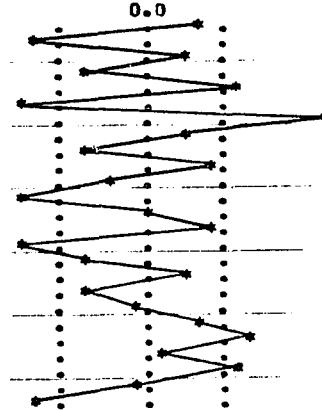


Restrained Eq.

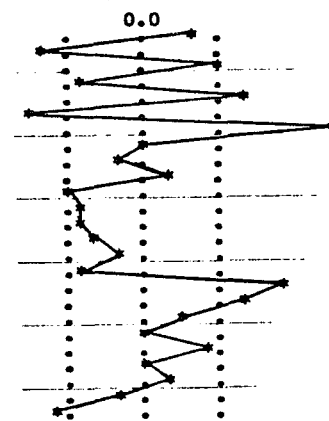
291



F.UT.GDP.6 : 1956-1980
Unrestrained Eq.

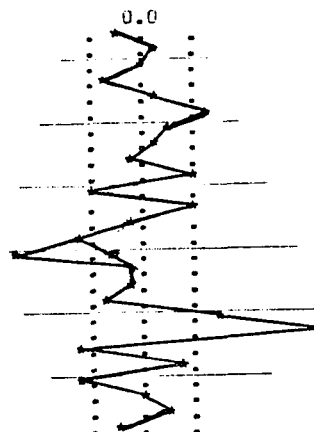


Restrained Eq.

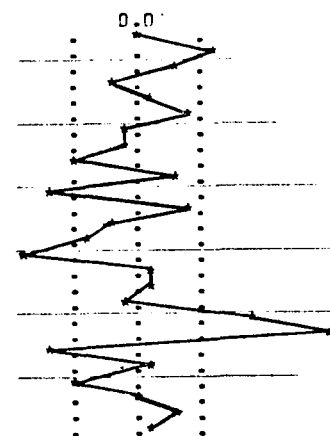


ECUADOR

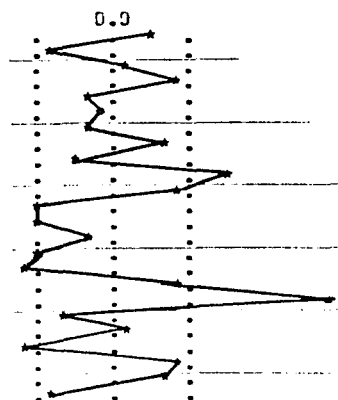
F.UT.GDP.4 : 1955-1980
Unrestrained Eq.



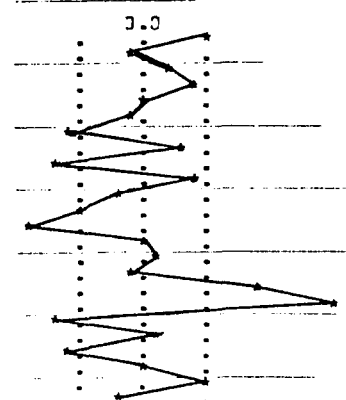
Restrained Eq.

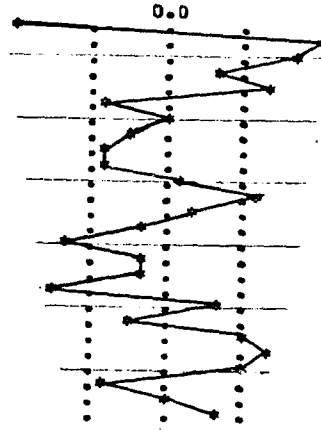


F.UT.GDP.6 : 1957-1980
Unrestrained Eq.

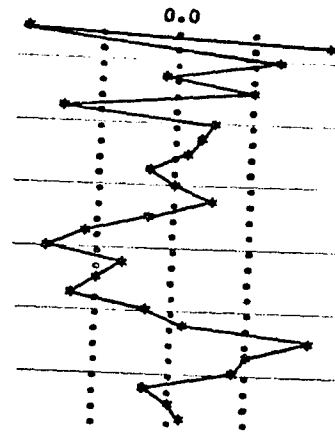
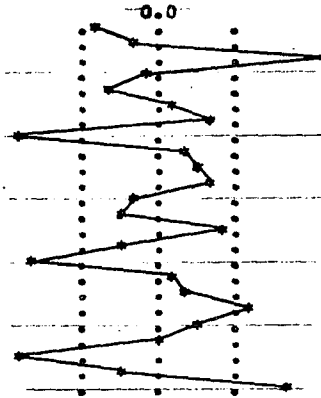


Restrained Eq.

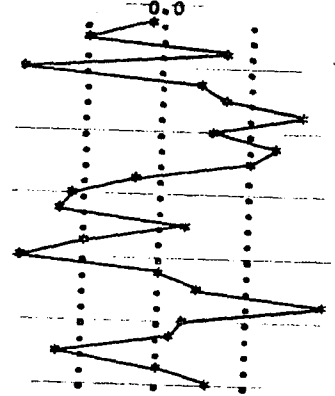
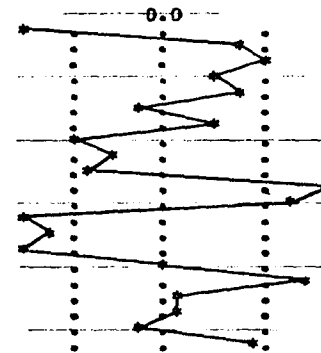


F.UT.GFCF.4 : 1954-1979
Unrestrained Eq.

Restrained Eq.

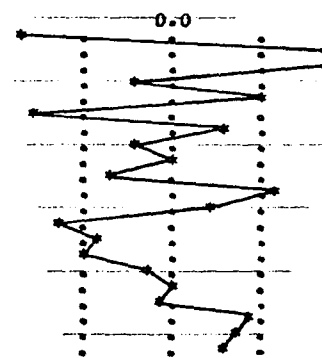
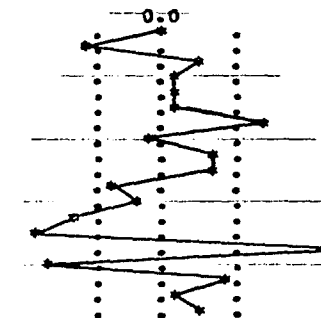
F.UT.GFCF.6 : 1956-1979
Unrestrained Eq.

Restrained Eq.

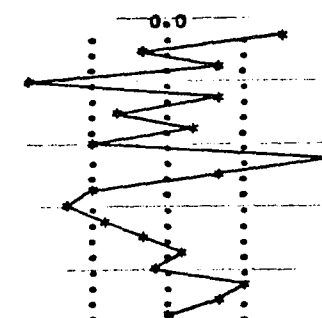
F.UT.GFCF.4 : 1959-1980
Unrestrained Eq.

URUGUAY

Restrained Eq.

F.UT.GFCF.6 : 1961-1980
Unrestrained Eq.

Restrained Eq.



Appendix D

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE OF CAUSALITY USING T

TABLE 90

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GDP USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Chile				
EPDD.GDP.2	.051	.033	1.553	(7)
Colombia				
EPDD.GDP.4	.026	.046	.565	(11)
EPDD.GDP.5	-.058	.067	-.866	(8)
Ecuador				
EPDD.GDP.6	.361	.116	3.112**	(5)
GDP.EPDD.2	3.156	1.286	2.450**	(17)
GDP.EPDD.3	4.802	1.379	3.482*	(14)
GDP.EPDD.4	6.500	1.923	3.380*	(11)
Paraguay				
EPDD.GDP.5	-.011	.020	-.550	(7)
GDP.EPDD.6	2.688	1.308	2.055	(4)
Peru				
EPDD.GDP.3	-.074	.033	-2.242**	(14)
GDP.EPDD.2	8.189	3.076	2.662**	(17)
GDP.EPDD.3	11.679	4.552	2.566**	(14)
Uruguay				
GDP.EPDD.5	9.754	1.681	5.802*	(8)
GDP.EPDD.7	9.733	11.457	.850	(2)
Venezuela				
EPDD.GDP.4	.172	.062	2.774**	(10)
EPDD.GDP.5	.315	.112	2.812**	(7)
EPDD.GDP.6	.442	.132	3.323**	(4)
GDP.EPDD.2	.539	1.162	.464	(16)
GDP.EPDD.3	2.632	1.096	2.401**	(13)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 91

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GFCF USING G

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Ecuador				
EPDD.GFCF.3	-.203	.098	-2.071***	(14)
EPDD.GFCF.4	-.332	.126	-2.635**	(11)
GFCF.EPDD.2	1.365	.616	2.216**	(17)
GFCF.EPDD.3	2.049	.711	2.882**	(14)
GFCF.EPDD.4	1.964	.867	2.265**	(11)
GFCF.EPDD.7	1.282	1.359	.943	(2)
Paraguay				
EPDD.GFCF.3	-.082	.101	-.812	(7)
GFCF.EPDD.2	2.170	.646	3.359*	(10)
Peru				
EPDD.GFCF.3	-.133	.052	-2.558**	(14)
EPDD.GFCF.5	-.230	.057	-4.035*	(8)
EPDD.GFCF.6	-.256	.130	-1.969	(5)
Venezuela				
EPDD.GFCF.3	-.159	.065	-2.446**	(13)
GFCF.EPDD.3	2.014	.387	5.204*	(13)
GFCF.EPDD.6	2.235	1.968	1.136	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 92

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GDP USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Chile				
GDP.ADSR.2	.003	.003	1.000	(13)
GDP.ADSR.3	.003	.004	.750	(12)
Colombia				
ADSR.GDP.4	129.738	87.715	1.479	(21)
ADSR.GDP.5	2.356	144.076	.016	(20)
ADSR.GDP.6	-388.785	288.531	-1.348	(19)
GDP.ADSR.6	.010	.003	3.333*	(19)
Ecuador				
ADSR.GDP.2	-55.995	51.500	-1.087	(23)
ADSR.GDP.3	-111.441	95.969	-1.161	(22)
ADSR.GDP.4	-412.101	141.445	-2.914*	(21)
ADSR.GDP.5	-582.823	221.382	-2.633**	(20)
GDP.ADSR.2	-.001	.0004	-2.500**	(23)
GDP.ADSR.3	-.001	.0005	-2.000***	(22)
GDP.ADSR.4	-.001	.0006	-1.667	(21)
GDP.ADSR.5	-.003	.003	-1.000	(20)
GDP.ADSR.6	-.005	.006	-.833	(19)
GDP.ADSR.7	-.004	.003	-1.333	(18)
Paraguay				
ADSR.GDP.2	-1585.370	2317.758	-.684	(22)
ADSR.GDP.3	-3916.550	2556.169	-1.532	(21)
ADSR.GDP.4	-8413.890	3452.900	-2.437**	(20)
ADSR.GDP.5	-10223.250	5159.167	-1.982***	(19)
Venezuela				
ADSR.GDP.2	-50.402	14.384	-3.504*	(22)
ADSR.GDP.3	-67.855	27.157	-2.499**	(21)
ADSR.GDP.4	-59.970	37.205	-1.612	(20)
ADSR.GDP.5	-90.529	24.662	-3.671*	(19)
ADSR.GDP.6	-139.917	34.039	-4.110*	(18)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 93

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GFCF USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
ADSR.GFCF.2	98.366	46.130	2.132**	(23)
ADSR.GFCF.3	133.467	44.395	3.006*	(22)
ADSR.GFCF.4	207.988	64.075	3.246*	(21)
ADSR.GFCF.5	278.703	82.984	3.359*	(20)
Ecuador				
ADSR.GFCF.3	125.759	45.749	2.749**	(22)
ADSR.GFCF.4	181.521	57.506	3.157*	(21)
GFCF.ADSR.3	-.001	.001	-1.000	(22)
GFCF.ADSR.4	-.002	.001	-2.000***	(21)
GFCF.ADSR.5	-.002	.001	-2.000***	(20)
GFCF.ADSR.6	.006	.001	6.000*	(19)
GFCF.ADSR.7	.012	.000	undefined	(16)
Paraguay				
ADSR.GFCF.2	-1999.097	1340.895	-14.915*	(16)
ADSR.GFCF.3	-3789.330	1903.576	-1.991***	(15)
ADSR.GFCF.4	-3177.837	2568.961	-1.237	(14)
Peru				
ADSR.GFCF.5	262.222	64.712	4.052*	(19)
ADSR.GFCF.6	408.639	66.410	6.153*	(18)
Venezuela				
ADSR.GFCF.5	-37.808	24.767	-1.527	(19)
ADSR.GFCF.6	-80.924	29.047	-2.786**	(18)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 94

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GDP USING F

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GDP.EXP.2	.736	.228	3.228*	(20)
Bolivia				
EXP.GDP.6	.068	.050	1.360	(10)
EXP.GDP.7	-.069	.057	-1.210	(7)
GDP.EXP.2	.857	.354	2.421**	(22)
Brazil				
EXP.GDP.2	.265	.104	2.548**	(14)
EXP.GDP.3	.366	.160	2.288**	(11)
Chile				
GDP.EXP.2	-.408	2.889	.178	(7)
Colombia				
GDP.EXP.2	1.376	.469	2.934*	(17)
GDP.EXP.3	1.670	.628	2.659**	(14)
GDP.EXP.4	2.511	.940	2.671**	(11)
GDP.EXP.5	3.059	1.679	1.822	(8)
GDP.EXP.6	-1.409	2.268	-.621	(5)
Ecuador				
GDP.EXP.4	5.046	2.138	2.360**	(16)
Paraguay				
EXP.GDP.3	.132	.050	2.640**	(18)
EXP.GDP.4	.115	.062	1.855***	(15)
GDP.EXP.7	5.857	1.685	3.476**	(6)
Peru				
EXP.GDP.5	.304	.098	3.102**	(7)
GDP.EXP.2	-3.751	1.223	-3.067*	(16)
GDP.EXP.3	-3.142	1.901	-1.653	(13)
GDP.EXP.4	-2.236	2.277	-.982	(10)
GDP.EXP.5	-6.126	3.223	-1.901***	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.
All tests are two-tail.

TABLE 95

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.EXP.2	.375	.132	4.258*	(20)
GFCF.EXP.4	.824	.379	2.174**	(14)
GFCF.EXP.5	1.312	.444	2.955**	(11)
GFCF.EXP.6	3.429	.253	13.553*	(2)
Bolivia				
GFCF.EXP.2	.653	1.000	.653	(22)
Colombia				
GFCF.EXP.2	.370	.250	1.480	(17)
GFCF.EXP.3	.508	.296	1.716	(14)
GFCF.EXP.4	.773	.414	1.867***	(11)
GFCF.EXP.5	1.041	.944	1.103	(8)
GFCF.EXP.6	.979	.725	1.350	(5)
Ecuador				
EXP.GFCF.2	.238	.134	1.776***	(22)
GFCF.EXP.3	.885	.313	2.828**	(19)
GFCF.EXP.4	.893	.333	2.682**	(16)
GFCF.EXP.5	1.035	.398	2.600**	(13)
GFCF.EXP.6	1.318	1.107	1.191	(10)
GFCF.EXP.7	1.730	.724	2.390**	(7)
Paraguay				
EXP.GFCF.2	.488	.183	2.667**	(10)
EXP.GFCF.3	1.067	.212	5.033*	(7)
Peru				
EXP.GFCF.2	-.212	.127	-1.699	(16)
GFCF.EXP.3	.056	.332	.169	(13)
Venezuela				
EXP.GFCF.2	.266	.106	2.509**	(16)
EXP.GFCF.4	.439	.135	3.252*	(10)
EXP.GFCF.5	.521	.216	2.412**	(7)
EXP.GFCF.6	.635	.409	1.553	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.
***Significant at 10% level.
All tests are two-tail.

TABLE 96

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GDP USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GDP.2	-.041	.024	-1.708	(20)
DFI.GDP.6	-.069	.016	-4.313*	(8)
GDP.DFI.4	3.638	5.074	.717	(14)
GDP.DFI.6	18.920	7.850	2.410**	(8)
Bolivia				
DFI.GDP.6	-.030	.032	-.978	(7)
DFI.GDP.7	.013	.044	.296	(4)
GDP.DFI.4	7.770	2.998	2.592**	(13)
GDP.DFI.5	12.048	3.684	3.270*	(10)
Brazil				
DFI.GDP.2	.084	.030	2.800**	(14)
DFI.GDP.3	.131	.039	3.359*	(11)
DFI.GDP.4	.198	.056	3.536*	(8)
DFI.GDP.5	.269	.071	3.789*	(5)
Colombia				
DFI.GDP.8	.065	.022	2.955**	(5)
GDP.DFI.3	-8.309	4.370	-1.901***	(20)
Ecuador				
GDP.DFI.2	-4.584	1.543	-2.971*	(22)
GDP.DFI.3	-3.503	1.954	-1.793***	(19)
GDP.DFI.4	-1.209	2.182	-.554	(16)
Paraguay				
DFI.GDP.6	-.002	.053	-.038	(10)
DFI.GDP.7	.058	.049	1.184	(7)
GDP.DFI.3	13.456	6.600	2.039***	(19)
GDP.DFI.4	1.451	5.298	.274	(16)
GDP.DFI.5	3.980	4.482	.888	(13)
GDP.DFI.8	13.815	4.762	2.901**	(4)
Peru				
DFI.GDP.2	-.012	.007	-1.714	(22)
DFI.GDP.3	-.015	.007	-2.143**	(19)
DFI.GDP.4	-.020	.008	-2.500**	(16)
DFI.GDP.5	-.026	.017	-1.529	(13)
DFI.GDP.6	-.045	.016	-2.181***	(10)
DFI.GDP.7	-.058	.030	-1.933***	(7)

Venezuela				
GDP.DFI.6	18.977	10.985	1.728	(10)
GDP.DFI.7	12.456	18.629	.669	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 97

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GFCF.6	.833	.062	10.158*	(8)
GFCF.DFI.5	9.042	2.564	3.527*	(11)
Colombia				
GFCF.DFI.5	-14.753	4.478	-3.295*	(14)
Ecuador				
GFCF.DFI.5	-1.688	3.719	-.454	(13)
GFCF.DFI.8	-6.775	1.947	-3.480**	(4)
Paraguay				
DFI.GFCF.2	.166	.063	1.841***	(10)
GFCF.DFI.4	3.180	.602	5.282*	(4)
Peru				
GFCF.DFI.2	-.622	1.634	-.381	(22)
GFCF.DFI.6	-5.461	3.536	-1.544	(10)
Venezuela				
GFCF.DFI.8	-1.377	1.149	1.198	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 98

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GDP USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
UT.GDP.2	-.013	.029	-.448	(23)
UT.GDP.3	-.197	.046	-4.283*	(20)
UT.GDP.4	-.154	.072	-2.139**	(17)
UT.GDP.5	-.200	.071	-2.817**	(14)
Brazil				
UT.GDP.2	-.071	.047	-1.511	(14)
UT.GDP.4	-.211	.076	-2.705**	(8)
UT.GDP.5	-.406	.118	-3.441**	(5)
Colombia				
UT.GDP.7	-.785	.190	-4.132*	(7)
GDP.UT.2	-5.558	1.746	-3.183*	(22)
GDP.UT.3	-4.574	1.587	-2.882	(19)
GDP.UT.4	-5.996	1.554	-3.858*	(16)
GDP.UT.5	-10.557	3.163	-3.338*	(13)
GDP.UT.6	-9.287	5.265	-1.764	(10)
Ecuador				
UT.GDP.2	-.077	.031	-2.484**	(22)
Paraguay				
GDP.UT.3	7.144	4.479	1.595	(19)
GDP.UT.4	-1.324	3.742	-.354	(16)
GDP.UT.8	-15.114	5.077	-2.977**	(4)
Uruguay				
GDP.UT.2	.674	3.006	.224	(17)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 99

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GFCF USING T

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.UT.2	2.652	1.080	2.456**	(20)
GFCF.UT.8	-.928	2.020	-.459	(2)
Bolivia				
UT.GFCF.2	-.089	.400	-.222	(23)
UT.GFCF.3	-.126	.053	-2.377**	(20)
UT.GFCF.4	-.191	.078	-2.449**	(17)
UT.GFCF.5	-.286	.122	-2.344**	(14)
Brazil				
UT.GFCF.4	-.344	.182	-1.890***	(8)
UT.GFCF.5	-1.219	.347	-3.513***	(5)
UT.GFCF.6	-.849	.537	-1.581	(2)
GFCF.UT.2	-1.974	.614	-3.215*	(14)
GFCF.UT.3	-2.268	1.100	-2.062**	(11)
GFCF.UT.4	-3.494	1.421	-2.459**	(8)
Chile				
GFCF.UT.2	-1.650	.616	-2.679**	(7)
Colombia				
GFCF.UT.3	-1.723	.812	-2.122**	(19)
GFCF.UT.4	-2.772	.947	-2.927*	(16)
GFCF.UT.5	-2.934	1.144	-2.565**	(13)
GFCF.UT.6	-2.239	1.585	-1.413	(10)
GFCF.UT.8	-1.718	.830	-2.070	(4)
Ecuador				
UT.GFCF.2	-.251	.102	-2.461**	(22)
UT.GFCF.3	-.417	.125	-3.336*	(19)
Paraguay				
GFCF.UT.2	-1.653	.612	-2.701**	(10)
GFCF.UT.3	-2.578	.677	-3.808**	(7)
GFCF.UT.4	-6.878	.761	-9.038*	(4)
Peru				
UT.GFCF.5	-.064	.091	-.703	(13)
UT.GFCF.6	-.030	.080	-.375	(10)
UT.GFCF.7	-.163	.122	-1.336	(7)
UT.GFCF.8	-.450	.106	-4.245**	(4)
GFCF.UT.2	-.555	.484	-1.147	(22)

GFCF.UT.3	-.285	.607	-.470	(19)
GFCF.UT.4	-.384	.659	-.583	(16)
GFCF.UT.5	-.394	.771	-.511	(13)
Uruguay				
UT.GFCF.2	-.294	.110	-2.673**	(17)
UT.GFCF.3	-.616	.165	-4.248*	(14)
UT.GFCF.5	-.766	.257	-2.980**	(8)
UT.GFCF.6	-1.474	.383	-3.849**	(5)
Venezuela				
UT.GFCF.8	-2.074	.403	-5.146*	(4)
GFCF.UT.2	-3.134	.949	-3.302*	(22)
GFCF.UT.3	-3.276	1.505	-2.177**	(19)
GFCF.UT.4	-2.310	2.423	-.953	(16)
GFCF.UT.5	-.794	4.221	-.188	(13)
GFCF.UT.6	-.910	4.952	-.184	(10)
GFCF.UT.7	5.469	7.540	.725	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.9)-(5.3.12).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

Appendix E

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE OF CAUSALITY USING Θ

TABLE 100

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GDP USING Θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Chile				
EPDD.GDP.2	.027	.020	1.350	(7)
Colombia				
EPDD.GDP.4	.067	.060	1.117	(11)
EPDD.GDP.5	-.716	.065	-11.015*	(8)
Ecuador				
EPDD.GDP.6	.326	.049	6.653*	(5)
GDP.EPDD.2	3.623	1.268	2.813**	(17)
GDP.EPDD.3	3.728	.881	4.232*	(14)
GDP.EPDD.4	3.467	.671	5.167*	(11)
Paraguay				
EPDD.GDP.5	.104b	.333	.312	(7)
GDP.EPDD.6	.920	.404	2.277***	(4)
Peru				
EPDD.GDP.3	.416b	.748	.556	(14)
GDP.EPDD.2	8.214	2.254	3.234*	(17)
GDP.EPDD.3	8.977	2.370	3.788*	(14)
Uruguay				
GDP.EPDD.5	15.217	20.091	.757	(8)
GDP.EPDD.7	9.234	11.134	.829	(2)
Venezuela				
EPDD.GDP.4	.570	.410	1.390	(10)
EPDD.GDP.5	.560	.243	2.304***	(7)
EPDD.GDP.6	.699	.226	3.093**	(4)
GDP.EPDD.2	.602	1.330	.453	(16)
GDP.EPDD.3	3.976	2.525	1.575	(13)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

bStability condition for H is not satisfied.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two tail.

TABLE 101

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EPDD AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Ecuador				
EPDD.GFCF.3	-3.441	13.222	-.260	(14)
EPDD.GFCF.4	-6.640	37.630	-.176	(11)
GFCF.EPDD.2	1.825	.658	2.774**	(17)
GFCF.EPDD.3	2.110	.641	3.292*	(14)
GFCF.EPDD.4	1.413	.641	2.204**	(11)
GFCF.EPDD.7	.341	.355	.961	(2)
Paraguay				
EPDD.GFCF.3	-.130	.220	-.591	(7)
GFCF.EPDD.2	2.633	.508	5.183*	(10)
Peru				
EPDD.GFCF.3	-.591	.477	-1.239	(3)
EPDD.GFCF.5	-.561	.132	-4.250*	(8)
EPDD.GFCF.6	-.516	.205	-2.517***	(5)
Venezuela				
EPDD.GFCF.3	-.498	.271	-1.838***	(13)
GFCF.EPDD.3	2.122	.633	3.352*	(13)
GFCF.EPDD.6	1.002	.839	1.194	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 102

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Chile				
GDP.ADSR.2	.003	.005	.600	(13)
GDP.ADSR.3	.003	.003	1.000	(12)
Colombia				
ADSR.GDP.4	265.857	105.009	2.532**	(21)
ADSR.GDP.5	3.953	240.719	.016	(20)
ADSR.GDP.6	-3887.850b	21890.436	-.178	(19)
GDP.ADSR.6	.002	.0004	5.000*	(19)
Ecuador				
ADSR.GDP.2	622.167	712.954	.872	(23)
ADSR.GDP.3	-1428.731	2099.661	.680	(22)
ADSR.GDP.4	-412.101	950.065	-1.928***	(21)
ADSR.GDP.5	-1234.794	280.014	-4.410*	(20)
GDP.ADSR.2	-.001	.001	-1.000	(23)
GDP.ADSR.3	-.0005	.002	-.250	(22)
GDP.ADSR.4	-.0003	.002	-.150	(21)
GDP.ADSR.5	-.001	.001	-1.000	(20)
GDP.ADSR.6	-.001	.001	-1.000	(19)
GDP.ADSR.7	-.002	.015	-.133	(18)
Paraguay				
ADSR.GDP.2	18651.412b	30527.353	.611	(22)
ADSR.GDP.3	36264.352b	44010.768	.824	(21)
ADSR.GDP.4	24039.686b	12246.461	.509	(20)
ADSR.GDP.5	46050.676b	67741.800	.680	(19)
Venezuela				
ADSR.GDP.2	-607.253	715.853	-.848	(22)
ADSR.GDP.3	-33927.500	1696869.300	-.020	(21)
ADSR.GDP.4	1817.273b	7113.138	.255	(20)
ADSR.GDP.5	374.087b	176.810	2.116**	(19)
ADSR.GDP.6	183.869b	251.571	.731	(18)

The methodology use here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

bStability condition for H is not satisfied.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 103

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN ADSR AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Colombia				
ADSR.GFCF.2	161.786	77.726	2.081**	(23)
ADSR.GFCF.3	148.793	106.834	1.393	(22)
ADSR.GFCF.4	157.209	34.241	4.591*	(21)
ADSR.GFCF.5	133.927	22.223	6.027*	(20)
Ecuador				
ADSR.GFCF.3	4491.393	21997.903	.204	(22)
ADSR.GFCF.4	12965.786	135144.620	.096	(21)
GFCF.ADSR.3	-.001	.001	-1.000	(22)
GFCF.ADSR.4	-.002	.001	-2.000***	(21)
GFCF.ADSR.5	-.005	.012	-.417	(20)
GFCF.ADSR.6	.001	.002	.500	(19)
GFCF.ADSR.7	.001	.000	undefined	(18)
Paraguay				
ADSR.GFCF.2	22212.189b	37949.558	.585	(16)
ADSR.GFCF.3	19432.462b	14924.296	1.302	(15)
ADSR.GFCF.4	(z) 1187961.600		.092	(14)
Peru				
ADSR.GFCF.5	206.149	53.680	3.840*	(19)
ADSR.GFCF.6	171.914	18.183	9.455*	(18)
Venezuela				
ADSR.GFCF.5	-156.231	82.965	1.883***	(19)
ADSR.GFCF.6	-186.461	244.398	-.763	(18)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

bStability condition for H is not satisfied.

(z)Figure is -109580.590.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 104

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GDP.EXP.2	.743	.228	3.259*	(20)
Bolivia				
EXP.GDP.6	.091	.055	1.655	(10)
EXP.GDP.7	-.600	2.027	-.296	(7)
GDP.EXP.2	1.012	.314	3.223*	(22)
Brazil				
EXP.GDP.2	.329	.084	3.917*	(14)
EXP.GDP.3	.332	.080	4.150*	(11)
Chile				
GDP.EXP.2	.532	4.150	.128	(7)
Colombia				
GDP.EXP.2	2.925	.785	3.726*	(17)
GDP.EXP.3	2.998	.744	4.030*	(14)
GDP.EXP.4	3.092	.587	5.268*	(11)
GDP.EXP.5	2.976	1.026	2.901**	(8)
GDP.EXP.6	16.011b	163.711	.098	(5)
Ecuador				
GDP.EXP.4	2.722	.956	2.847**	(16)
Paraguay				
EXP.GDP.3	.380	.124	2.984*	(18)
EXP.GDP.4	.278	.114	2.439**	(15)
GDP.EXP.7	2.972	.573	5.187*	(6)
Peru				
EXP.GDP.5	.104	.024	4.333*	(7)
GDP.EXP.2	-208.389	5225.850	-.399	(16)
GDP.EXP.3	-41.342	160.820	-.257	(13)
GDP.EXP.4	-7.818	14.717	-.531	(10)
GDP.EXP.5	98.806b	613.040	.161	(7)

The methodology use here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

bStability condition for H is not satisfied.

*Significant at 1% level.

**Significant at 5% level.
***Significant at 10% level.
All tests are two-tail.

TABLE 105

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN EXP AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.EXP.2	.562	.317	-1.773***	(20)
GFCF.EXP.4	1.342	.884	1.518	(14)
GFCF.EXP.5	1.489	.677	2.199***	(11)
GFCF.EXP.8	2.574	.600	4.290***	(2)
Bolivia				
GFCF.EXP.2	.766	1.143	.670	(22)
Colombia				
GFCF.EXP.2	1.201	.851	1.411	(17)
GFCF.EXP.3	1.677	.996	1.736	(14)
GFCF.EXP.4	1.802	.830	2.171***	(11)
GFCF.EXP.5	1.753	1.748	1.003	(8)
GFCF.EXP.6	1.431	1.341	1.067	(5)
Ecuador				
EXP.GFCF.2	.500	.191	2.618**	(22)
GFCF.EXP.3	1.323	.275	4.811*	(19)
GFCF.EXP.4	1.114	.221	5.041*	(16)
GFCF.EXP.5	1.262	.623	2.026***	(13)
GFCF.EXP.6	1.291	.934	1.382	(10)
GFCF.EXP.7	.986	.216	4.565*	(7)
Paraguay				
EXP.GFCF.2	-.029	.229	-.127	(10)
EXP.GFCF.3	.942	.121	7.785*	(7)
Peru				
EXP.GFCF.2	-.396	.213	-1.859***	(16)
GFCF.EXP.3	.122	.755	.162	(13)
Venezuela				
EXP.GFCF.2	.623	.202	3.084*	(16)
EXP.GFCF.4	.516	.103	5.010*	(10)
EXP.GFCF.5	.408	.130	3.139**	(7)
EXP.GFCF.6	.304	.140	2.171***	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.
***Significant at 10% level.
All tests are two-tail.

TABLE 106

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GDP.2	-.032	.022	-1.455	(20)
DFI.GDP.6	-.454	1.331	-.341	(8)
GDP.DFI.4	6.394	12.053	.530	(14)
GDP.DFI.6	-136.115b	311.810	-.437	(8)
Bolivia				
DFI.GDP.6	.106	.168	-.564	(7)
DFI.GDP.7	.023	.077	.299	(4)
GDP.DFI.4	5.663	1.901	2.979**	(13)
GDP.DFI.5	6.067	1.166	5.203*	(10)
Brazil				
DFI.GDP.2	.147	.056	2.625**	(14)
DFI.GDP.3	.160	.061	2.623**	(11)
DFI.GDP.4	.154	.037	4.162*	(8)
DFI.GDP.5	.280	.073	3.836**	(5)
Colombia				
DFI.GDP.8	-.158b	.094	-1.681	(5)
GDP.DFI.3	-8.243	3.451	-2.389**	(20)
Ecuador				
GDP.DFI.2	-5.730	1.774	-3.230*	(22)
GDP.DFI.3	-5.762	2.598	-2.218**	(19)
GDP.DFI.4	-3.100	4.383	-.707	(16)
Paraguay				
DFI.GDP.6	-.006	.154	-.039	(10)
DFI.GDP.7	.030	.016	1.667	(7)
GDP.DFI.3	19.730	12.214	1.615	(19)
GDP.DFI.4	2.004	7.173	.279	(16)
GDP.DFI.5	2.865	3.214	.891	(13)
GDP.DFI.8	4.194	1.233	3.402**	(4)
Peru				
DFI.GDP.2	-.015	.009	-1.667	(22)
DFI.GDP.3	-.020	.010	-2.000***	(19)
DFI.GDP.4	-.017	.008	-2.125**	(16)
DFI.GDP.5	-.015	.010	-1.500	(13)
DFI.GDP.6	-.018	.018	-1.00	(10)
DFI.GDP.7	-.016	.004	-4.00*	(7)

Venezuela				
GDP.DFI.6	10.801	6.486	1.665	(10)
GDP.DFI.7	6.136	10.406	.590	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).
 bStability condition for H is not satisfied.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 107

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN DFI AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
DFI.GFCF.6	.705	.311	2.267***	(8)
GFCF.DFI.5	8.280	2.722	3.042**	(11)
Colombia				
GFCF.DFI.5	-9.221	2.180	-4.230*	(14)
Ecuador				
GFCF.DFI.5	-1.511	3.358	-.450	(13)
GFCF.DFI.8	-5.964	4.740	-1.258	(4)
Paraguay				
DFI.GFCF.2	.284	.162	1.753	(10)
GFCF.DFI.4	.828	.109	7.597*	(4)
Peru				
GFCF.DFI.2	-1.616	4.770	-.339	(22)
GFCF.DFI.6	-4.987	4.312	-1.157	(10)
Venezuela				
GFCF.DFI.8	-.572	.672	-.851	(4)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 108

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GDP USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Bolivia				
UT.GDP.2	-.031	.072	-.431	(23)
UT.GDP.3	-.341	.069	-4.942*	(20)
UT.GDP.4	-.262	.085	-3.082*	(17)
UT.GDP.5	-.372	.409	-.910	(14)
Brazil				
UI.GDP.2	-.151	.082	-1.841***	(14)
UT.GDP.4	-.201	.051	-3.941*	(8)
UT.GDP.5	-.246	.081	-3.037**	(5)
Colombia				
UT.GDP.7	-.142	.016	-8.875*	(7)
GDP.UI.2	-4.888	1.365	-3.581*	(22)
GDP.UI.3	5.925	1.640	-3.613*	(19)
GDP.UI.4	-5.358	.946	-5.664*	(16)
GDP.UI.5	-5.504	1.359	-4.050*	(13)
GDP.UI.6	-5.747	3.210	-1.790	(10)
Ecuador				
UT.GDP.2	-.365	.150	-2.433**	(22)
Paraguay				
GDP.UI.3	13.792	9.165	1.505	(19)
GDP.UI.4	-2.062	5.901	-.349	(16)
GDP.UI.8	-2.914	.929	-3.137**	(4)
Uruguay				
GDP.UI.2	3.585	17.457	.205	(17)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

TABLE 109

TESTS OF SIGNIFICANCE FOR THE SIGN AND MAGNITUDE
OF CAUSALITY BETWEEN UT AND GFCF USING θ

Country	Sum of Causal Coefficients	SE of Sum	t-statistic	(d.f.)
Argentina				
GFCF.UT.2	7.387	4.921	1.501	(20)
GFCF.UT.8	-.318 _D	.657	-.484	(2)
Bolivia				
UT.GFCF.2	-.216	.114	-1.895***	(23)
UT.GFCF.3	-.281	.134	-2.097**	(20)
UT.GFCF.4	-.354	.150	-2.360**	(17)
UT.GFCF.5	-.490	.206	-2.379**	(14)
Brazil				
UT.GFCF.4	-.198	.056	-3.536*	(8)
UT.GFCF.5	-.313	.036	-8.694*	(5)
UT.GFCF.6	-.605	.482	-1.255	(2)
GFCF.UT.2	-2.238	.480	-4.662*	(14)
GFCF.UT.3	-2.032	.532	-3.820*	(11)
GFCF.UT.4	-1.900	.343	-5.539*	(8)
Chile				
GFCF.UT.2	-3.733	1.834	-2.035***	(7)
Colombia				
GFCF.UT.3	-4.619	2.723	-1.696	(19)
GFCF.UT.4	-4.284	1.420	-3.017*	(16)
GFCF.UT.5	-3.752	1.115	-3.365*	(13)
GFCF.UT.6	-4.101	1.738	-2.360**	(10)
GFCF.UT.8	-1.793	.657	-2.729***	(4)
Ecuador				
UT.GFCF.2	-.550	.186	-2.957*	(22)
UT.GFCF.3	-.741	.171	-4.175*	(19)
Paraguay				
GFCF.UT.2	-.759	.226	-3.358*	(10)
GFCF.UT.3	-.965	.201	-4.900*	(7)
GFCF.UT.4	-.650	.027	-24.074*	(4)
Peru				
UT.GFCF.5	-.082	.131	-.626	(13)
UT.GFCF.6	-.025	.063	-.397	(10)
UT.GFCF.7	-.089	.061	-1.459	(7)
UT.GFCF.8	-.111	.012	-9.250*	(4)
GFCF.UT.2	-1.279	1.172	-1.091	(22)

GFCF.UT.3	-.526	.106	-4.962*	(19)
GFCF.UT.4	-.461	.749	-.616	(16)
GFCF.UT.5	-.353	.666	-.530	(13)
Uruguay				
UT.GFCF.2	-.318	.367	-.866	(17)
UT.GFCF.3	-.357	.050	-7.140*	(14)
UT.GFCF.5	-.476	.125	-3.808*	(8)
UT.GFCF.6	-.380	.060	-6.333*	(5)
Venezuela				
UT.GFCF.8	-.189	.003	-63.000*	(4)
GFCF.UT.2	-3.947	.579	-6.817*	(22)
GFCF.UT.3	-3.882	.694	-5.594*	(19)
GFCF.UT.4	-3.527	1.318	-2.676**	(16)
GFCF.UT.5	-1.890	6.263	-.312	(13)
GFCF.UT.6	-1.695	6.527	-.260	(10)
GFCF.UT.7	-7.681b	5.213	-1.473	(7)

The methodology used here to obtain the sign and magnitude of causality is derived in equations (5.3.13)-(5.3.16).

bStability condition for H is not satisfied.

*Significant at 1% level.

**Significant at 5% level.

***Significant at 10% level.

All tests are two-tail.

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