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## Impact of liberalization, economic growth and trade policies on current accounts of developing countries: An econometric study

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Discussion Paper No. 2002/63

## **Impact of Liberalization, Economic Growth and Trade Policies on Current Accounts of Developing Countries**

An Econometric Study

Ashok Parikh\*

July 2002

### **Abstract**

The objectives of this paper are to examine the impact of liberalization on trade deficits and current accounts for developing economies. Attempts at liberalization in trade could lead to an increase in imports in the short run and this could cause both trade and current account deficits in countries that adopt rapid liberalization. Liberalization could increase growth rates in the short run and this also could result into higher imports than exports. The study examines the data of 64 developing economies over the period 1970–99 and conducts a panel data study on the relationship between trade balance to GDP percentages with the growth rates controlling for other factors. Similar analysis is conducted using the current account to GDP percentages in the panel data framework. We consider the endogeneity of growth variable and lagged effects through a dynamic structure. We find that higher growth rates in developing economies result in greater trade and current account deficits although the sensitivity of such trade deficits to growth rates is not high. The higher growth rate in developed countries and improvement in income terms of trade of developing economies tends to reduce trade deficits and current account deficits of developing economies. Liberalization on its own has positive impact but combined with income terms of trade yields a negative overall impact on trade balance to GDP percentages. The impact of improvement in terms of trade and the higher growth in developed countries seems to play a greater role in improving trade balances than the corresponding deterioration induced by higher growth in developing economies.

**Keywords:** liberalization, panel data, dynamic, terms of trade, oil

**JEL classification:** F02, F32, C23, C33, O53

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## **Author's note**

First part of the study is based on UNCTAD (1999) *Trade and Development Report* and uses the data from UNCTAD Trade and Development Statistics. Econometric analysis uses three sets of dependent variables, two from the IMF source and one from the UNCTAD Database. All of them confirm the negative relationship between trade balance to GDP (percentages) and economic growth in a domestic economy.

Figures and tables appear at the end of the paper.

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## **Introduction**

A current account deficit can be defined as the country's excess of investment over savings. However, the saving and investment flows reported in many national income accounts do not conform closely to the theoretically correct concepts of saving and investment when international capital mobility is extensive. Historically, current account balances were slight in post-1945 period initially because of official restrictions on international capital movements, with most industrialised countries' currencies inconvertible until 1959. After the early 1970s net international capital flows have expanded as a result of petrodollar recycling, the removal of many industrial country restrictions on international payments following the adoption of floating exchange rates and technological evolution in the financial industry.

There is a plausible link between economic growth and the external balance, and this was noted in the literature on two-gap models (Chenery and Bruno 1962) in 1960 and the balance of payments constrained economic growth (Thirlwall 1979). In the two-gap models, the first one relates to the resources needed for investment as external capital flows permit developing countries to invest more than their domestic savings. This alone is sometimes not sufficient to accelerate capital accumulation and economic growth because the foreign exchange gap becomes dominant. Both investment and growth in developing countries are dependent on imported intermediate and capital goods. It is probable that even if domestic savings are sufficient to finance all the investment, a developing country may not be able to carry out investment projects if the foreign exchange available to run the projects is not adequate. Investment in this instance would be lower than the one that could be financed by savings generated at full employment of existing resources. Hence, the production capacity would be underutilized and income and savings would be reduced. Capital inflows can reduce the foreign exchange gap, allowing imports, investment and savings to be raised above the levels constrained by export earnings. The balance of payments constrained model of growth predicts that the rate of the growth of a country is equal to the rate of growth of the volume of exports divided by the income elasticity of demand for imports. Both these approaches are largely static and do not adequately capture the link between trade and economic growth. In the dynamic context, the role of exports is not only to earn extra foreign exchange but also to create the domestic market because the latter would allow the industry to operate at full capacity while the former would generate surplus foreign exchange. Export expansion depends upon investment; a sustainable growth process requires dynamic interactions between capital accumulation and exports. In the dynamic process, exports, savings and investment all increase, in absolute terms but initially the savings and foreign exchange gaps tend to be large but over time they should become narrow as domestic savings and exports grow faster than imports and investment. Thus, the economy can continue to grow rapidly despite a relative decline in real resource transfers from abroad. In this respect, we need to focus on a dynamic framework where intertemporal utility maximization subject to current account constraint is considered. One of the conclusions of these models is to explain the smoothed consumption behaviour over time. A country's trade performance is influenced by a large number of domestic factors including its structural characteristics,

resource endowments and policies. External economic environment is no less important in determining the country's trade balance. These vary considerably from country to country and a full account of such influences requires detailed country specific analysis. As the detailed country analysis is not the purpose of this study the scope of this research is confined to examine the impact of a number of common factors namely the global demand, terms of trade, trade and financial liberalization and exchange rate regimes on the trade-balance to GDP percentages. These factors would have presumably influenced the trade and growth performance of a large number of low and medium income developing countries. Slow growth of the developed countries' markets, continued restrictions of access in areas of export interest to developing countries tend to add to trade deficits in developing countries by slowing the pace of their export earnings and leading to terms of trade losses. Trade liberalization widens the deficits as in the short run this produces an upsurge in imports where protection was excessive and the import-substitution strategies were not successful. The lack of coordination between exchange rate management and trade liberalization can lead to trade deficit. Financial liberalization leading to capital account liberalization tends to aggravate payments difficulties by discouraging investment in traded-goods industries.

The objectives of this study are to provide a theoretical framework for the analysis of trade balance and GDP growth relationship and incorporate several exogenous global factors that can have influence on the balance of payments. The other objective is to examine and assess quantitatively the impact of trade liberalization for 14 selected economies that have liberalized at different points of time during the period 1970–91. As our quantitative analysis covers a large number of African, Asian and Latin American developing economies, we use panel data since we want to study the behavioural relationship between trade balance and GDP growth under liberalization, changes in terms of trade and growth in world market demand. As the growth of GDP and trade balance are endogenous variables we propose to estimate the model equation by using instrumental variable estimation for panel data. It is also proposed to look at policies to alleviate the effects of trade and financial liberalization on trade deficits of developing economies. A part of the study is also using dynamic models on panel data and tries to account for endogeneity of the country's growth variable by using instruments.

In Section 1, we review the long-term trends while in Section 2, we consider two gap models and intertemporal framework to examine the consumption smoothing phenomenon and the consequent sustainable current account deficits. In Section 3, we study the impact of liberalization and other factors on trade balance to GDP percentages for 14 developing economies. These economies are from 3 different geographical regions so we do separate study for each region in latter section in case there is a large structural difference among the regions. Also, the study is extended to 64 developing economies over the period 1970–99 and a relationship is derived between trade balance and GDP growth. In Section 4, we treat trade balance-GDP percentage and domestic growth as endogenous variables and estimate a trade balance to GDP relationship using panel data instrumental-variable-techniques. In Section 5, we estimate the relationship between trade balance to GDP percentage and growth by *regions*. A similar model is estimated for the relationship between current account to GDP percentages and economic growth for each region namely Africa, Asia and Latin America. In the final

concluding section we provide summary conclusions with some limitations of the study. Appendix lists the mean values by countries for dependent variables (trade balance and current account deficits to GDP) and domestic economic growth for each of the 64 countries.

## **1 External deficits and growth in developing countries: A review of long-term trends<sup>1</sup>**

### **1.1 All developing countries and territories**

The ratio of the current-account deficit to gross domestic product (GDP) has been relatively stable for the group of developing countries<sup>2</sup> taken as a group over the past decade and a half although it has fluctuated between one and three per cent (Figure 1). This contrasts sharply with the 1970s, where developing countries faced strong fluctuations in their current account but experienced a surplus in most of the years. Developing countries' trade account has moved by and large in parallel with their current account. It is noteworthy, however, that the early 1990s was the first period during which developing countries had a trade deficit for several consecutive years. This has caused the average (group) trade-account position to be worse during the 1990s than in previous periods, with an only slight difference compared with the 1980s but a very large one compared with the 1970s. The rate of growth in developing countries has fluctuated substantially over the past three decades: an average growth rate of about six per cent – but with significant fluctuations around a downward trend – during the 1970s was followed by a sharp drop in GDP-growth at the beginning of the 1980s. GDP-growth was relatively stable at around three to four per cent during the second half of the 1980s and subsequently rose to an average of about five per cent during the first half of the 1990s. Taking the evidence on external deficits and GDP-growth together suggests that for developing countries the external deficits and financial requirements associated with any given growth rate have been larger over the past few years compared to earlier periods.

The evolution of the world market price for crude oil has strongly influenced the external position and rate of growth of developing countries, with significantly different implications for fuel- and non-fuel-exporting countries. The difference in the experience between these two country groups has of course been marked most in the years immediately following the two oil-price hikes in 1973 and 1979 but has been very distinct also over the past few years when the price of oil declined drastically. Given the strong dependence of the major fuel-exporting developing countries on just one export item with a strongly fluctuating price on the world market, they face very specific problems. Therefore, the remainder of this analysis will focus on non-fuel exporting

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1 A large part of the Section 1 is presented in UNCTAD (1999) *Trade and Development Report*. I am grateful to Dr Jörg Mayer for his analysis of issues of a large number of developing countries and their trade policy.

2 Given that data on the current account for the 1970s with a comprehensive coverage of developing countries is available only from the IMF's World Development Outlook database, this section makes use of the IMF's country group convention, i.e. Hong Kong, China SAE, the Republic of Korea, Singapore and Taiwan, Province of China are not included in the group of developing countries.

developing countries. The People's Republic of China will also be excluded from the following analysis for two reasons. First, China may be characterized best as an economy in transition which over the past few years has undergone a change in nature of the way in which the economy functions comparable to that of the transition economies in Central and Eastern Europe which are also excluded from the analysis. Secondly, given that China alone accounts for about 15 per cent of GDP of all developing countries; its external accounts have often moved opposite to those of the group of developing countries as a whole and China's growth rate has been very substantially higher than that of most other developing countries over the past few years, its inclusion would introduce a bias to the analysis. But while the described pattern for non-fuel exporting developing countries is more pronounced if China is excluded, the overall picture does not change if China is included in the analysis.

## **1.2 Non-fuel exporting developing countries excluding China**

Three distinct phases have characterised the evolution of GDP growth and the external accounts of non-fuel-exporting developing countries excluding China since 1970:

- a deterioration in the period between 1970 and the early 1980s which was particularly pronounced in the years immediately following the two oil price shocks (i.e. 1974–75 and 1980–81). The deterioration of the external accounts during the 1970s was not associated with a concomitant decline of growth partly because these deficits could be financed relatively easily given that international capital from commercial sources began to assume a large role since commercial lending was the prime channel to recycle petro dollars.
- a strong improvement between 1982 and 1987–88: this was a period of, first, adjustment and, then, recovery. Developing countries registered a swing in their external accounts by 3 to 4 percentage points of GDP and balanced their trade account towards the end of this period. While the improvement in the external accounts during the crisis and adjustment period of the early-1980s were associated mainly with import compression and falling growth, the relationship between external account and growth became virtuous and very unusual for the short period between 1983 and 1985 when external accounts improved with rising growth.
- a strong deterioration in the external position between 1987–88 and the mid-1990s with a swing back to a deficit level similar to that during the 1970s. Two features of the post-1987 period stand out. (i) The period 1987–90 was characterized by increasing external deficits and slowing growth, i.e. a constellation, which is clearly unsustainable in the long run. During this period many developing countries also underwent a regime change in their trade policy in the sense that they dismantled quantitative restrictions and reduced tariffs, and that they maintained this stance in spite of a worsening trade account. In other words, they stopped using trade policy measures for balance-of-payments purposes. (ii) Even though economic growth in developing countries picked up moderately after 1990, the rates achieved are associated with higher GDP-ratios of their external deficits than in previous periods. This means that over the past decade there has been an increase in the external

financing requirement associated with any given growth rate. As a matter of fact, the relationship between growth and the external position of the past few years mimics that of the period prior to the economic crisis of the early-1980s.

The evolution of the current account position in the non-fuel-exporting-developing countries excluding China has been largely determined by the evolution of their trade and income accounts, while their balances on services and current transfers have not been subject to important changes over the past three decades.<sup>3</sup> During the 1970s and the 1990s, high trade deficits were the main factor behind the rising current account deficit. By contrast, the rising burden of interest payments associated with developing countries' rising external indebtedness caused a strong deterioration in their incomes' account during the early-1980s. They contained the consequent deterioration of their current account by an improvement in their trade account (as can be seen in Figure 1 by the increased difference between the current and the trade account during the 1980s).<sup>4</sup> Figure 2 uses mean values of trade balance and current account deficits to GDP percentages. It can be seen that there is an increased difference between current account and trade deficits after 1990. Similarly in Figure 3, the World Economic Outlook (WEO) are used for the aggregate group of developing countries including fuel economies. The decline in world interest rates since 1989 has reduced the pressure of debt service payments on the current account but this has not translated into lower current-account deficits due to the renewed deterioration in the trade account.

A comparison of the average external positions and growth rates for these three periods reveals a similar general pattern for developing countries as a whole, as well as for several sub-groups thereof.<sup>5</sup> Between the 1970s and the 1980s, developing countries reduced their external trade deficits by about 2–3 percentage points but experienced a drop in the rate of growth by about two percentage points; by contrast, between the 1980s and the 1990s, their trade deficits increased strongly with the rate of growth remaining by and large unchanged. There are a few notable exceptions from this basic pattern of a similar deficit/GDP ratio and a lower growth rate in the 1990s compared with the 1970s:

- the average external trade position of developing countries including the major fuel-exporting countries has worsened throughout the period;

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3 The GDP-ratio of the services account has fluctuated between 0 and –0.5 per cent, while that of the current transfers has fluctuated between 1.5 and 2.0 per cent. With the fuel-exporting developing countries included, the average services/GDP ratio becomes –0.8 to –3.0 per cent and that of the current transfer/GDP ratio 0 to 0.8 per cent. For detailed empirical evidence, see Table A31 in International Monetary Fund, *World Economic Outlook*, various issues.

4 Fuel-exporting developing countries experienced a sharp deterioration in the services account following the first oil-price shock, which explains why in Figure 1 the discrepancy between the GDP ratios of the trade deficit and the current-account deficit widened already during the second half of the 1970s.

5 Given the fact that for many countries country-specific data on the current account are available only from the mid-1980s onwards, the argument presented in this paragraph refer only to the trade account. However, since the available data at the aggregate level shows that trade and current account positions have moved by and large in parallel, it seems reasonable to assume that the following argumentation also applies to the current account.



- the group of non-fuel exporting countries in sub-Saharan Africa has experienced a worsening of both its external position and its growth rate;
- the group of non-fuel developing Asia excluding China raised its growth rate while improving its external position during the 1980s; it is the only region for which the relationship in the first half of the 1990s is not substantially different from that in the 1970s.

Similar movements in the trade account/GDP ratios can be caused by different trends in exports and imports. Export and import value indices give some indication as to whether an improvement in a trade balance of the country was achieved by an increase in exports, a decrease in imports, or both. Statistical evidence shows that after a continuous increase of both exports and imports of developing countries during the 1970s, their exports stagnated and their imports dropped during the first half of the 1980s. By contrast, both imports and exports have risen strongly since 1986. Looking at regional sub-groups suggests that the drastic improvement in the trade balance of non-fuel Developing America during the 1980s were due to a slight increase in exports but mainly due to a very substantial compression of imports. This contrasts sharply with the experience of non-fuel Developing Asia excluding China whose trade balance improved in the 1980s due mainly to a very strong increase in exports-contrary to Developing America, imports also increased. Hence, while import compression is likely to have choked economic growth in Developing America, rising imports were associated with rising growth and rising exports in Developing Asia. Sub-Saharan Africa is the other developing region that experienced strong import compression during the 1980s and, contrary to the situation in Developing America, this experience has not very much improved over the past few years.

### **1.3 Individual country experience**

The pattern of adjustment regarding the combination between the external trade position and growth has not been uniform across developing countries. As already mentioned, it can be expected that rising (falling) growth is associated with a deteriorating (improving) trade account/GDP ratio. An improving trade account/GDP ratio accompanied by rising growth may be called an unusual and virtuous combination, while falling growth accompanied by a deteriorating trade account / GDP ratio is clearly unsustainable. Given that a good part of the 1980s can be considered as a period of crisis and adjustment and hence as exceptional for developing countries, it appears most appropriate to compare the past few years with the 1970s.

Looking at trends in external trade and growth at the level of individual developing countries shows that 34 out of the 84 countries which are included in the analysis have had on average a worse position in both external trade and growth over the past few years compared to the 1970s; 23 countries have had the ‘normal’ but adverse experience of an improving trade position and falling growth, 18 countries had the ‘normal’ and positive experience of rising growth combined with a deteriorating trade position, while only 9 developing countries have succeeded in improving both the external trade position and GDP growth (see Table 1). Given that sub-Saharan Africa has performed significantly worse than any other developing region over the past decade or two, it is not surprising that with 15 almost half of the 34 countries with an unsustainable position

are in that region. However, it is noteworthy that with Colombia, Egypt, the Philippines and Turkey four of the biggest developing countries are also in this group.

Comparing individual country experience between the 1970s and the 1990s with that between the 1980s and the 1990s (Tables 1 and 2) shows that during each of the periods the external trade position deteriorated in the majority of countries, while the majority of countries experienced rising growth rates between the 1980s and the 1990s. However, 15 out of the 29 countries with a deteriorating external trade position and rising growth between the 1980s and the 1990s are in Developing America. It is also noteworthy that, between the 1980s and the 1990s, all the developing countries which have been affected most by the recent financial crisis (i.e. Brazil, Indonesia, Korea, Malaysia and Thailand) experienced a worsening in their external trade position and thus an increase in their external financing requirements.

A perhaps somewhat surprising feature is that Singapore is the only main exporter of manufactures whose external trade position has improved between the 1980s and the 1990s, while that of Hong Kong, Korea, Malaysia, Mexico, Taiwan, Thailand and Turkey has worsened. It should not be forgotten, however, that exports with a comparatively high income elasticity of demand encompasses a much broader spectrum than manufactures. Some countries in the sample have been able to increase exports of agro-industrial goods, such as for example Chile, where export earnings from fruit and fishery and forestry products have, together, come to rival those from copper, and this has helped her to achieve both increased growth and an improved external position between the 1970s and the 1990s.

#### **1.4 World growth and terms of trade**

World growth, and in particular growth in developed countries, experienced a marked and secular decline in the early-1970s. But while developed countries were still growing at an annual average rate of about three per cent during the 1970s and 1980s, their rate of growth slowed down to an average rate of below two per cent during the 1990s. One consequence of this has been a decline in the demand for exports from developing countries as many of the export items serve as inputs for production to the manufacturing industries in developed countries. This decline in the demand for their exports has been particularly harmful for developing countries over the past few years during which many of them have adopted an export-led growth strategy. The combination of an only slow growth in demand and the attempt by many developing countries to capture the same export markets is likely to lead to a situation of falling terms of trade for developing countries. Developing countries have indeed expanded both the volume and value of their exports over the past few years but this has not allowed them to experience a similar increase in the purchasing power of their exports.

Economies with a relatively specialized export structure are more vulnerable to adverse terms of trade shocks so that the sustainable level of their current-account deficit tends to be lower than that of economies with a more diversified export structure. As is well known, many developing countries continue to be heavily dependent on a narrow range of primary commodities for their export earnings. Despite temporary price hikes of primary commodity prices – most recently in the mid-1990s – most developing

countries have been subject to a downward trend in their terms of trade over the medium- and long-term. There is a strong statistical evidence suggesting that the decline in commodity prices since the early-1980s has been mostly of a secular and persistent nature, and that an only small part is attributable to reversible cyclical forces. Moreover, there is evidence that suggests that the volatility in commodity prices has risen steadily and considerably since the early 1970s (Reinhart and Wickham 1994). There can be little doubt that both these movements combined have had detrimental impacts on economic growth and investment in developing countries.

The adverse impact of the recent financial crises in the Asian economies on the demand for primary commodities has added further to the decline in the terms of trade of commodity-exporting countries and the expectation is that commodity prices will remain depressed well into the next century *even though commodity prices have experienced a slight upturn during the first half of 1999* (World Bank 1998). It is clear that under these circumstances commodity-exporting developing countries will find it very difficult to obtain sufficient export earnings to finance the imports required to step up growth. In particular, there is a danger that commodity-exporting countries will be faced with a similar dilemma as in the 1980s when they tried to expand their exports in an attempt to service mounting debt obligations with the result of contributing to a further decline in commodity prices (see e.g. Gilbert 1989). This means that in spite of an increase in the volume of commodity production and trade, many developing countries did not succeed in raising their earnings from commodity exports.<sup>6</sup>

An obvious policy conclusion from the above is that developing countries need to strive for diversification with a view to raising the proportion of manufactures in their exports. *However, those developing countries for which manufactures have been the main source of export earnings have not succeeded in obtaining a lasting improvement in their terms of trade; the terms of trade of these countries have fallen on average by somewhat over 1 per cent per annum since the beginning of the 1980s.*<sup>7</sup> But while a few developing countries have come to export a wide variety of manufactures, many of them have been in the early stages of manufacturing where labour-intensive or natural resource-intensive goods can be produced with a well-established and relatively simple technology. However, there is also a growing concern that such manufactured goods are beginning to acquire the features of commodity exports. This notion of a 'commoditization' of some manufactured goods refers to the fact that there are few, or no, barriers to enter the markets of such low-technology manufactures<sup>8</sup> and output expansions induce price falls. A possible explanation of this phenomenon regards the entry of China into global markets as a major exporter of manufactured products after 1985. It has been argued, for example, that this has resulted in an approximately 20 per

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6 This is because a simultaneous expansion of export volumes by a number of producers results in lower export prices and export revenues for each of them. The group of commodities for which this 'adding-up problem' has been documented include bananas, cocoa, coffee, cotton, tea and tobacco. See Akiyama and Larson (1994).

7 UNCTAD (1995, Table 2.5). The group of developing countries classified as major exporters of manufactures include Brazil, Hong Kong (China), Malaysia, Mexico, the Republic of Korea, Singapore, Taiwan (Province of China), Thailand, Turkey and the former Yugoslavia.

8 This definition follows Kaplinsky (1998).

cent decline in the terms of trade of developing countries' manufactured exports between the mid-1980s and the mid-1990s (Wood 1997).

### **1.5 Trade policies and its impact on economic growth**

Regarding the evolution of the level of the real exchange rate, there is significant difference between the three regions. The currencies of the Latin American countries appreciated after trade liberalization as they had adopted a policy of exchange-rate based stabilization – as mentioned above, except Chile for which the data mirrors the substantial devaluation in 1982. (Brazil had experienced a strong appreciation of its currency in the late-1980s so that the depreciation shown in the data can be considered a slight correction of that development.) The Asian countries maintained a by and large unchanged level of their real exchange rate, except Turkey whose currency appreciated. By contrast, the African countries (except Kenya, which faced strong appreciation, and Tunisia, which maintained the pre-reform level of its real exchange rate) experienced depreciation after trade liberalization. This phenomenon is marked most in Ghana and Uganda but these two countries had suffered from very strong overvaluation in the pre-reform period. This means that many liberalizing countries have not succeeded in engineering a depreciation of the exchange rate in order to soften the need for contractionary demand policies to contain the balance of payments problems after trade liberalization. This appears to be true in particular for those countries where the discrepancy between the growth rate of imports and that of exports is greatest during the period immediately following trade liberalization (Argentina, Colombia, Mexico and Turkey) all of which experienced a significant appreciation of their real exchange rate. By contrast, countries, which maintained a relatively stable (and realistic) level of the real exchange, i.e. Malaysia, Philippines, Thailand and Tunisia, experienced a relatively balanced growth of their imports and exports in both periods. In addition to the level of imports, their structure has an important bearing on growth and the potential for future exports. A surge in imports of intermediate production inputs and capital goods, particularly machinery and equipment, is likely to hold very different prospects in the medium-term than one dominated by consumer goods. Empirical evidence (UNCTAD 1999) suggests that the share of capital goods in total imports increased after trade liberalization in all four Asian developing, as well as in Argentina and Brazil, strongly dropped in Kenya and Mexico, and remained unchanged in the other four countries. It is also interesting to note that the share of luxury goods in total imports increased in almost all of the fifteen countries, and very significantly so in Argentina, Brazil, Colombia, Tunisia and Turkey. This suggests that the structure of trade liberalization in these countries was less than optimal with regard to stimulating economic growth and exports.

## **2 Theoretical base of current account and GDP growth relationship**

Two gap models namely saving-investment and foreign exchange gaps were based on the treatment of one gap more binding than the other and that provided a lower limit on growth for available capital flow. The Chenery-Strout (1966) model provided an absorptive capacity constraint stating that the peak capital inflow a developing country

could absorb. Bacha (1984) was the first one to mention that the two gaps were identical to the internal and external balances of the open economy macroeconomics with developing country framework. Bacha (1990) introduced the third gap namely fiscal gap in the two gap model and analysed the consequences of foreign resource transfers on the GDP growth rate of developing countries. The utilisation of excess capacity was not considered in the original two-gap models until Taylor (1991) brought the capacity utilisation explicitly in the analysis of foreign capital requirements for developing countries. In the three gap models, the constrained growth rate corresponding to each gap can be derived and with respect to foreign exchange gap one can show how the increased output cuts back on the growth rates and how decline in foreign transfer affect the economies in short and medium run. A reduction in foreign transfer reduces output levels in the short run while over the medium run net exports will rise until the savings gap becomes binding. Basically, the model is static and does not go far enough to analyse the complex process of dynamics of capital accumulation, trade balance and economic growth. We, therefore, consider a dynamic framework under which a constraint of current account balance can be derived under optimisation of consumption over time.

We consider a small open economy inhabited by a representative agent with an infinite time horizon. The economy starts in period  $t$  and continues forever. We normalize population size to unity. The utility function for infinite period is

$$U(t) = \sum_{s=t}^{\infty} \beta^{s-t} U(C_s) \quad (2.1)$$

where  $C_s$  is consumption in period  $s$  and  $\beta$  is the discount rate. Deriving the  $t$  period-budget constraint, the current account with constant interest rate is

$$CA_t = B_{t+1} - B_t = Y_t + rB_t - C_t - G_t - I_t \quad (2.2)$$

where  $CA$  is current account,  $B$  is net foreign assets accumulated on prior dates,  $I$  is investment and is equivalent to changes in capital stock,  $C$  is consumption,  $G$  is government expenditure,  $t$  refers to the time period.

There is an accounting equivalence of that net export surplus in current account is equal to negative value in the capital account. However, current account balance shows the accumulated trade balance over time while the net exports view yields a single period excess of exports over imports. The current account balance is defined as the changes in net foreign assets position between two periods i.e.

$$CA_t = B_{t+1} - B_t$$

If output is determined by  $Y = AF(K)$  i.e. output is a function of capital  $K$  (accumulated over previous periods) with  $A$  as the given technology, the utility function after substitution for consumption in period  $s$  will be

$$U_t = \sum_{s=t}^{\infty} \beta^{s-t} u[(1+r)B_s - B_{s+1} + A_s F(K_s) - (K_{s+1} - K_s) - G_s] \quad (2.3)$$

One finds necessary conditions for maximizing  $U_t$  with respect to  $B_{s+1}$  and  $K_{s+1}$ . For every period  $s \geq t$ , two conditions must hold:

$$U'(C_s) = (1+r) \beta U'(C_{s+1}) \quad (2.4)$$

$$A_{s+1} F'(K_{s+1}) = r \quad (2.5)$$

These are called consumption (Euler) equation (2.4) and the equality between marginal product of capital and the world interest rate (2.5). The relevant infinite-horizon budget constraint is

$$\sum_{s=t}^{\infty} \left( \frac{1}{1+r} \right)^{s-t} (C_s + I_s) = ((1+r)B_t + \sum_{s=t}^{\infty} \left( \frac{1}{1+r} \right)^{s-t} (Y_s - G_s)) \quad (2.6)$$

Generally, there are inherent uncertainties that will affect consumption and investment decisions, which will affect future income and payoffs on investment. In a stochastic environment, we make the assumption of rational expectations and can replace the utility maximization over time under certainty with the expected utility maximization over infinite time period corresponding to equation 2.1. Rearranging the budget constraint and writing  $TB_s = Y_s - C_s - I_s - G_s$  as the economy's trade balance in equation (2.6) we obtain

$$-(1+r)B_t = \sum_{s=t}^{\infty} \left( \frac{1}{1+r} \right)^{s-t} TB_s \quad (2.7)$$

The trade balance is the net output the economy transfers to foreigners each period. Suppose that  $Y_{s+1} = (1+g) Y_s$  where  $g > 0$  is the growth rate in output and that the economy maintains a steady debt-output ratio ( $B_s/Y_s$ ) so that  $B_{s+1} = (1+g) B_s$ . The current account identity would imply a steady imbalance of  $B_{s+1} - B_s = gB_s = rB_s + TB_s$ , which yields

$$\frac{TB_s}{Y_s} = \frac{-(r-g)B_s}{Y_s} = \frac{-B_s}{Y_s/r-g} \quad (2.8)$$

To maintain constant debt-GDP ratio the country need to pay out excess of interest over its growth rate. Alternatively, the necessary trade surplus as a proportion of GDP is equivalent to the ratio of the debt to the world market value of a claim to the economy's entire future. The relationship between trade balance as a proportion to GDP and the country's growth rate is positive.<sup>9</sup> The consumption function for infinite time period is a simple equation. There are, however, possibilities of negative relationship between economic growth and trade balances.

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9 The slow growing economies are likely to suffer the debt burden in the short-run. In 1991, the slow growing Argentina and Nigeria had external debt as 3.9 per cent and 4.8 per cent of GDP respectively while the fast growing Thailand had the same of the order of 0.2 per cent. (Obstfeld and Rogoff 1997)

If output follows a stochastic process

$$Y_{t+1}-Y_t = \phi (Y_t- Y_{t-1}) \quad (2.9)$$

with  $0 < \phi < 1$ ,

then output will be a nonstationary random variable where

$$Y_t = Y_{t-1} + \sum_{s=-\infty}^t j^{t-s} e_s \quad (2.10)$$

In the above equation permanent output fluctuates more than current output level. Consumption smoothing implies that an unexpected increase in output causes an even greater increase in consumption. However, a positive output innovation implies a current account deficit.

The other case is the one where there is a trend productivity growth and a small developing economy is growing faster than the world economy. In this case, debt-GDP ratio is increasing forever which is unstable. This is because a country is promoting higher growth now at the cost of future economic growth. Under our dynamic framework, debt-GDP ratio could increase if there is a positive output shock or the domestic growth rate<sup>10</sup> is higher than the world economy's growth rate. Productivity shocks<sup>11</sup> can occur through terms of trade shocks and also through liberalization policy in a developing economy. A temporary deterioration in terms of trade can cause a current account deficit, whereas a permanent deterioration would cause an immediate shift to the new lower consumption level consistent with external balance.

If we assume that the world real rate of interest is not constant but is equal to the growth rate in developed economies then we have a model equation for trade balance to GDP ratio where  $CA=B_{s+1}-B_s = rB_s + TB_s$  and the ratio of current account to GDP is equivalent to  $TB/GDP+rB/GDP=F$  (GDP growth, Productivity shocks). As productivity shocks are due to terms of trade changes, growth in developed world and liberalization regimes, we use these as determinants of productivity shocks in trade balance to GDP ratios.

$$TB/GDP = F \text{ (GDP growth, Terms of Trade, Growth in Industrial Countries, Liberalization)} \quad (2.11).$$

10 It is now a well-known proposition that with integrated global capital markets there can be no intercountry differences in returns to capital (risk-adjusted) and as capital flows to the country where the rate of return is higher the cross-country differences in marginal products of capital would disappear leading to convergence of output per worker. This proposition was empirically tested and a plausible conclusion to draw from the debate is that there is convergence in output per worker but it has been very slow.

11 In the representative agent model, the higher productivity growth will tend to weaken the current account as people would borrow today against the higher future income. In the overlapping generations model, the productivity growth could raise the labour income of young workers but does not affect the wage incomes of the older workers. As young savers will count more heavily in aggregate saving than old dissavers, saving will tend to rise and the current account to improve. (Obstfeld 1995).

For current account to GDP percentages, we use world interest rate that is determined by the growth rate in developed countries. So, our estimating equation for CA/GDP is:

$$CA/GDP = F(\text{World Interest Rate, Terms of Trade, Liberalization}) \quad (2.12)$$

and World Interest rate is determined by the growth rate in developed economies.

In the above relationships, we expect interactions between liberalization and GDP growth and liberalization and terms of trade as liberalization is likely to affect both the terms of trade and economic growth. The marginal effect of GDP growth on TB/GDP will be negative as developing countries are likely to grow faster than developed countries and their import propensity will be higher than export propensity in the short-run. Moreover, the marginal impact of terms of trade will be positive as improvement of terms of trade in favour of developing economies will lead to improvement in TB/GDP ratio. The higher growth in developed economies will improve trade balance to GDP ratio as the developing countries are likely to export more to developed world since growth in industrialized world creates demand for commodities and raw-materials including intermediate products.

### **3 Trade balance to GDP ratios and its determinants for 14 countries**

#### **3.1 Adverse effects from trade liberalization and an inappropriate level of the real exchange rate**

Since the mid-1980s, a large number of developing countries liberalized their trade regimes. Trade liberalization has usually been part of more comprehensive economic reforms designed to accelerate economic growth. This turn to economic liberalization was the result of a number of factors: it was a response to the economic crisis, which many developing countries had been facing in the years before, including that related to the debt crisis; in particular in Latin America there was a feeling that import substitution, which was initially adopted as a policy response to specific conditions prevailing in the international economy, had been continued far too long; last but not least, many developing countries were faced with pressure from multilateral financial institutions to liberalize their economies.

The economic rationale for trade policy reform has been debated extensively. It is commonly based on the view that the move towards a liberal trade regime leads to more efficient resource use, better access to state-of-the-art technologies and greater productive efficiency through the exposure of the domestic economy to world market discipline. The move towards a more efficient mix of investment, production and trade is expected to enhance a country's medium-term growth prospects. There is a large body of empirical literature that generally shows that countries with more open trade policies, as well as those with a faster speed of integration into the world economy, grow faster than countries that are more inward oriented even though it is not always clear to what extent the results of these studies are sensitive to the debatable



classification of East Asian economies as ‘open’.<sup>12</sup> It has also been widely recognized that trade liberalization does not come without costs. This view has been based mostly on microeconomic considerations arguing that the private economic and social costs of trade liberalization can be large for some groups and individuals (e.g. workers in import-competing industries) but that these costs are only temporary and that on aggregate benefits more than outweigh costs.

Balance of payment constraints can have a decisive influence on the design of trade reform, as well as on the sustainability of reform and the pace of economic growth. This is particularly so if trade reform is not backed up by appropriate exchange rate policies and trade-restrictions remain an integral element of the balance of payments position required to preserve macroeconomic stability and rapid growth. Before the widespread adoption of more liberal trade policies over the past two decades or so, developing countries routinely tightened their trade regimes when they were experiencing balance of payments problems.<sup>13</sup> Such concerns and experiences were also reflected in GATT-rules allowing member countries to have recourse to temporary restrictions on trade in goods and services for balance of payments purposes (GATT Article XVIII).

Given that imports usually react much faster than exports to trade liberalization, trade policy reforms lead to balance of payments problems and lower rates of economic growth if the government uses contractionary fiscal and monetary policies in order to dampen the import boom without resorting to exchange-rate devaluation. The adoption of contractionary macroeconomic policies is designed to reduce imports by reducing the level of economic activity. However, domestic capital formation in the tradeable sector is likely to be adversely affected by these restrictive demand policies with the result that the supply response in that sector is both delayed and smaller. In *industrialized countries*, devaluing the exchange rate concomitantly with the adoption of trade liberalization reduces the extent of required contractionary macroeconomic policies as it helps to reduce the import bill and to raise export earnings, thereby containing the deterioration in the trade account (see e.g. Dornbusch 1990). In *commodity-producing countries*, devaluations have usually a less favourable impact on the country’s export earnings as a higher volume of exports cause a fall in prices.

Little attempt has been made to assess the size of devaluations needed to accompany a move to trade liberalization. This reflects, partly, the theoretical and empirical difficulties in determining the appropriate real exchange rate, and partly, the difficult political economy issues raised by devaluation (see Dornbusch 1990). Moreover, trade liberalization cannot be accompanied by a devaluation if inflation is out of control and the nominal exchange rate, in combination with other nominal variables such as wages, are used as nominal anchor during disinflation. The latter has been a prominent feature of the turbulent adjustment processes in Argentina, Brazil and Mexico in the 1990s and

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12 See *Trade and Development Report* (UNCTAD 1997) for discussion. For a critical assessment of the empirical evidence, see also Rodriguez and Rodrik (1999).

13 For discussion, see for example Little et al. (1993).

in Chile in the late 1970s (but this strategy was reversed in Chile with the 1982-devaluation).<sup>14</sup>

Whereas until the 1980s developing countries tended to liberalize their trade policy regimes only in periods of trade account surpluses, they have increasingly come to adopt and maintain trade liberalization in spite of existing trade deficits. This change in trade policy has occurred mainly in Latin America and Africa, while Asian countries have followed a more selective and gradual approach to trade liberalization. There was a significant opening to foreign direct investment (FDI) in South-East Asian countries in the mid-1980s. This opening has partly been designed to raise the supply of new technology for industrialization, i.e. an objective that is closely related to the main economic rationale for trade policy reform, as mentioned above. Hence, changes in openness towards FDI can serve as a measure for changes in integration in these countries.

An attempt can be made to date the change in policy from when on trade policy has not been tightened. This has been done for 15 countries.<sup>15</sup> Five countries from Latin America – Argentina (1991), Brazil (1991), Chile (1976), Colombia (1991) and Mexico (1986); five countries from Asia – Korea (1986), Malaysia (1988), Philippines (1986), Thailand (1986) and Turkey (1989); and five countries from Africa – Ghana (1985), Kenya (1993), Morocco (1984), Tunisia (1989) and Uganda (1988). However, to isolate the impact of this regime change on the liberalizing country's trade account is made difficult by the fact that trade liberalization has in some cases been preceded or accompanied by exchange rate devaluation or a move towards a more flexible exchange rate regime. Therefore, an evaluation of the changes in imports and exports following trade liberalization also needs to take exchange rate changes into account. Turkey was excluded because no data on income terms of trade were available.

### **3.2 Trade liberalization and growth in exports and imports**

It is convenient to distinguish the immediate impact of trade liberalization on the growth rate of imports and exports from its more medium-term impact because exports usually pick up only after a time lag. Regarding the period immediately following trade liberalization, imports grew faster than exports in all ten countries from Latin America as well as for Kenya; the other four African countries show a more balanced development (Table 4). In a medium-term period after trade liberalization, by contrast, exports and imports grew at about the same speed, except Brazil where imports grew very significantly stronger than exports, and Argentina where exports grew much faster than imports. However, Argentina's imports had grown at a rate of over 60 per cent during the period immediately following liberalization, compared to a two-per cent growth of exports, so that it is not surprising that the rate of import growth slowed down. Looking at the two periods combined, the exports of most of the liberalizing countries have not grown fast enough after trade liberalization to compensate for the rapid growth of imports during the years immediately following trade liberalization.

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14 For the adjustment experience of these countries, see, for example, Amadeo (1996). For a recent general discussion of this issue, see Calvo and Vegh (1999).

15 The classification is based on data from three studies: Little et al. (1993), Rajapatirana et al. (1996), and Sachs and Warner (1995). See also Dean et al. (1994).

This evidence suggests that trade liberalization in developing countries has tended to lead to a deterioration in the trade account.

We now present the results of panel data estimation designed to obtain the relation between economic growth and trade balance in developing countries and the effect of liberalization on this relation. These results can also be used in constructing scenarios to estimate payments deficits that could be associated with faster growth in developing countries than has so far been achieved, and hence of their external financing requirements. The model is specified by taking the ratio of trade balance to income (TBGDPIMF and TBGDP from UNCTAD) as the dependent variable, and the growth rate (GROWTH) and the purchasing power of exports (i.e. income terms of trade) (PPI) of developing countries, and the growth rate of developed countries (DEVWD) as explanatory variables. Income rather than barter terms of trade is used to capture the effects of both relative prices and export volumes and to assess the impact of liberalization on import propensity.<sup>16</sup> Liberalization (LIB) is used as a dummy variable and is expected to capture the joint effects of exchange rate appreciation and instability resulting from capital account liberalization as well as the impact of import liberalization. The regression equations are estimated on the basis of panel data estimation techniques using the information for 14 countries over 30 years, i.e. from 1970 to 1999. The equations are estimated alternatively as random effects and fixed effects models. The Hausman test supports the random effects model implying that the intercepts are uncorrelated with the explanatory variables.<sup>17</sup> In general, cross-section and time series data on their own yield very different estimates of a model. If pooled cross-section and time-series data are available, we have more information and this in turn avoids a number of problems encountered with either cross-section or time-series alone. One method of reducing omitted-variable bias is to use a panel instead of the standard cross-country data. Panel estimation controls for differences in time-invariant, unobservable country characteristics, thereby removing any bias resulting from the correlation of these characteristics with the explanatory variables. As a first hypothesis, LIBERAL is used as an intercept shift; i.e. it adds to trade deficits by a constant amount independent of the values of the explanatory variables.

We show the results of various estimation procedures in Tables 5A, 5B and 5C. In Table 5A, we show the result of fixed effects versus random effects models. Three dependent variables are used alternately. In each case, the Hausman test favours the random effects model. Analysing the results of random effects model, we find that the increase in growth by 1 per cent will contribute to 0.19 percentage point to the trade deficit while a similar improvement in growth will contribute to current account deficit

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16 Since the TB/GDP percentage incorporates the barter terms of trade and the export volume, in this formulation the impact of income terms of trade on the trade balance works through import volumes. The model has also been estimated using the net barter terms of trade. The latter had a positive and significant impact on the trade balance, and the effect of other explanatory variables were broadly similar to those obtained with the income terms of trade. However, unlike the specification reported here, liberalization had no effect on the relation between barter terms of trade and trade balances.

17 These models using panel data analysis differ according to whether they treat intercept parameters as random or fixed across the sample. The estimators in the random effects model are the generalized least squares estimators, and they combine the within and between country estimators using the corresponding residual variances as weights. For elementary panel data techniques see Johnston (1996). For special treatment of panel data models, see Wooldridge (2002).

by 0.15 percentage point *ceteris paribus*. The faster growth in developed economies tends to reduce the deficit and 1 extra percentage point growth in developed world will improve the trade balance to GDP by 0.79 percentage point and current account by 0.51 percentage point. An increase in oil prices tends to have a negative effect on both current account and trade balance as oil-producing economies are not in our sample. Liberalization significantly improves current account but on its own liberalization does not have a significant effect on trade balance. The improvement in terms of trade on its own improves both trade balance and current account but when liberalization impact is considered along with the improvement in terms of trade, the impact of improvement in terms of trade on trade balance is considerably reduced.

In Table 5B, we deal with the problem of endogeneity of growth variable. Growth might depend upon investment to GDP ratio and initial level GDP at constant prices in each country. We therefore adopt instrumental variable approach to the estimation of random effects models. Our test does not reject the hypothesis of zero correlation between country effects and the error term. For each of the three dependent variables we estimate random effects models with IV procedure (Baltagi 1995). Our results marginally worsen with respect to the Growth variable when it is treated endogenous and two-stage estimator is derived. Most of the other coefficients have the same signs as in Table 5A and income terms of trade have a positive impact in improving trade balance to GDP or current account to GDP percentages. The model is static and does not have lagged variables. This is now corrected in Table 5C.

We estimate two further models, one a dynamic model and the other, the first differenced model by using the Instrumental Variable technique. We write the equation for a dynamic model in the following form:

$$y_{it} = d_1 y_{it-1} + d_2 y_{it-2} + \mathbf{X}_{it} \mathbf{B} + \mathbf{a}_i + \mathbf{h}_t + \mathbf{e}_{it} \quad i = 1, 2, \dots, 14, t = 1, 2, \dots, 30 \quad (4.1)$$

$y_{it}$  is the trade balance or current account to GDP in percentages,  $\mathbf{X}_{it}$  is a set of explanatory variables namely liberalization, growth in real GDP, purchasing power of exports (terms of trade), and intereactions of purchasing power of exports with liberalization and Growth rate in real GDP in developed economies.  $\mathbf{h}_t$  is the effects of time or year dummies and may be represented as cyclical impacts on trade balance to GDP percentages. We expect the sign of the coefficients to be positive with respect to purchasing power of exports and growth in developed economies while we expect negative sign with respect to growth in real GDP and oil prices.

Even if  $y_{it-1}$  and  $\mathbf{e}_{it}$  are not correlated, if  $t$  does not approach infinity ( $t=30$  in our case) then estimation by fixed effects or random effects is not consistent even if  $n$  (number of countries) goes to infinity. Arellano and Bond (1991) suggest an alternative procedure that corrects not only for the bias introduced by the lagged endogenous variable, but also permits a degree of endogeneity in the other regressors such as Growth variable on the right hand side variable as a subset of  $\mathbf{X}$  matrix. The Generalized Method of Moments Estimator first differences each variable and then use lagged values of each of the variables as instruments. Specifically,

$$\Delta y_{it} = d_1 \Delta y_{it-1} + d_2 \Delta y_{it-2} + \mathbf{X}_{it} \mathbf{B} + \Delta \mathbf{e}_{it} \quad (4.2)$$

The first three observations are lost due to lags and differencing. Assuming that  $e_{it}$  are not autocorrelated for each  $i$  at  $t=4$ ,  $y_{i1}$  and  $y_{i2}$  are valid instruments for lagged variables. Similarly, at  $t=5$ ,  $y_{i1}$ ,  $y_{i2}$  and  $y_{i3}$  are valid instruments. We thus estimate the dynamic model using the above procedure.<sup>18</sup> For the first differenced model, we explicitly use the instruments for the Growth variable namely investment to GDP ratio, GDP at constant prices of the last period and the growth variable lagged by three periods. We discuss these results using the 14-country sample with 30 observations for each country.

In the first differenced model, the second lag is not used. All the variables are in first differenced form. The second lagged variable is not significant. Of the two results for each dependent variable we prefer the first version as it captures endogeneity of some so called exogenous regressors. For the dynamic model, the signs of the estimated coefficients are in agreement with our *a priori* views. Growth has a negative and significant coefficient and its impact is slightly less on current account to GDP percentages than on trade balance to GDP percentage. The growth in developed world in current period acts as a cushion for averting the current account deficit while liberalization helps to improve current account but liberalisation with income terms of trade tends to worsen the current account and trade balance to GDP percentages. When we control for relevant factors, we find that the impact of 1 per cent increase in growth rate in developing countries tends to worsen the trade balance to GDP percentage by 0.22 points while the current account deteriorates by 0.20 points. When this effect is combined with last period growth the impact on both trade balance and current account is much larger and it is nearly 0.40 points.

#### **4 Trade balance and growth relationships, structural change and endogeneity with a larger sample of 64 countries**

Our study of 14 countries have shown that as expected, growth in a liberalized developing economy is associated with greater trade deficits than in a non-liberalized economy. On the other hand, increases in the purchasing power of exports continue to improve the trade balance in a liberalized economy, but less than before liberalization. This suggests that liberalization tends to raise the import propensity, and is indeed consistent with the rise in the share of imports in GDP in developing countries as a whole from 21.5 per cent in 1990 to over 27 per cent in 1996.

By contrast, the results show that faster growth in industrial countries improves the trade balance in a liberalized developing economy more than in a non-liberalized economy. A possible explanation for this result is that in an open economy emphasizing trade, business is generally more prepared to exploit market opportunities abroad than in an inward-oriented economy.<sup>19</sup> In other words, this result could be due to a positive impact of liberalization on export growth associated with any given growth rate of industrial countries. Accordingly, if industrial countries grow sufficiently rapidly,

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18 Monte Carlo simulation has shown that for panels with  $t=5$  or 6, the bias of the coefficients of lagged dependent variable can be significant, although the bias for the coefficients on other right hand side variables tends to be minor.

19 This could also be true in an economy which is not very open but export-oriented, such as the contemporary China (not included in the sample) or the East Asian newly industrialized economies until the past decade.

acceleration of exports in developing countries could lead to an improvement in their trade balance even though this may bring in more imports than in a non-liberalized economy.

These results are presented in Tables 6 to 11. In Table 6, we present fixed effects and random effects results based on 1620 observations with three dependent variables used alternately. The significant coefficients nearly have the same magnitude in all regressions and the coefficient of liberalization and its interaction with terms of trade are not significant for the current account to GDP regression equation. For trade balance to GDP percentages, increases in the purchasing power of exports continue to improve the trade balance in a liberalized economy, but less than before liberalization. In the model with UNCTAD trade data, the coefficient of liberalization is positive while it is negative with respect to LIBPPI. An increase in oil prices unambiguously tends to deteriorate the trade balance and current account while the growth in the developed world tends to improve the trade balance and current account in all models. For current account model, the random effects model is not rejected while for trade balance to GDP percentage regressions, the random effects model is rejected. This means that there exists a significant correlation between the fixed effect and exogenous regressors.

In Tables 7 and 8 the results of dynamic models are presented. Both first differenced models and dynamic models are estimated by instrumental variable estimation technique. First differences remove the fixed effects and given the dynamics, we introduce lagged effects on changes in TBGDPIMF and CAGDP and TBGDP. We sometimes find that both growth and lagged growth effects are negative on trade balance. This also confirms that the faster growth in a developing economy tends to reduce the trade and current account balance. On the other hand, the larger growth achieved in developed countries tends to assist the trade balance and current accounts. The terms of trade have significant positive effects without liberalization in improving trade balance and current account but liberalization with terms of trade tends to deteriorate the trade balance or current account. A rise in oil prices tends to reduce trade surplus. The results of Table 8 confirm most of the tentative conclusions of Table 7. With a more general dynamic model, the Generalized Method of Moments estimator is provided and this also supports that there is no serial correlation in the error term. However, like many other studies, the Sargan test rejects the overidentifying restrictions. Liberalization does not have a significant impact on the TBGDPIMF, CAGDP or TBGDP. It is terms of trade in conjunction with the liberalization, which tends to deteriorate the trade balance or current account to GDP percentages.

In Table 9, we have introduced real exchange rates variable. This information is not complete and like previous tables, we have unbalanced panel but with reduced number of observations. For all three dependent variables we have 1224 observations. Tables 9, 10 and 11 provide these results with static and dynamic models. If lags are not used, we have contradictions on the choice of fixed effects versus random effects models. For the Current account to GDP percentages and UNCTAD based TBGDP variables, the null hypothesis of random effects is rejected. For TBGDPIMF, the hypothesis of random effects is accepted. In Table 10, models based on first differences are presented. Instruments are used and IV estimation is carried out. These results probably suffer from serial correlation of higher order as higher order lagged dependent variable is

significant. When the dynamic model is estimated with GMM procedure, we find that there is no second order serial correlation in error term and lagged dependent variables have significant coefficients in all models when all variables used are in first differenced form. These results point out the importance of real exchange rate. A depreciation of real exchange rate improves trade balance and current account. Growth, PPI, Libppi and Oilpr all have correctly signed coefficients. Lib and Libppi loses its significance when real exchange rate is introduced in the model.

## 5 Estimation of model by regions

A possible shortcoming of the above specifications is the treatment of 64 countries as one sample and this may have serious limitation as different countries belong to different regions and there are sometimes trade blocks within regions. We decided to treat Africa, Asia and Latin American countries separately. For the African, Asian and Latin American block we have respectively 30, 14 and 20 countries in the original sample. If we exclude the countries for which the information on income terms of trade (PPI) is not available we have respectively 25, 11 and 18 countries in our sample. As we divide into blocs, we have more observations over time compared to countries. We use time demeaned observations<sup>20</sup> and then pool the sample for each bloc and treat growth as an endogenous variable for which a separate equation is estimated. We propose a model where

$$\begin{aligned} TBGDPIMF_{it} &= \mathbf{b}_0 + \mathbf{b}_1 GROWTH_{it} + \mathbf{b}_2 PPI_{it} + \mathbf{b}_3 DEVWD_{it} + \mathbf{e}_{1t} \\ GROWTH_{it} &= \mathbf{d}_0 + \mathbf{d}_1 GDPLAG_{it} + \mathbf{d}_2 DEVWD_{it} + \mathbf{d}_3 OILPR_{it} + \mathbf{d}_4 LIBERAL_{it} + \mathbf{e}_{2t} \end{aligned} \quad (5.1)$$

The model is not strictly simultaneous as TBGDPIMF does not influence the GROWTH variable directly. The results of this system are presented in Table 12. For African economies, the relationship between trade balance and GDP growth is negative but not significant while for Asian and Latin American countries the increase in growth rate deteriorates the trade balance to GDP percentages significantly. An improvement in terms of trade improves the trade balance for all three groups. The growth in developed world has positive and significant impact on trade balance to GDP percentages in 311111211101011991088987786676556445334322311211122334455667788991010111121213131414151516161717181819192020

The results on growth equation for three blocs differ to some extent. The growth convergence accounted for by the last year's GDP variable does not turn out to be significant although it has a negative coefficient at 10 per cent significant level for Asian economies. However, the sign is negative and there is some evidence of convergence among these economies. The growth in developed world improves the growth in Asian and Latin American economies significantly but it has no significant impact in African economies. An increase in oil prices is harmful to growth in both African and Latin American economies. Liberalization has a positive and significant

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20 We subtract the mean of each country (mean calculated with 30 observations over time) from the original observed values and then pool this data for Africa (25 countries), Asia (11 countries) and Latin America (18 countries). As we use the lagged GDP, we lose 25, 11 and 18 observations in each group.

impact on growth in Asia and Latin America while this does not play any significant role in African economies. It seems that structurally, African economies are different from Asian and Latin American economies and the treatment of each bloc might reveal some of the underlying weaknesses of pooling the data of all developing economies together.

A similar model was estimated by using the current account to GDP percentages as a dependent variable in Table 13. The results are quite different between the two as the current account in African, Asian and Latin American economies tend to respond positively to the growth in their economies while trade balance tends to deteriorate with higher growth rate in domestic economy. An improvement in terms of trade improves the current account balances for Asian and Latin American economies. In Asia, the growth rate in developed countries tends to improve the growth in the domestic economy. Oil price rise deteriorates growth in Africa and Latin America while we get opposite effect in Asian economies.

A major conclusion from this model is that both trade balance to GDP and current account to GDP could have different impacts of domestic growth under liberalization. When different models were considered for prediction purposes with low, medium and high values of explanatory variables, we found that the predicted trade balance to GDP deficits did not vary a great deal among them. The sensitivity of trade deficits to GDP percentages is generally low with respect to growth rates in most estimated models. If the world market conditions are favourable such as growth in developed countries and favourable terms of trade for developing economies, then the situation of higher trade deficits with low growth rates are less likely to arise and a suitable trade policy leading to appropriate real exchange rates should be able to mitigate the effects of shocks in the short-run. It also might be the case that the relationship between trade deficits and economic growth might be non-linear and a very high economic growth could result into improvement in trade balance (for example China). In the medium run, the growth in developing economies would perhaps tend to improve trade balance if the developed world provided a faster access to their markets.

## **6 Summary and conclusions**

This long paper has posed variety of problems and one of the most important issue is the capital financing requirements of developing economies in the short to medium run. Globalization has made both developing and developed countries interdependent. In such environment of highly integrated markets for goods, capital and ideas one would expect to observe absolute convergence meaning thereby the same level of output per worker, regardless of country's saving rates or population growth. If one considers a large number of developing and developed countries in the same sample, Baumol et al. (1989) argue that if one looks separately at low income, medium-income and high-income countries, there is evidence of convergence within each group. But his finding does not explain why one does not observe convergence across groups. Within a group, where the countries show the absolute convergence, the process appears to be slow. Barro and Sala-I-Martin (1991) estimate the time period to be 35 years to close half of per capita income within the same group of OECD countries. If the developing



countries were to achieve half of the per capita income of the developed economies in a reasonable time period,<sup>21</sup> enormous help would be needed from developed countries by way of capital financing. Despite the liberalization in trade and finance, private capital is less likely to move in required amounts to developing countries to promote higher economic growth so that they can catch up with the developed countries' per capita income and reduce the disparity in per capita incomes. Trade liberalization has increased the imports of developing countries by and large and although after the initial phase of import growth exports picked up in some developing countries, on the whole it remained insufficient to narrow the trade deficits. Rapid liberalization was sometimes followed by large inflows of capital, currency appreciation and mounting trade deficits but it often ended with a crisis involving reversal of capital inflows, collapse and overshooting of exchange rates, sharp cuts in imports and a deep economic contraction. If developed economies of the world would like to see the prospects of faster growth for developing countries, trade and financial liberalization would not be entirely appropriate without establishing institutions to facilitate a change in developing economies. Moreover, until the structure of the economy becomes favourable for growth, trade and financial liberalization alone will produce short-term reversal in growth rates and divergence in per capita income. The hypothesis that greater integration promotes economic growth is a plausible proposition but there are examples where opening the economy to trade lowers the rate of growth. (Grossman and Helpman 1990, 1991).

Our study has many limitations as the data inadequacies dominate the model estimation. Real exchange rates were not available for all 64 countries although the limited data revealed significant impact of depreciation of real exchange rates in improving trade balance to GDP percentages. The measures of trade liberalization namely Sachs-Warner index or our constructed dummies do not take into account different intensities of liberalization attempts in different time periods. Most often liberalization in almost all measures amount to reduction in tariff and non-tariff barriers by the country concerned. It is not evident that the developed countries have necessarily followed the relaxation of tariff and non-tariff barriers to the same extent as developing countries. This effect was not considered in our study.

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21 Our study does not indicate a significant absolute convergence within the same bloc of countries namely Asia, Africa and Latin America.

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Table 1  
Trade account to GDP ratio and GDP growth: 1989–96 compared with 1970–79  
(excluding 1974–75)

	Improving trade account				Deteriorating trade account			
	More than 10%	5 to 10%	2 to 5%	0 to 2%	0 to 2%	2 to 5%	5 to 10%	More than 10%
Rising Growth	More than 5% growth				Chile			Uganda
	3 to 5%	PNG			<b>China</b>			
	1 to 3%	Benin				Cyprus	Guyana	Ghana <i>Kuwait</i> Jamaica Nepal
Falling Growth	0 to 1%	Guinea-Bissau Jordan <u>Singapore</u>		Pakistan			<b>Malaysia</b> <b>Peru</b> Sri Lanka	El Salvador
	0 to 1%			Senegal	Guinea Madagascar	Bolivia <i>Indonesia</i> <i>Iran</i>	Liberia Zimbabwe	Nicaragua Sudan Tanzania
	1 to 3%	Barbados Burkina Faso <i>Nigeria</i> <i>Syria</i>		Fiji <i>Venezuela</i>	Costa Rica	CAR <b>Colombia</b> Tunisia	Honduras Mali Mauritius <b>Turkey</b>	Guatemala Dom. Republic <i>Libya</i> Zambia
	3 to 5%	Trinidad and Tobago	<b>Korea</b>	<u>Hong Kong</u>	<b>Mexico</b> Sierra Leone <b>Taiwan</b> Togo	Kenya Malawi Morocco	<b>Philippines</b>	Paraguay
	More than 5%	Botswana Congo	<i>Algeria</i> Cameroon <i>Gabon</i>	<b>Brazil</b> Cote d'Ivoire <i>Ecuador</i>			Zaire	<b>Egypt</b> Haiti Rwanda

14 big countries in bold (defined as largest GDP in 1990-95 and GDP greater than US \$60 billion in 1997 excluding the major oil-exporting countries, as well as Hong Kong, Singapore).

12 major oil exporting countries in italics. 9 main manufactures underlined.

All data from ETS except data on current GDP are from World Development Indicators for Ghana, India, Jamaica, Malaysia, Mauritania, Nigeria, Papua New Guinea, Rwanda, Sierra Leone, Sri Lanka, Thailand, Trinidad and Tobago, Zimbabwe. As no data on current GDP are available for 1996 for Barbados, Bolivia, Gambia, Iran, Iraq, Liberia, Libya, Saudi Arabia and Sudan, the second period comprises only 1989-95 for these countries.

Table 2  
Trade account to GDP ratio and GDP growth: 1989–96 compared with 1982–88

		Improving trade account				Deteriorating trade account			
		More than 10%	5 to 10%	2 to 5%	0 to 2%	0 to 2%	2 to 5%	5 to 10%	More than 10%
Rising Growth	More than 5% growth		<i>Syria</i>	<i>Libya</i>	<i>Iran</i>	<b>Chile</b> <b>China</b> <b>Argentina</b>		Guinea Guyana Guatemala Liberia <b>Malaysia</b> Nicaragua <b>Philippines</b> Uganda	Sudan  El Salvador
	3 to 5%	PNG <u>Singapore</u>	Jordan <i>Trinidad and Tobago</i>	<i>Gabon</i>			Bolivia	<b>Kuwait</b> <b>Mexico</b>	
	1 to 3%	Benin <i>Nigeria</i>	<i>Saudi Arabia</i>	Mali	Niger	<i>Ecuador</i>	<b>Chile</b> Fiji <i>Indonesia</i> <b>Peru</b> <b>Thailand</b>		Mauritania Tanzania
	0 to 1%			<i>Venezuela</i>	Bangladesh <b>Colombia</b> Sri Lanka Tunisia <b>India</b>	Cote d'Ivoire	Dominican Republic Jamaica Nepal Costa Rica Zambia	Paraguay	
Falling Growth	0 to 1%	Guinea Bissau	<i>Congo</i>	CAR <b>China</b> Senegal				Malawi	Ghana
	1 to 3%	Burkina Faso		<b>Pakistan</b>	<i>Algeria</i> Cyprus Morocco	<b>Brazil</b> Kenya <b>Turkey</b>	<u>Hong Kong</u> <b>Korea</b> Madagascar	Mauritius Zimbabwe	Gambia
	3 to 5%		Chad	Togo		Barbados <b>Egypt</b> Haiti Botswana Democratic Rep of Congo Rwanda	Sierra Leone	<b>Taiwan</b>	
	More than 5%	Cameroon	<i>Iraq</i>				Burundi		

18 big countries in bold (defined as largest GDP in 1990-95 and GDP greater than US \$60 billion in 1997 excluding the major oil-exporting countries, as well as Hong Kong, Singapore).

9 major oil exporting countries in italics. 9 main exporters of manufactures underlined.

All data from ETS except data on current GDP are from World Development Indicators for Ghana, India, Jamaica, Malaysia, Mauritania, Nigeria, Papua New Guinea, Rwanda, Sierra Leone, Sri Lanka, Thailand, Trinidad and Tobago, Zimbabwe. As no data on current GDP are available for 1996 for Barbados, Bolivia, Gambia, Iran, Iraq, Liberia, Libya, Saudi Arabia and Sudan, the second period comprises only 1989–95 for these countries.

Table 3A  
Average annual growth rates of import and export values,  
Selected developing country groups, 1970–96, percentages

	1970–79 less 1974–75		1982–88		1989–96	
	Exports	Imports	Exports	Imports	Exports	Imports
Developing countries and territories	22.0	18.6	2.0	2.6	11.7	12.4
Non-fuel developing countries	21.6	17.9	9.0	5.5	12.1	13.4
Non-fuel developing countries excl. China	21.4	17.5	8.8	4.8	11.7	13.5
Non-fuel sub-Saharan Africa	14.0	13.4	3.2	1.0	6.2	6.1
Non-fuel Developing America	18.8	15.0	2.9	-1.9	9.7	13.9
Non-fuel Developing Asia and Oceania	26.5	21.8	12.9	9.6	13.2	13.9
China	25.7	28.2	12.3	16.4	15.9	12.8

Source: UNCTAD database.

Table 3B  
Average annual growth rates of import and export volumes  
Selected developing country groups, 1970–96, percentages

	1970–79 less 1974–75		1982–88		1989–96	
	Exports	Imports	Exports	Imports	Exports	Imports
Developing countries and territories	6.9	5.9	4.7	1.2	8.2	9.3
Sub-Saharan Africa	6.4	7.0	0.8	-6.8	3.6	2.4
Developing America	6.3	3.0	2.8	-4.5	6.7	9.1
South and South-East Asia	15.2	8.5	11.7	9.0	11.4	11.6
Non-fuel developing countries	10.6	4.9	8.6	3.9	11.6	10.0

Source: UNCTAD Handbook of International Trade and Development Statistics, various years.

Table 4  
Growth of imports and exports and movements of real exchange rates after trade  
liberalization in selected developing countries

Name of country/region	Year of regime change in trade policy	First two years after regime change in trade policy			Subsequent ten years <sup>a</sup>		
		Growth <sup>b</sup> of Exports	Imports	Real exch. rate <sup>c</sup>	Growth <sup>b</sup> of Exports	Imports	Real exch. rate <sup>c</sup>
Latin America							
Argentina	1991	2	65	87	22	13	76
Brazil	1990	2	5	110	8	33	104
Chile	1976	17	31	98	9	4	119
Colombia	1991	2	24	93 <sup>d</sup>	14	12	75
Mexico	1986	6	18	93	15	16	64
Asia							
Malaysia	1988	18	32	103 <sup>d</sup>	18	18	104 <sup>d</sup>
Philippines	1986	15	18	107 <sup>d</sup>	15	19	98 <sup>d</sup>
Thailand	1986	31	32	98	17	19	86
Turkey	1989	5	15	85	11	18	82
Africa							
Ghana	1985	22	18	141 <sup>d</sup>	12	21	247 <sup>d</sup>
Kenya	1993	12	21	82	n.a.	n.a.	n.a.
Morocco	1984	7	2	157 <sup>d</sup>	7	9	119 <sup>d</sup>
Tunisia	1989	16	13	103 <sup>d</sup>	9	9	100 <sup>d</sup>
Uganda	1988	-21	-25	136 <sup>d</sup>	35	39	242

a Subsequent (under 10) years until 1996, where the regime change was after 1986.

b Annual average growth of value in per cent.

c Index of average real exchange rate with the dollar unless otherwise indicated (year of regime change = 100), and increase in the index indicates depreciation.

d Real effective exchange rate

Source: UNCTAD database, except real effective exchange rates which are from International Financial Statistics.

Table 5A  
14 countries study: Fixed effects model (LEVELS)

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Fixed effect: Regression coefficient and t-statistic	Random Effect Regression coefficient and t-statistic	Fixed effect: Regression coefficient and t-statistic	Random Effect Regression coefficient and t-statistic	Fixed effect: Regression coefficient and t-statistic	Random Effect Regression coefficient and t-statistic
GROWTH	-0.1909 (-4.04)	-0.1899 (-4.04)	-0.1546 (-3.31)	-0.1476 (-3.33)	-0.2359 (-4.31)	-0.2367 (-4.35)
DEVWD	0.7962 (5.14)	0.7963 (5.16)	0.5232 (3.42)	0.5147 (3.37)	0.8398 (5.03)	0.8397 (5.05)
OILPR	-0.0158 (-0.63)	-0.0161 (-0.64)	-0.0966 (-3.87)	-0.0979 (-3.95)	-0.0544 (-2.00)	-0.0548 (-2.02)
PPI	0.0521 (5.80)	0.0524 (5.86)	0.0432 (4.87)	0.0453 (5.20)	0.0484 (5.04)	0.0487 (5.10)
LIBERAL	1.3848 (1.35)	1.4066 (1.37)	2.9799 (2.93)	2.8914 (2.96)	0.8518 (0.69)	0.9029 (0.73)
LIBPPI	-0.0384 (-4.12)	-0.0387 (-4.17)	-0.0334 (-3.62)	-0.0346 (-3.84)	-0.0352 (-3.32)	-0.0355 (-3.38)
CONSTANT	-7.8661 (-8.11)	-7.9037 (-4.78)	-6.4088 (-6.68)	-6.5366 (-6.78)	-7.4548 (-7.14)	-7.4717 (-3.97)
$\sigma_u$	4.6672	5.0264	0.9528	0.6680	5.1617	5.8883
$\sigma_e$	3.9283	3.9283	3.8840	3.8840	4.1691	4.1691
$\rho$	0.5853	0.6208	0.0567	0.0287	0.6052	0.6661
R <sup>2</sup>	0.2447	0.1611	0.1999	0.2011	0.2314	0.1236
F(6,400)	21.60		15.27		F(6,344)= 17.24	
No. observations	420	420	420	420	364	364
Wald $\chi^2(6)$		131.20		99.52		104.84
Hausman Test $\chi^2(6)$		0.51		0.8090		0.14



Table 5B  
14 countries study: Random effects model estimated by error component two stage least squares  
(LEVELS)

Name of the variable	Dependent variable		
	TBGDPIMF	CAGDP	TBGDP
	Random effect Regression coefficient and t-statistic	Random effect Regression coefficient and t-statistic	Random effect Regression coefficient and t-statistic
GROWTH	-0.4544 (-1.81)	-0.1864 (-1.73)	-0.8657 (-2.19)
DEVWD	0.9511 (4.46)	0.5365 (3.41)	1.1738 (3.95)
OILPR	-0.0393 (-1.29)	-0.1175 (-4.51)	-0.0849 (-2.15)
PPI	0.0482 (4.42)	0.0462 (5.16)	0.0388 (2.71)
LIBERAL	2.9100 (2.34)	3.9767 (3.70)	1.4357 (0.91)
LIBPPI	-0.0400 (-3.45)	-0.0413 (-4.18)	-0.279 (-1.87)
CONSTANT	-6.3564 (-3.71)	-5.9801 (-5.45)	-4.3984 (-1.75)
$\sigma_u$	4.1154	0.0	5.6418
$\sigma_e$	8.3764	7.7642	8.1394
$\rho$	0.1945	0.0	0.3245
R <sup>2</sup>	0.0804	0.1743	0.0767
No. observations	336	336	336
Wald $\chi^2(6)$	70.16	69.84	57.49

Instrumented: Growth instruments used: devwd, oilpr, liberal, libppi, growth(-2) inv and gdpcostant

Table 5C  
14 countries study: Dynamic model estimated by Arellano Bond  
Panel data estimation and first differenced regression by instrumental variable estimation

Name of the variable	TBGDPIMF		CAGDP		TBGDP	
	Dynamic model Regression coefficient and z-statistic	First differenced Model using instruments* Regression coefficient and z-statistic	Dynamic model Regression coefficient and z-statistic	First differenced model using instruments* Regression coefficient and z-statistic	Dynamic model Regression coefficient and z-statistic	First differenced model using instruments* Regression coefficient and z-statistic
Lagged Dependent (1)	0.5680 (10.64)	0.0759 (0.16)	0.5487 (9.20)	0.1987 (0.37)	0.4061 (5.29)	-0.0157 (-0.06)
Lagged Dependent (2)	-0.0097 (-0.15)		-0.0132 (-0.20)		0.0467 (0.59)	
GROWTH	-0.2201 (-3.77)	-0.2214 (-3.10)	-0.1987 (-3.37)	-0.2084 (-2.56)	-0.1831 (-4.80)	-0.1621 (-3.04)
GROWTH(-1)	-0.1720 (-3.48)	-0.2123 (-5.22)	-0.1846 (-3.30)	-0.2142 (-5.48)	-0.1964 (-5.99)	-0.1791 (-3.66)
DEVWD	0.5799 (4.60)	0.4218 (3.90)	0.4837 (3.76)	0.3922 (3.39)	0.6899 (3.72)	0.4392 (3.29)
DEVWD (-1)	-0.1264 (-0.83)	0.1097 (0.45)	0.0217 (0.13)	0.1314 (0.55)	0.1030 (0.71)	0.2118 (1.11)
OILPR	-0.0336 (-1.41)	-0.0838 (-2.40)	-0.0882 (-3.47)	-0.0838 (-2.28)	-0.0190 (-0.66)	-0.0542 (-1.18)
PPI	0.0274 (2.75)	0.0452 (3.63)	0.0174 (2.40)	0.0444 (3.37)	0.0317 (3.18)	0.0622 (3.95)
LIBERAL	1.4257 (1.20)	4.7564 (2.63)	0.5540 (0.64)	5.0263 (2.74)	2.0059 (1.48)	3.0977 (1.31)
LIBPPI	-0.0190 (-2.06)	-0.0371 (-2.85)	-0.0138 (-2.01)	-0.0378 (-2.67)	-0.0249 (-2.54)	-0.0256 (-1.43)
CONSTANT	-0.0723 (-1.53)	-0.0757 (-0.40)	0.0649 (1.49)	-0.0476 (-0.24)	-0.0852 (-1.05)	-0.4353 (-1.76)
AC order 1	-3.04 (0.0023)		-3.01 (0.0026)		-2.15 (0.0317)	
AC order 2	0.55 (0.5793)		0.44 (0.6597)		-1.16 (0.2452)	
No. of observations	378	364	378	364	322	308
Wald $\chi^2(10)$	1434.36		994.32		3009.36	
Sargan Test $\chi^2(403)$	1.22		0.12		1.55	
R-square		0.2340		0.3758		0.0358
$\sigma_u$		4.5319		1.1238		5.5742
$\sigma_e$		3.2846		3.4883		3.9661
$\rho$		0.6556		0.0940		0.6639

Instrumented: Lagged Dependent variable, all variables in first differences.

Instruments used: growth, lagged growth, devwd, lagged devwd, oilpr, ppi, liberal, libppi, and lag3 of dependent variable

Note: z-statistic is normally distributed. In the dynamic model, results of robust standard errors are used.

Table 6  
Panel data estimation, fixed effects and random effects models without dynamics (LEVELS)

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
Growth	-0.096 (-3.02)	-0.0957 (-3.01)	0.0008 (0.02)	0.0040 (0.11)	-0.1731 (-5.71)	-0.1727 (-5.69)
DEVWD	0.4686 (3.71)	0.4682 (3.70)	0.4770 (3.28)	0.4815 (3.32)	0.4922 (4.15)	0.4914 (4.13)
OILPR	-0.1040 (-5.38)	-0.1040 (-5.38)	-0.0668 (-3.00)	-0.0663 (-2.99)	-0.1174 (-6.49)	-0.1174 (-6.48)
PPI	0.0373 (7.42)	0.0365 (7.28)	0.0252 (4.36)	0.0239 (4.21)	0.0698 (12.75)	0.0684 (12.52)
LIBERAL	-0.7706 (-0.96)	-0.9452 (-1.18)	-0.5225 (-0.57)	-0.6191 (-0.68)	1.4170 (1.60)	1.1807 (0.182)
LIBPPI	-0.0218 (-3.87)	0.0207 (-3.68)	-0.0040 (-0.63)	-0.0026 (-0.41)	-0.0508 (-7.70)	-0.0493 (-7.47)
CONST	-8.3135 (-10.12)	-8.2172 (-5.79)	-8.1973 (-8.67)	-8.1219 (-7.03)	-12.5937 (-15.57)	-12.4308 (-8.53)
$\sigma_u$	9.032	8.4960	5.0915	4.9713	9.5704	8.8925
$\sigma_e$	6.488	6.4887	7.4677	7.4677	5.9745	5.9745
$\rho$	0.6596	0.6316	0.3173	0.3071	0.7196	0.6900
R <sup>2</sup>	0.1089	0.0527	0.0580	0.0446	0.2066	0.0589
F(53,1560)	56.22		13.76		F(53, 1344) =62.9	
No. observations	1620	1620	1620	1620	1404	1404
Wald $\chi^2(6)$		191.22		96.87		346.96
Hausman $\chi^2(6)$		39.33		2.49		27.13

Figures in parentheses are z-statistics, Z is normally distributed.

Table 7  
First difference panel data models: Instrumental variable estimation with endogenous growth

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic
Lagged Variable	-0.1841	-1.88	-0.2317	-2.16	-0.3543	-1.36
GROWTH	-0.0313	-1.24	-0.0455	-1.69	-0.1003	-4.30
Lag Growth	-0.0562	-2.27	-0.0786	-3.03	-0.1136	-4.54
DEVWD	0.3019	3.19	0.3588	3.61	0.2657	3.14
Lag DEVWD	0.2498	2.46	0.3356	3.14	0.2983	2.27
OILPR	-0.0897	-2.93	-0.0484	-1.52	-0.0756	-2.53
PPI	0.0535	7.40	0.0453	6.01	0.0780	10.83
LIBERAL	2.8264	1.96	2.3874	1.59	0.9025	0.59
LIBPPI	-0.0341	-3.87	-0.0253	-2.75	-0.0227	-2.20
CONSTANT	-0.1288	-0.79	-0.0341	-0.20	-0.3596	-2.20
$\sigma_u$	10.74		6.0370		13.5168	
$\sigma_e$	5.89		6.1327		5.1715	
$\rho$	0.7691		0.4921		0.8723	
Wald $\chi^2(10)$	102.77		87.55		177.88	
No. observations	1404		1404		1188	

Note: Instrumented lagged dependent variable, all variables are in first differences.

Instruments used: growth, lagged growth, devwd, lagged devwd, oilpr, ppi, liberal, libppi and third lag of the dependent variable.

Table 8  
Two-step estimation of a Dynamic Model with lags and instruments: Arellano-Bond estimation

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Regression coefficient	z-statistic	Regression coefficient	z-statistic	Regression coefficient	z-statistic
TBGDPIMF(-1)	0.5074	35.05	0.5267	23.38	0.4799	17.45
TBGDPIMF(-2)	-0.0809	-4.33	-0.0202	-0.71	0.0168	0.73
GROWTH	-0.0397	-1.56	-0.0613	-5.16	-0.1103	-8.14
GROWTH(-1)	-0.1263	-5.27	0.0308	2.12	-0.1009	-8.42
GROWTH(-2)	-0.0800	-2.00	-0.0320	-2.27	-0.0345	-2.03
DEVWD	0.2673	5.11	0.4124	9.99	0.4124	13.28
DEVWD(-1)	-0.1197	-3.20	-0.1328	-3.47	-0.0029	-0.10
OILPR	-0.0808	-9.75	-0.0560	-4.06	-0.0460	-5.29
PPI	0.0342	5.34	0.0283	3.04	0.0586	18.32
LIBERAL	-1.8183	-0.81	1.8121	0.65	2.1461	0.80
LIBPPI	-0.0165	-1.75	-0.0177	-1.44	-0.0373	-2.32
CONSTANT	0.0112	0.22	0.0222	0.38	-0.0802	-2.42
Sargan test	40.49		42.47		50.40	
$\chi^2(529)$						
AC test order 1	-3.45		-3.65		-4.23	
AC test order 2	-0.98		-1.21		-0.96	
Wald $\chi^2(11)$	10823.38		3229.73		5642.77	
No. Observations	1458		1454		1242	

All variables are in first differences. Growth lagged by period 2–5 are used as instruments.

Table 9  
Panel data estimation, fixed effects and random effects models without dynamics with real exchange rates (LEVELS model)

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Fixed effects	Random effects	Fixed effects	Random effects	Fixed effects	Random effects
GROWTH	-0.1701 (-4.90)	-0.1684 (-4.86)	0.0382 (0.89)	0.0484 (0.260)	-0.1766 (-5.38)	-0.1758 (-5.35)
DEVWD	0.5268 (3.97)	0.5254 (3.96)	0.5537 (3.36)	0.5535 (3.35)	0.5021 (4.00)	0.5004 (3.98)
OILPR	-0.0965 (-4.74)	-0.0964 (-4.73)	-0.0257 (-1.02)	-0.0252 (-1.00)	-0.1105 (-5.73)	-0.1104 (-5.72)
PPI	0.0395 (6.23)	0.0388 (6.16)	0.0334 (4.24)	0.0308 (4.01)	0.0715 (11.91)	0.0701 (11.72)
LIBERAL	-0.6189 (-0.62)	-0.7641 (-0.77)	-0.6437 (-0.52)	-0.7151 (-0.59)	1.1261 (1.20)	0.9081 (0.97)
LIBPPI	-0.0258 (-3.51)	-0.0248 (-3.38)	-0.0018 (-0.20)	0.0003 (0.03)	-0.0541 (-7.76)	-0.0525 (-7.55)
REER	2.1679 (7.24)	2.1279 (7.13)	1.2095 (3.25)	1.0015 (2.74)	-1.0534 (-3.72)	-1.0640 (-3.76)
CONST	-10.5569 (-10.82)	-10.3602 (-6.48)	-11.5691 (-9.54)	-11.2773 (-8.22)	-11.7756 (-12.74)	-11.418 (-7.33)
$\sigma_u$	9.3005	9.0209	5.3840	4.7121	9.4245	8.9245
$\sigma_e$	6.1425	6.1425	7.6317	7.6317	5.8148	5.8148
$\rho$	0.6963	0.6832	0.3323	0.2760	0.7243	0.7020
R <sup>2</sup>	0.1480	0.0367	0.0654	0.0342	0.2296	0.0669
F(50,1166)	55.87		11.27		62.29	
No. of observations	1224	1224	1224	1224	1224	1224
Wald $\chi^2(7)$		201.14		77.51		346.08
Hauman $\chi^2(7)$		11.51		257.33		14.42

Figures in parentheses are z-statistics, Z is normally distributed.

Table 10  
First difference panel data models: Instrumental variable estimation with endogenous growth

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic
Lagged Variable	-0.1606	-1.48	-0.2590	-2.10	-0.1932	-0.61
GROWTH	-0.1061	-3.50	-0.0448	1.36	-0.0833	-3.35
Lag Growth	-0.0835	-2.72	-0.0674	-2.08	-0.1089	-4.35
DEVWD	0.2884	2.67	0.3251	2.84	0.1921	2.16
Lag DEVWD	0.2122	1.80	0.2946	2.37	0.2311	1.67
OILPR	-0.1265	-3.48	-0.0639	-1.66	-0.0859	-2.84
PPI	0.0755	7.54	0.0741	7.04	0.0863	9.83
LIBERAL	1.2542	0.68	0.5606	0.28	1.4290	0.85
LIBPPI	-0.0217	-1.72	-0.0121	-0.90	-0.0261	-2.28
REER	2.4838	4.37	2.6695	4.36	-0.2153	-0.41
CONSTANT	-0.1919	-0.86	-0.1130	-0.55	-0.4068	-2.39
$\sigma_u$	10.9249		6.8201		12.04986	
$\sigma_e$	6.0193		6.4038		4.8569	
$\rho$	0.7671		0.5314		0.8602	
Wald $\chi^2(10)$	129.24		117.26		181.40	
No. observations	1044		1044		1044	

Note: Instrumented lagged dependent variable, all variables are in first differences. z is normally distributed. Instruments used: growth, lagged growth, devwd, lagged devwd, oilpr, ppi, liberal, libppi and third lag of the dependent variable

Table 11  
Two-step estimation of a dynamic model with lags and instruments: Arellano-Bond estimation

Name of the variable	Dependent variable					
	TBGDPIMF		CAGDP		TBGDP	
	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic	Regression coefficient	Z-statistic
TBGDPIMF(-1)	0.4150	26.75	0.4668	35.50	0.4460	18.76
TBGDPIMF(-2)	-0.1003	-13.57	-0.0059	-0.87	0.0345	2.00
GROWTH	-0.0853	-7.28	-0.0120	-0.95	-0.1028	-9.94
GROWTH(-1)	-0.0652	-5.93	-0.0133	-1.44	-0.1416	-12.79
DEVWD	0.2728	5.27	0.4192	18.18	0.3300	7.39
DEVWD(-1)	-0.0602	-2.28	-0.1330	-4.54	0.0370	0.80
OILPR	-0.0803	-8.18	-0.0042	-0.41	-0.0415	-5.39
PPI	0.0433	17.78	0.0394	6.30	0.0715	9.73
LIBERAL	-2.4185	-1.43	-1.0652	-0.56	4.8119	1.77
LIBPPI	0.0608	0.54	-0.0112	-1.08	-0.0510	-3.25
REER	2.0643	3.69	1.6162	5.59	-0.2432	-0.28
CONSTANT	-0.1592	-3.75	0.0152	0.39	-0.1310	-4.40
Sargan test $\chi^2(403)$	39.79		43.89		43.94	
AC test order 1	-2.86 (0.0042)		-2.93 (0.0034)		-4.02 (0.0001)	
AC test order 2	-0.90 (0.3680)		-1.22 (0.2211)		-0.56 (0.5765)	
Wald $\chi^2(11)$	6613.65		6550.45		11561.80	
No. observations	1087		1087		1087	

Note: All variables are in first differences.

Table 12  
Three stage least square estimates for Asia, Africa and Latin America on time demeaned observations  
using endogenous growth (Static Model)

Name of variable	Africa		Asia		Latin America	
	Dependent variable		Dependent variable		Dependent variable	
	TBGDPIMF	GROWTH	TBGDPIMF	GROWTH	TBGDPIMF	GROWTH
GROWTH	-0.0099		-1.7204		-0.5965	
	(-0.04)		(-2.51)		(-2.75)	
PPID	0.0190		0.0108		0.0198	
	(3.25)		(3.79)		(3.48)	
LAG TBGDPIMF	0.4382					
	(11.06)					
DEVWDD	0.6993	0.0424	1.8583	0.7407	0.8989	0.3248
	(4.70)	(0.25)	(3.78)	(4.13)	(3.66)	(2.28)
CONSTANT	-0.1462	-0.0615	0.709	0.0463	-0.318	-0.0546
	(-0.69)	(-0.28)	(0.13)	(0.19)	(-0.10)	(-0.30)
GDPLAG		-0.0018		-7.92x10 <sup>-6</sup>		-0.00006
		(-2.35)		(-1.67)		(-1.40)
OILPRICE		0.0393		0.0902		-0.1023
		(0.05)		(3.89)		(-4.54)
LIBERAL		1.4184		1.5409		1.7961
		(1.90)		(2.80)		(4.12)
RMSE	5.703	5.9070	7.9309	4.4072	7.4196	4.1909
$\chi^2$	264.012	8.057	39.1725 27.1029		24.5725	57.89
No. observations	725		319		522	
No. countries	25		11		18	

Note: Endogenous Variables: TBGDPIMF, GROWTH. Exogenous Variables: dewd, ppid, gdplag, oilpr, liberal, oil, libedev.

Table 13  
 Three stage least square estimates for Asia, Africa and Latin America  
 on time demanded observations using endogenous growth with current account to GDP  
 Percentages and growth as endogenous (Static model)

Name of the variable	Africa		Asia		Latin America	
	Dependent variable		Dependent variable		Dependent variable	
	CAGDP	GROWTH	CAGDP	GROWTH	CAGDP	GROWTH
GROWTH	1.7177 (3.32)		1.7705 (1.95)		0.4759 (2.54)	
PPID	0.0091 (1.06)		0.0233 (4.64)		0.0268 (5.51)	
DEVWDD	0.9082 (3.09)	-0.1682 (-1.04)	-0.6174 (-1.01)	0.6384 (3.47)	0.3593 (1.69)	0.2293 (1.62)
CONSTANT	-0.0640 (-0.15)	-0.0045 (-0.02)	0.0300 (0.05)	0.0572 (0.23)	0.0698 (0.25)	-0.0408 (-0.22)
GDPLAG		0.0008 (-1.40)		-0.00001 (-2.19)		-0.00008 (-1.73)
OILPRICE		-0.0861 (-4.18)		0.0686 (2.50)		-0.1206 (-5.41)
LIBERAL		0.4871 (1.06)		-0.2896 (-0.35)		1.0743 (2.50)
RMSE	12.286	5.8931	11.6257	4.3982	6.5553	4.1895
$\chi^2$	56.0091	18.0136	21.5542	18.7913	44.6198	55.0525
No. observation	725		319		522	
No. countries	25		11		18	

Note: Endogenous variables: CAGDP, GROWTH. Exogenous Variables: dewd, ppid, gdplag, oilpr, liberal, oil, libedev



Figure 1

GDP-growth rates, merchandise trade-deficit/GDP ratio and current account/GDP ratio of developing countries and territories, 1970–97, %. From UNCTAD database

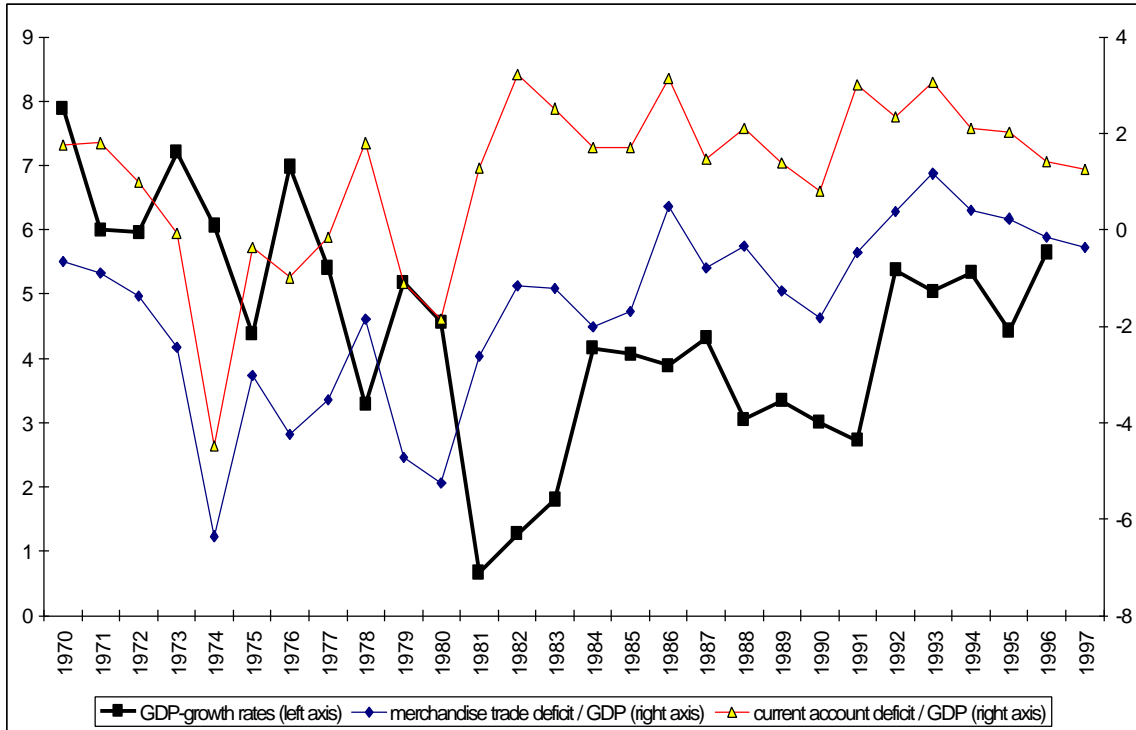


Figure 2

Mean Values of 64 countries for each year on TBGDPIMF, CAGDP and GROWTH. Both TBGDPIMF and CAGDP are deficits with positive signs. Negative values mean surplus on trade and current account.

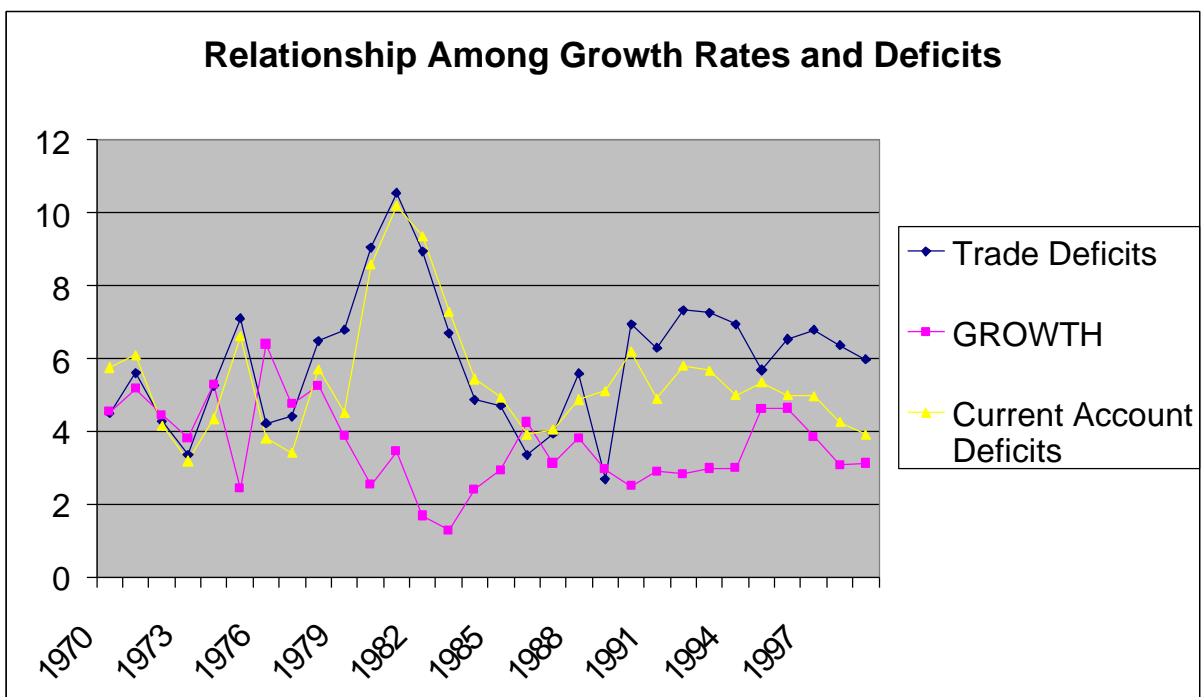
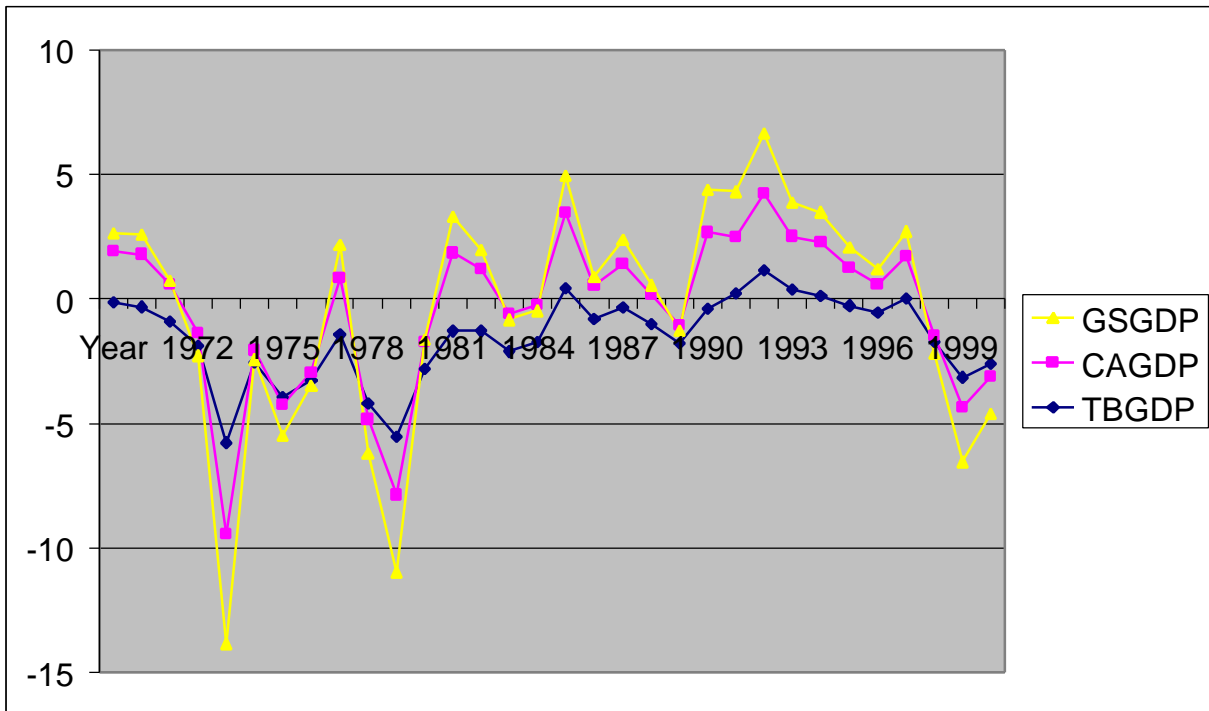


Figure 3

Deficits=Positive, Surplus=Negative





## Appendix

Table A1

Name of country	Country code	Variable	Mean	Standard deviation	Minimum	Maximum
Argentina	32	TBGDPIMF	1.8884	2.4190	-2.7258	6.5773
		CAGDP	-1.2458	2.3374	-4.8600	3.3306
		TBGDP	1.4876	2.5747	-3.2717	7.0184
		GROWTH	2.2322	5.0891	-7.0100	10.5000
Bangladesh	50	TBGDPIMF	-7.5208	1.7371	-11.4925	-5.0768
		CAGDP	-2.4744	1.2300	-4.6391	-0.3936
		TBGDP	-9.3475	2.8169	-13.9451	-1.8967
		GROWTH	3.3403	4.3961	-11.0400	13.5200
Barbados	52	TBGDPIMF	-32.4046	9.6072	-55.9443	-17.4854
		CAGDP	-5.5502	10.1264	-33.0938	9.2000
		TBGDP	-31.1541	6.8050	-42.9750	-20.9293
		GROWTH	2.0430	4.0655	-5.2800	10.7300
Bolivia	68	TBGDPIMF	-1.1226	5.5425	-7.9842	12.1852
		CAGDP	-4.7986	4.0582	-13.3508	7.1837
		TBGDP	-0.1092	4.2786	-8.8818	7.8388
		GROWTH	2.7670	3.0399	-4.4200	6.6300
Botswana	72	TBGDPIMF	-4.3645	15.9220	-36.9148	33.1025
		CAGDP	-5.6271	13.6463	-40.3318	25.6347
		TBGDP	-10.4768	20.3834	-40.4947	42.1077
		GROWTH	10.4200	7.3718	-1.2300	32.3700
Brazil	76	TBGDPIMF	0.9197	15.9220	-6.5547	8.9492
		CAGDP	-3.5330	3.2918	-10.4001	1.5733
		TBGDP	0.5693	2.9138	-5.9209	5.6435
		GROWTH	4.3577	4.8858	-4.6300	14.2900
Burundi	108	TBGDPIMF	-4.2684	4.8717	-12.4797	6.7810
		CAGDP	-4.2381	7.2274	-14.0077	11.7732
		TBGDP	-7.3571	4.9975	-14.3407	2.8137
		GROWTH	2.6610	6.0679	-8.6000	16.1900
Cameroon	120	TBGDPIMF	4.9173	4.6031	-3.1955	17.5801
		CAGDP	-3.1502	3.4713	-8.5727	4.9692
		TBGDP	-0.9058	4.9381	-8.6962	10.0756
		GROWTH	3.7723	7.3716	-7.4000	24.1400
Central African Republic	140	TBGDPIMF	-2.3840	6.5313	-5.1201	18.5783
		CAGDP	0.4159	9.3410	-15.1442	15.6697
		TBGDP	-1.4986	3.4997	-10.1717	4.3287
		GROWTH	1.6040	3.8218	-6.9500	9.6100
Sri Lanka	144	TBGDPIMF	-6.8417	6.3802	-16.6359	5.8913
		CAGDP	-3.7631	4.6460	-11.5581	6.8273
		TBGDP	-8.6914	6.0719	-24.1130	1.2771
		GROWTH	4.6333	2.2947	-2.3600	9.5600
Chad	148	TBGDPIMF	-4.7416	3.7480	-12.0138	2.7595
		CAGDP	-6.3390	5.7317	-16.2418	2.8719
		TBGDP	-8.0537	4.8785	-15.0931	3.1629
		GROWTH	2.2123	7.8670	-21.3700	20.9100
Chile	152	TBGDPIMF	1.3431	3.2763	-6.9112	8.2796
		CAGDP	-3.6378	2.9837	-12.0710	1.4792
		TBGDP	0.1121	3.8599	-10.2467	7.2878
		GROWTH	3.9477	6.0689	-14.0900	10.6600

Name of country	Country code	Variable	Mean	Standard deviation	Minimum	Maximum
Colombia	170	TBGDPIMF	0.4545	3.4180	-7.2988	6.9613
		CAGDP	-2.0484	3.8521	-10.1431	5.5202
		TBGDP	-0.9356	3.1654	-6.3038	5.5779
		GROWTH	4.0007	2.5047	-4.3000	8.4600
Costa Rica	188	TBGDPIMF	-4.4736	3.5715	-12.5409	3.5171
		CAGDP	-7.3211	3.9893	-16.0072	-0.5003
		TBGDP	-7.2446	3.8127	-16.7652	-0.6130
		GROWTH	4.2920	3.5441	-7.4400	8.9000
Cyprus	196	TBGDPIMF	-24.8791	4.5150	-34.9871	-15.2461
		CAGDP	-3.2885	3.7522	-9.3759	5.8437
		TBGDP	-28.5280	3.6786	-34.7910	-21.8587
		GROWTH	-4.8760	7.3613	-19.0000	17.9600
Benin	204	TBGDPIMF	-9.1085	6.5207	-30.2591	0.3222
		CAGDP	-5.2557	7.2364	-30.3098	2.5315
		TBGDP	-17.7971	9.2720	-39.4384	-2.6263
		GROWTH	3.4207	3.4482	-4.9700	9.3800
Dominican Republic	214	TBGDPIMF	-31.6461	17.7122	-73.8215	-4.0879
		CAGDP	-16.9752	13.2829	-47.6680	14.0059
		TBGDP	-11.3933	7.1604	-22.0424	0.1445
		GROWTH	5.0140	3.8572	-5.4600	12.9000
El Salvador	222	TBGDPIMF	-6.6095	7.4749	-18.2862	4.4455
		CAGDP	0.3134	3.3099	-4.9230	5.7325
		TBGDP	-6.3926	6.8022	-21.4374	5.4084
		GROWTH	2.6347	4.0818	-8.6700	7.8600
Fiji	242	TBGDPIMF	-15.0831	3.6594	-22.5925	-9.6636
		CAGDP	-3.4053	4.6179	-14.5176	5.6522
		TBGDP	-12.3139	4.6673	-23.5004	0.0842
		GROWTH	3.6777	5.2738	-6.9200	13.4200
Gambia	270	TBGDPIMF	-10.9853	9.0303	-35.9564	7.8939
		CAGDP	-5.5330	10.3253	-46.5070	8.8364
		TBGDP	-29.6309	15.8949	-58.6799	-1.9758
		GROWTH	4.7200	6.6491	-9.4200	20.0900
Ghana	288	TBGDPIMF	-2.5174	5.8608	-17.8822	7.6489
		CAGDP	-2.7093	3.9941	-14.3904	5.1619
		TBGDP	-3.2012	9.6922	-43.1444	6.0118
		GROWTH	2.4317	4.8875	-13.3800	9.8400
Guatemala	320	TBGDPIMF	-3.6657	3.9326	-11.0641	1.9850
		CAGDP	-3.4829	2.1030	-7.5262	0.3114
		TBGDP	3.7260	3.7770	-11.8382	1.9651
		GROWTH	3.6153	2.7613	-3.5400	7.8100
Guinea	324	TBGDPIMF	2.9358	4.4352	-13.7126	10.9556
		CAGDP	-6.0456	4.4626	-20.0653	3.1276
		TBGDP	0.5379	6.4714	-12.2534	13.1017
		GROWTH	2.3357	4.0741	-10.5800	9.9000
Guyana	328	TBGDPIMF	-6.2827	9.4719	-21.1605	20.9223
		CAGDP	-17.9684	11.1363	-46.0169	3.4000
		TBGDP	-5.9201	10.9614	-37.7140	21.1111
		GROWTH	1.3347	5.3604	-12.3000	9.1400
Haiti	332	TBGDPIMF	-7.0267	3.8511	-15.2595	-2.2828
		CAGDP	-2.3362	2.4391	-7.7340	1.2425
		TBGDP	-10.1232	5.6204	-26.6177	-2.9417
		GROWTH	0.7327	5.0379	-15.1400	8.6400

Name of country	Country code	Variable	Mean	Standard deviation	Minimum	Maximum
Honduras	340	TBGDPIMF	-5.3131	5.4247	-23.0201	3.7661
		CAGDP	-2.0781	2.8886	-12.3422	-0.8235
		TBGDP	-4.2404	2.8638	-9.4133	1.3948
		GROWTH	3.5700	3.4394	-2.9900	10.4900
India	356	TBGDPIMF	-2.4029	1.1316	-4.0070	-0.5210
		CAGDP	-1.0797	0.9505	-2.8851	1.0837
		TBGDP	-5.7992	4.5988	-13.5473	1.5391
		GROWTH	7.4140	4.0372	0.0000	17.4200
Cote d'Ivoire	384	TBGDPIMF	11.6110	3.4065	6.6081	19.6788
		CAGDP	-4.3787	6.0445	-12.9581	9.5136
		TBGDP	6.7424	5.1702	-0.0481	20.7458
		GROWTH	3.3797	7.5354	-17.6600	21.5100
Jamaica	388	TBGDPIMF	-12.5836	8.0629	-23.3099	2.8874
		CAGDP	-5.3852	4.0731	-15.0602	0.2797
		TBGDP	-15.3518	7.0478	-30.4535	-1.9414
		GROWTH	0.8313	3.9504	-6.2700	8.4200
Jordan	400	TBGDPIMF	-35.2538	9.8834	-56.7275	-21.5735
		CAGDP	-19.9567	30.9320	-101.8735	9.3713
		TBGDP	-44.1594	14.4240	-72.4817	-25.1198
		GROWTH	4.1647	7.6127	-13.4500	21.2200
Kenya	404	TBGDPIMF	-8.2182	3.9774	-15.2968	1.2656
		CAGDP	-3.4556	4.3712	-15.2645	2.8748
		TBGDP	-9.2430	3.2429	-14.8567	-2.2896
		GROWTH	4.3277	2.9026	-0.8000	10.8000
Republic of Korea	410	TBGDPIMF	-2.1711	5.9196	-13.5789	13.1282
		CAGDP	-1.3953	5.9761	-14.9549	12.7302
		TBGDP	-4.0625	5.0909	-13.6333	4.8816
		GROWTH	8.2637	4.4478	-5.5000	17.2900
Liberia	430	TBGDPIMF	13.1065	5.9444	4.2622	31.5039
		CAGDP	4.6598	7.7077	-7.3139	27.1820
		TBGDP	7.6929	6.9622	-4.5558	26.4921
		GROWTH	0.8243	3.4734	-10.8000	5.8600
Madagascar	450	TBGDPIMF	-3.1550	2.5037	-9.6667	0.7878
		CAGDP	-6.3585	3.6227	-15.0558	0.8769
		TBGDP	-3.1412	2.4322	-8.1818	1.1284
		GROWTH	1.2520	3.8813	-9.9600	9.8400
Malawi	454	TBGDPIMF	-9.3452	9.1831	-29.3204	3.4660
		CAGDP	-11.6979	7.8023	-31.4850	0.3208
		TBGDP	-9.2687	5.5216	-18.3850	3.6281
		GROWTH	4.2282	6.0841	-10.2000	16.5400
Malaysia	458	TBGDPIMF	8.1311	7.2573	-2.7293	28.6506
		CAGDP	-1.6290	6.8038	-13.4372	15.9470
		TBGDP	5.5792	5.8891	-4.8800	16.5763
		GROWTH	6.7920	3.9066	-6.8000	11.9900
Mali	466	TBGDPIMF	-10.0760	5.4840	-23.8887	0.6401
		CAGDP	-5.7257	3.1218	-12.4937	1.7963
		TBGDP	-11.8473	4.7566	-23.3204	-3.5852
		GROWTH	3.5670	5.9686	-10.1600	18.7000
Mauritania	478	TBGDPIMF	-3.0670	11.2580	-25.7948	14.0870
		CAGDP	-9.7276	11.5652	-40.1216	11.7046
		TBGDP	3.9502	12.1129	-17.2028	21.9249
		GROWTH	2.4623	3.9513	-6.4900	10.4300

Name of country	Country code	Variable	Mean	Standard deviation	Minimum	Maximum
Mauritius	480	TBGDPIMF	-2.6516	7.4566	-14.6467	19.3298
		CAGDP	0.3713	8.2623	-15.1399	25.7278
		TBGDP	-10.9128	5.3756	-20.2469	-0.0177
Mexico	484	TBGDPIMF	-0.1965	3.6432	-4.3880	9.3216
		CAGDP	-2.9233	2.7426	-7.0493	3.6596
		TBGDP	-0.1338	3.9527	-4.7977	9.2666
		GROWTH	3.9436	3.6476	-6.1900	9.1600
Morocco	504	TBGDPIMF	-4.3620	2.5174	-8.6649	0.8932
		CAGDP	-3.9854	3.2555	-9.7996	2.3704
		TBGDP	-9.7502	3.9362	-17.1675	-2.4487
		GROWTH	4.0770	4.7802	-6.6000	12.1000
Nepal	524	TBGDPIMF	-10.9425	4.4853	-17.8132	-2.4907
		CAGDP	-5.2745	2.9429	-10.6744	4.7450
		TBGDP	-10.4005	5.0776	-23.2860	-2.6469
		GROWTH	3.8510	2.9597	-2.9800	9.6800
Nicaragua	558	TBGDPIMF	-16.2344	16.1494	-52.3141	21.2249
		CAGDP	-23.0711	15.6841	-50.3592	16.7368
		TBGDP	-14.2596	11.9056	-34.2354	13.1785
		GROWTH	0.9756	7.1848	-26.5600	14.3100
Niger	562	TBGDPIMF	-2.3564	3.3897	-10.5205	2.2861
		CAGDP	-6.0896	4.3380	-18.0085	2.1693
		TBGDP	-2.7711	2.1787	-7.6319	1.1538
		GROWTH	1.0646	7.5256	-21.3800	14.1000
Pakistan	586	TBGDPIMF	-6.8527	2.8985	-11.1425	-1.7180
		CAGDP	-4.1512	2.0385	-10.0439	-1.2677
		TBGDP	-6.4677	3.2761	-11.5269	0.1288
		GROWTH	4.9616	2.3348	-0.4000	8.7000
Papua New Guinea	598	TBGDPIMF	2.5916	14.9131	-35.2067	29.0796
		CAGDP	-4.6776	13.7523	-36.6639	19.2400
		TBGDP	-2.1369	14.2188	-32.7436	25.0359
		GROWTH	3.0883	4.9566	-5.4000	17.2900
Paraguay	600	TBGDPIMF	-2.9744	3.5303	-9.0517	6.8647
		CAGDP	-3.3452	4.0032	-10.8032	7.3086
		TBGDP	-6.1853	6.3776	-24.7717	5.7228
		GROWTH	4.8053	3.7181	-3.0000	11.4400
Peru	604	TBGDPIMF	-0.0550	3.7657	-6.6666	9.9262
		CAGDP	-6.0261	3.6564	-14.2510	0.5898
		TBGDP	0.2354	4.6000	-8.1882	11.0400
		GROWTH	2.6453	5.8748	-11.9500	13.1300
Philippines	608	TBGDPIMF	-5.5565	4.7495	-13.6903	6.5115
		CAGDP	-2.6285	4.0946	-8.0177	9.6681
		TBGDP	-7.0635	3.9645	-14.6024	0.7971
		GROWTH	3.5663	3.7114	-7.3200	9.2300
Guinea Bissau	624	TBGDPIMF	-16.0474	8.1977	-35.8251	-6.3482
		CAGDP	-17.8838	10.7929	-43.9301	-4.6933
		TBGDP	-19.7764	10.2713	-32.7738	3.3843
		GROWTH	2.7240	7.7173	-21.0000	18.8900
Rwanda	646	TBGDPIMF	-5.8021	8.4926	-44.4804	4.3379
		CAGDP	-3.8744	4.5877	-10.8643	5.9806
		TBGDP	-9.1636	4.2776	-17.4336	0.6889
		GROWTH	3.5060	13.1063	-49.5000	36.6000

Name of country	Country code	Variable	Mean	Standard deviation	Minimum	Maximum
Senegal	686	TBGDPIMF	-8.9019	4.1021	-20.0416	-4.7488
		CAGDP	-7.5401	3.9015	-18.2155	1.1212
		TBGDP	-10.789	4.6099	-23.2208	-4.6562
		GROWTH	2.9133	4.5084	-5.4500	14.6800
Sierra Leone	694	TBGDPIMF	-4.6578	4.9539	-15.1328	6.7732
		CAGDP	-8.3372	4.1530	-16.5723	-1.0080
		TBGDP	-6.4189	5.5627	-18.4729	0.8599
		GROWTH	0.0436	6.2272	-20.2000	10.4300
Zimbabwe	716	TBGDPIMF	2.6822	3.1748	-3.7179	9.9302
		CAGDP	-2.5760	3.5986	-10.2584	3.8936
		TBGDP	-0.7826	5.0710	-15.0948	6.1397
		GROWTH	3.0423	5.1200	-9.0000	13.8600
Sudan	736	TBGDPIMF	-11.3035	17.1930	-72.8740	34.4877
		CAGDP	-16.1241	17.5310	-75.8887	23.3283
		TBGDP	-8.9589	9.5437	-37.9084	1.5557
		GROWTH	3.7653	7.6435	-10.5300	23.6000
Thailand	764	TBGDPIMF	-4.0748	4.5358	-11.4818	10.9383
		CAGDP	-3.4918	4.8045	-8.6796	12.7763
		TBGDP	-6.5553	2.3803	-12.0376	-0.6984
		GROWTH	6.5936	4.0186	-8.0000	13.0800
Togo	768	TBGDPIMF	-5.3044	7.5159	-20.5896	22.9919
		CAGDP	-7.3576	8.8209	-26.9613	27.0151
		TBGDP	-12.7305	8.4449	-32.6200	12.3472
		GROWTH	2.4930	6.5858	-16.4000	16.8000
Tunisia	788	TBGDPIMF	-10.8351	3.2227	-16.1901	-3.0333
		CAGDP	-5.0549	3.8406	-12.7362	1.4992
		TBGDP	-13.2520	3.5622	-17.6695	-5.8293
		GROWTH	5.2940	3.7130	-1.4400	17.5100
Turkey	792	TBGDPIMF	-4.5621	1.8774	-8.0619	-0.7621
		CAGDP	-1.0974	2.0673	-5.2442	3.2526
		TBGDP	-5.0169	1.6929	-8.3097	-2.0097
		GROWTH	4.4176	3.6927	-5.4600	10.4600
Uganda	800	TBGDPIMF	-7.3996	5.6862	-20.0478	0.7228
		CAGDP	-4.9644	5.0900	-21.2744	1.1265
		TBGDP	0.2666	6.3945	-10.5732	11.6967
		GROWTH	3.1330	5.0058	-11.0600	11.4000
Egypt	818	TBGDPIMF	-10.9515	4.6222	-18.5275	-1.6495
		CAGDP	-2.1976	3.7487	-10.5624	8.7345
		TBGDP	-11.8738	6.8574	-22.8823	2.1430
		GROWTH	5.8780	3.2870	2.2100	15.3000
United Republic of Tanzania	834	TBGDPIMF	-11.8284	4.7452	-20.4070	-5.4897
		CAGDP	-6.6679	3.8989	-17.6596	-1.4815
		TBGDP	-16.8097	11.6790	-44.1187	-4.6254
		GROWTH	3.5806	4.2667	-8.9000	16.9500
Burkina Faso	854	TBGDPIMF	-9.9447	3.2743	-16.3687	-2.0011
		CAGDP	-3.4397	3.6752	-12.8000	1.6644
		TBGDP	-11.2036	9.6886	-21.5444	15.2953
		GROWTH	3.9750	3.4814	-1.7700	10.4700
Uruguay	858	TBGDPIMF	-0.5938	3.5276	-7.4040	5.0838
		CAGDP	-1.9839	2.4012	-7.3841	2.8784
		TBGDP	-0.6892	3.5895	-6.1360	5.0668
		GROWTH	2.3486	4.1893	-9.3900	8.8600
Total		TBGDPIMF	-6.0581	11.1496	-73.8215	34.4877
		CAGDP	-5.4156	9.0713	-101.8735	27.182
		TBGDP	-7.7960	11.3761	-72.4817	42.1077
		GROWTH	3.5980	5.4913	-49.5000	36.6000