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Policy Determinants
of Growth

Survey of Theory and Evidence

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The efficiency of investment is as important as the level of in-
vestment in determining growth performance. Policies that
make investment more efficient and reduce distortions in re-
source allocation generally encourage growth.

After exploring the literature on economic growth, Easterly and Wetzel arrive at two broad conclusions:

• The efficiency of investment is as important as the level of investment in determining growth performance.

• Keeping to a minimum the distortion of resource allocation by government policies makes saving and investment more efficient and promotes long-term economic growth. Policies that contribute to the efficiency of investment and that lower distortions in resource allocation will thus generally encourage growth.

Policies that promote investment, liberalize trade restrictions, and remove distortions in

financial markets are likely to raise a country's long-run rate of growth. But more research is needed to formulate structural models of growth that give clear guidance on the effect of various policy measures.

Most of the empirical work on growth does not address the issue of transitions to higl., long-run growth paths that would result from policy changes. We cannot easily dismiss transitional effects as irrelevant.

Much work has been done on the determinants of long-run growth but the most important issues remain unresolved.

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As Table 1 shows, there has been a sharp decline in growth rates in the 1980s compared to previous experience of developing countries. The data further show that growth rates have varied considerably among countries and even among regions over the past decades. Both the decline in growth rates and the striking differences in regional and individual country experience have prompted renewed interest in the theory of economic growth and particularly in how policy can affect growth performance.

Recent work in growth theory has built on the neoclassical framework, but has re-emphasized the contribution that investment makes to technological change and thus emphasizes the impact of investment in both physical and human capital on long-term economic growth. This creates a role in the long-run growth process for policies that affect efficiency of resource use, such as openness to trade, regulation of financial intermediation, investment in infrastructure, health and education as well as development of the institutional environment.[1] In other words, improving policy along these dimensions can raise the long-term rate of growth of output as well as increasing the level of output.

This paper will explore the broad themes of the literature on economic growth. The first section discusses recent literature on the determinants of growth. The second section considers some empirical evidence of the relationship between these variables and growth rates. The two principal conclusions are interrelated. The first is that the efficiency of investment is as important as the level of investment in determining growth performance. The second is that keeping to a minimum the distortion of resource allocation by

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[1] See Barro (1989a, 1989b), Lucas (1988), Romer (1986, 1987a, 1987b, 1988, 1989a, 1989b), Scott (1989), Kormendi and Meguire (1985), and Chenery et.al. (1986).

Table 1: Average annual growth rate of GDP in developing countries (percent)

Country Group	1965-80	1980-87
Total reporting economies	4.1	2.9
Low-income economies	5.4	6.1
China and India	5.3	8.5
Other	5.5	1.7
Middle-income economies	6.2	2.8
Lower middle-income	5.7	2.1
Upper middle-income	6.7	3.4
High-income economies	3.7	2.6
OECD countries	3.6	2.7
Other 1/	8.1	-2.6

Regional Aggregates (Low and middle income)

East Asia	7.2	8.0
Europe, M. East & N. Africa	6.2	NA
Latin America & Caribbean	6.0	1.4
South Asia	3.8	4.8
Sub-Saharan Africa	5.1	0.4

Memorandum items:

Oil exporters	6.5	0.7
Seventeen highly indebted	6.1	1.1
Highest growth rate 2/	15.2	13.0
Lowest growth rate 2/	0.1	-6.1
Unweighted average of total reporting countries	4.8	2.3

Source: World Bank (1989b).

Note: Averages are weighted.

1/ Countries classified by UN or otherwise regarded by their authorities as developing.

2/ For an individual country. The highest and lowest in 1965-1980 are Oman and Chad, respectively. In 1980-87, the highest and lowest are Botswana and Trinidad and Tobago, respectively.

government policies contributes to the efficiency of saving and investment and promotes long-term economic growth. Policies that contribute to the efficiency of investment and that lower distortions in resource allocation will thus generally encourage growth. However, the conclusion mentions several caveats to the results that imply many issues remain to be resolved.

I. THE DETERMINANTS OF GROWTH

1. The New Growth Theories

Neoclassical growth theories conclude that the long-run rate of growth is determined by the rate of change of "disembodied" technology.[2] Moreover, this change in technology is independent of the savings and investment rate in the economy. Policies that affect the rate of savings and investment are assumed to have no effect on the long-run, equilibrium rate of growth. Neoclassical theory also implies that over time income levels and growth rates for different countries will converge. In practice, it is difficult to reconcile the implications of the neoclassical model with what we see happening in the world. The wide variation in growth rates makes it difficult to believe that all of the diff^rence can be accounted for by differences in technology. Studies that have considered the convergence of growth rates have found that, when a large sample of countries (including developing countries) is used, there is no evidence that growth rates

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[2] see Solow (1956) and Scott (1989). "Disembodied" technical change implies that technical progress is exogenous and hence not dependent upon the rate of investment in capital goods. Analysis of the "sources of growth" based on the Solow model found technological change to be very important in industrial countries' growth. However, studies of developing countries by Robinson (1971) and Elias (1978) found capital investment to be more important and total factor productivity to be less important than in industrial countries. Some East Asian economies are exceptions. De Melo (1985) found total productivity growth to be as important in Korea and Taiwan as in industrial countries.

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converge.[3] The difficulty of reconciling theory and evidence has prompted a number of economists to reconsider theories of economic growth. A major conclusion of their work is that investment that promotes increasing returns in the economy may affect growth after all.

The new theories of economic growth address the fundamental assumptions of the traditional model: constant returns to scale, the exogeneity of technology, and development of "human capital". Many of the recent models maintain constant returns to scale at the firm level, but allow for increasing returns to scale at the economy-wide level. They also make technical change and development of human capital endogenous in some way so that it responds to the incentives in the economy. Perhaps the most important result of these models is that they highlight how policies that alter savings or investment rates may influence growth. Generally, the literature considers three sources of increasing returns: development of human capital, spillover effects from R & D, and specialization.

Human capital. Human capital is generally considered to be the knowledge and skills that are embodied in the labor force. The general well-being of the labor force concerning health and nutrition is also sometimes considered part of human capital. Barro (1989b), Lucas (1988), Obstfeld (1989), Romer (1989b), Uzawa (1965) all present models where development of human capital allows the productivity of labor to grow over time, and the enhanced efficiency of labor affects output. The portion of the growth rate that is not explained by the increasing capital intensity of production is explained by a process of human

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[3] For a discussion of this issue, see Romer (1986), p.1013. Baumol (1986) argues that countries grouped into industrialized, intermediate, centrally planned, and less developed economies show a tendency toward convergence within groups, but there is no tendency toward overall convergence.

capital accumulation that the economy itself generates.[4] Human capital

accumulation depends upon the fraction of total savings per worker that is

allocated to education, on the job training health, etc. In the traditional

model, given technology, sustained increases in the growth rate are limited by the

diminishing returns to capital that are implied by exogenous growth of the labor

supply. In models incorporating human capital, both physical capital and

effective human capital are "produced". To the extent that an increase in savings

leads to a permanent increase in the rate of growth of both physical and human

cap l, it will imply a permanent increase in the rate of growth of output.

Spillover effects from Research and Development. These models[5] consider

the positive effects of research and development on the overall stock of

knowledge. While each firm decides to invest in research and development to

enhance its own productivity, it also adds to the overall stock of knowledge in

the economy. The increase in the stock of knowledge contributes to the increase

in the rate of growth of technology and hence to the rate of growth. Technology

becomes endogenous in these models and there are increasing returns that are

external to the firm that made the investment in research and development. The

knowledge gained from the research benefits the economy as a whole. Such models

imply that subsidies to investment in research and development that contribute to

the stock of knowledge as a whole will have a positive impact on the growth rate.

This work suggests that openness to trade increases the incentives to invest in

research and development by widening the extent of the markets.

Specialization. Another of the new models focuses on the idea that

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[4] see Obstfeld (1989), p.9.

[5] see Arrow (1962), Grossman and Helpman (1988a, 1989b), Romer (1986, 1988).

increasing specialization in intermediate inputs can improve growth.[6] The cost of production is assumed to be lower when more specialized intermediate inputs are available. This helps to augment total factor productivity and hence helps to improve growth. One implication of this approach that is brought out in Grossman and Helpman (1988a & b) is that openness to trade increases access to more specialized inputs and therefore contributes to growth.

By "embodying" technological change, the new growth theories re-emphasize the role of investment in both physical and human capital in long-term growth. Policies that affect both the level of investment and the efficiency of investment thus influence long-term growth.

2. Government Expenditure, Tax Revenues and Growth

Numerous studies have been undertaken on the role of the government in economic growth.[7] The overall role of government is usually proxied by the size of government which is represented by either the ratio of government expenditure to GDP or that of government revenue to GDP. Some researchers have found that economic growth and the share of government spending in GDP are negatively related. This negative relationship between government spending and growth may arise because higher spending requires either higher taxation or higher levels of deficit finance, both of which imply higher levels of distortion of resource use and more crowding out of private activities. Government policies can also positively contribute to growth by creating an efficient and stable environment for economic activity that allows resources to be used where they will be most

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[6] These models are based on Ethier (1982) and Romer (1987a).

[7] see Goode (1984), Landau (1986), Mueller (1987), Ram (1986a, 1986b, 1987), Reynolds (1983, 1985), World Pank (1988), Barro (1989a), Romer (1989b), Balassa (1988).

productive, as well as by supporting the private sector with the necessary public goods. Consider briefly two specific areas of government policy: expenditure and revenue mobilization.

Although increased **public expenditure** (as a share of gross domestic product) is usually found to have a negative relationship with growth, there are a number of different effects involved.[8] Capital spending, i.e. public investment, contributes to growth by supplying the basic infrastructure and public goods that are essential for economic growth. Such expenditure is complementary to private investment and will tend to have a positive effect on growth performance. Other public investment, however, may have the effect of crowding out private investment.[9]

Economic growth is also influenced by the government's current spending. In all income groups, the largest percentage of these expenditures goes to subsidies and transfers.[10] Transfers that contribute to the development and maintenance of public goods, such as transfers to local governments for the maintenance of roads or for primary education, contribute to growth by helping to develop the infrastructure and basic human capital that is necessary for economic growth. In contrast, transfers and subsidies that distort prices in the economy have a negative effect upon growth. The way in which transfers and subsidies are allocated also has an effect on growth. When lobbying is an effective m ns of gaining access to subsidies, time and resources are spent pursuing these rents

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[8] See Landau (1986), Mueller (1987), Ram (1986a, 1986b, 1987), World Bank 1988.

[9] see Blejer and Khan (1984), Balassa (1988).

[10] see World Bank (1988), p. 108.

rather than in undertaking directly productive activities.[11] Recent work has shown that such rent-seeking does have a negative effect on growth.[12] To the extent that interest payments and other types of current expenditure squeeze out expenditure on physical and human capital, they may contribute to lower growth.

Revenue mobilization. The primary means that the government has for raising revenue is taxation. The structure of the tax system affects the incentives to save and invest in an economy. These, in turn, influence growth.

Here we will discuss the direct relationship between taxation and growth. While taxation is essential for financing expenditure, distortion caused by taxation is one of the principal ways in which government policy affects growth (see Section III). If the tax structure significantly affects the relative value of resources in the economy, the resulting distortions could inhibit growth by preventing resources from being used where they would have the highest return to the economy.

A number of empirical studies have been undertaken and have found conflicting results.[13] One study found higher growth rates in countries with low tax rates [14]. A more recent study found that, for a sample of sixty-three countries, neither average nor marginal tax rates had any effect on growth _rates_, but rather, that when controlling for average tax rates, marginal tax rates have a negative relationship with the _level_ of economic activity.[15] Finally, as

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[11] see Bhagwati (1982) and Krueger(1974)

[12] see Grossman and Helpman, (1989b).

[13] see Koestler and Kormendi (1989), Marsden (1983), Peltzman (1980), Reynolds (1985), Skinner (1987).

[14] see Marsden (1983).

[15] see Koestler and Kormendi (1989). Average and marginal tax rates are for all types of taxation (direct, indirect, etc.).

mentioned earlier, a negative relationship has been found between the share of government consumption and growth, which has been explained as reflecting the distortions caused by financing government expenditure.[16]

Fiscal Deficits. Putting the expenditure and the revenue side together also has implications for growth. Most developing countries spend more than they receive through taxation so the balance of their expenditure must somehow be financed. Countries can borrow domestically or try to borrow externally. Alternatively they can print money. Excessive deficits will create macroeconomic imbalances that will have a negative affect upon growth. High inflation resulting from overreliance on money creation may hinder financial intermediation, reduce the efficiency of saving and investment and, in the long run, have a negative effect on growth. Alternatively, a government that has little access to external finance and relies largely on borrowing in domestic markets may prompt an increase in real interest rates that is likely to discourage private investment and may hinder long-term growth if the loss of private investment is greater than the benefits provided by increased public investment.

In addition, the macro imbalances that result from unsound fiscal policy are likely to influence expectations of the private sector. If the private sector perceives that deficits are unsustainable, it may be unwilling to invest or may take its capital abroad. To the extent that unsustainable fiscal deficits contribute to uncertainty and distort macroeconomic variables, they will have a negative effect on savings and investment and, hence, on growth.[17]

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[16] See again Barro (1989a) and Romer (1989b).

[17] See World Bank 1988 and Easterly 1989.

3. Trade Policy and Growth

The extensive research on trade policy and growth generally supports the positive relationship between openness to trade and growth.[18] There is, however, little agreement on the theoretical underpinnings of this relationship and the policies that they imply. Two major difficulties arise when considering the relationship between openness -- as measured by export performance -- and growth. The first is that it is difficult to talk about causality in the export-GDP relationship -- exports may contribute to GDP growth, but GDP growth may also have an effect on exports. Where causality tests have been done the results are mixed.[19] The second is that the results of these studies have been obtained without controlling for the trade orientation of the countries in the sample.[20] With these difficulties in mind, consider some of the ways in which openness to trade is likely to contribute to growth.

The traditional arguments behind the strong relationship between openness and growth focus on the static efficiency gains to be made from reducing distortions in the economy, improving resource allocation and on reducing rent-seeking and directly unproductive activities.[21] Other studies in the neoclassical framework have incorporated exports as an additional factor of production citing the greater diffusion of technology and economies of scale that come with outward-

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[18] see Balassa (1978, 1982, 1985), Bhagwati (1978), Edwards (1989), Feder (1983), Kavoussi (1984), Krueger(1978), Michaely (1988), Ram (1985), World Bank, (1989a), World Bank (1987).

[19] see World Bank (1989a) Chapter 3, and Jung and Marshall (1985).

[20] see Edwards (1989), P. 28 and World Bank 1989a.

[21] see Corden (1971), de Melo and Robinson (1989), World Bank (1987).

oriented policies.[22]

Trade policy has also been found to influence growth through its effect on total factor productivity. It is argued that the diversity of intermediate inputs that results from more open trade contributes to total factor productivity and that this increased productivity contributes to growth.[23] A study extending this work shows that tariffs and subsidies can affect the long-run world rate of growth if one country has an initial comparative advantage in R & D or can develop one over time. In the two country case, any (small) trade policy that switches spending away from R & D in the country with a comparative advantage in R & D will cause long-run growth rates to decline. Subsidies to R & D will accelerate growth when applied at equal rates in both countries but need not do so if introduced only in the country with the comparative disadvantage in R & D. Trade policy thus affects the rate of growth by altering the incentives to undertake research and development.[24] For many developing countries, in which technology transfer is likely to be more relevant than direct R & D, the effect of trade policy on incentives for technology transfer may have similar implications for growth.

Another recent study[25] argues that countries that have more open trade policies are better able to take advantage of the economies of scale, the technology transfer and the other externalities that trade may provide. In this case, the focus is on the dynamic effects of these benefits as an explanation of the difference in growth performance between those countries with outward-

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[22] see Feder(1983), Kavoussi (1984), Ram (1985) and Tyler (1981).

[23] see Ethier (1982).

[24] see Grossman and Helpman (1989a, 1989b).

[25] see de Melo and Robinson (1989).

oriented trade strategies and those with inward-oriented strategies.

4. Financial Sector Policies and Growth

A number of studies have focused on the relationship between financial policies and their effect on growth.[26] An important strand of the literature argues that financial repression harms growth.

Financial repression is usually associated with low or negative real interest rates. These low or negative rates discourage saving or may divert it to unproductive inflation hedges or to foreign assets. A recent study finds that growth is positively related to real interest rates paid on deposits, although the causality issue remains unresolved.[27] Credit rationing is also argued to be a symptom of financial repression. Such rationing may lead to an arbitrary allocation investment across sectors and is likely to lower the overall productivity of capital. Financial instability also increases the variance of the rate of return and discourages investment. However, Dornbusch and Reynoso (1989) argue that financial repression has an important effect only when it leads to large-scale instability.

5. Institutions and Administration

Although the evidence is mostly anecdotal, it seems relatively clear that institutional structure and administrative capacity are likely to have an important effect on growth.[28] A stable system of civil liberties, defense, law and order, and property rights, can reduce uncertainty and may help promote

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[26] See McKinnon (1973), Dornbusch and Reynoso, and the summary of existing works presented in Balassa (1989) and Gelb (1989). See also World Bank (1989b).

[27] Gelb (1989). Gelb suggests that growth could affect real interest rates since more rapidly growing countries can afford to pay higher real interest rates.

[28] see Crook (1988), Reynolds (1983, 1985), World Bank (1987), World Bank (1988).

investment. Proxies for this kind of stability have been shown to have a significant influence on investment and growth.[29] Recent work has recognized that political stability will contribute to growth and is particularly important in countries undergoing stabilization and adjustment programs.[30]

One scholar has argued that administrative competence is the single most important factor in explaining growth differences among countries.[31] Lack of administrative capacity will harm the effectiveness of government policies and thus affect growth. Weak administration may limit effective revenue collection, leading to reliance on more distortionary taxes. It may also affect the ability of the government to undertake expenditure reviews and to effectively set priorities for government spending, lowering the efficiency of public investment. Institutions and administrative capacity affect the transactions costs that economic agents must face. Societies in which contract, law and property rights are well established will have lower transaction costs, permitting realizations of the gains from trade and a higher level of growth.[32]

6. Labor and the Development of Human Capital

Just as the efficiency of investment influences growth, so does the efficiency of labor. Increased productivity of labor results from improvement of nutrition and health as well as investment in human capital -- education and on

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[29] see Kormendi and Meguire,(1985) p.155, Scully (1988), and Barro (1989a, 1989b).

[30] see Haggard and Kaufmann (1989).

[31] see Reynolds (1983, 1985).

[32] see North (1987) and World Bank (1987), Chapter 4.

the job training. The new growth models mentioned above usually include both physical and human capital in the production function. The inclusion of human capital affects growth in two ways. First, the development of human capital through education and training increases productivity which allows for increased output. Second, investment in human capital has benefits that are external to the individual -- i.e. it benefits the economy as a whole. These benefits imply that investment in human capital will lead to increasing returns to scale. The increasing returns to scale models indicate that improvements in human capital will raise the long run rate of growth.[33] A positive relationship has been found between a measure of human capital stock and growth for a sample of developed countries.[34] Another study has found some evidence of a relationship between the growth rate and primary and secondary education levels.[35] Policies that encourage improved labor productivity through the development of human capital are thus likely to have a positive effect on long-term growth.

7. What is long-run growth?

Most of the literature reviewed thus far takes as given the traditional view that the behavior of output can be decomposed into short-run and long-run components, with the growth literature naturally focusing on the latter. Typically, growth is taken to mean the exponential trend in output calculated over a suitably long period, with deviations from the trend taken as short-run fluctuations. This trend is usually identified with the supply-side of output. In this view, initial conditions and output demand do not matter since output

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[33] see Barro (1989b), Lucas (1988), Obstfeld (1989), Romer (1986, 1989a, 1989b). Some of the early literature on human capital includes Becker (1964) and Schultz (1963) and Uzawa (1965).

[34] see Romer (1989b).

[35] See Barro (1989b)

converges inexorably to its trend value. However, this view has been challenged from various perspectives.

Several empirical studies of output behavior find that output behavior does not fit the exponential trend model. Campbell and Mankiw (1987) found that real output in the U.S. cannot be decomposed into short-run and long-run elements. Shocks to output persist for long periods, perhaps permanently. The response of output to "cyclical" shocks is no less persistent than to "permanent" shocks. Cuddington and Urzua (1989) also rejected the trend model for Colombia in favor of a moving average process.

Theoretical models in the "structuralist" tradition also reject the rigid long-run/short-run dichotomy for the determination of output. Taylor (1985, 1989) presents models in which capacity utilization remains an endogenous variable in the long run. Distributional factors play a key role in this type of analysis. The work of Chenery et. al. (1986) also stresses the role of structural factors such as income distribution and demand composition.

Some of the increasing returns models of the new economic growth literature also have the implication that initial conditions such as income distribution and demand composition matter. Murphy et al. (1989) present a model in which the "size of the market" as affected by distributional factors determines whether industrialization takes place, as in the "big push" theory of the development literature.

Challenges to the traditional decomposition of output behavior into secular and cyclical elements are disquieting because they complicate the definition of what we mean by long-run growth. The implications of these challenges do not seem to have been addressed as yet by the main body of literature on growth.

II. EMPIRICAL EVIDENCE ON THE DETERMINANTS OF GROWTH

As discussed above, resource allocation and growth depend upon a number of factors including the level and efficiency of investment in both human and physical capital, the extent of distortions in the economy, the openness to trade and the institutional structure. This section discusses the empirical evidence on these relationships.

1. Investment and Growth

Figure 1 illustrates the relationship between GDP growth and the share of investment in GDP based on data for seventy-three countries. By and large the figure shows a positive relationship between investment and GDP growth, but there is a fairly wide dispersion. This dispersion indicates that countries with similar investment levels do not necessarily achieve the same growth rates.

Consider the joint effects of different policy variables on growth. A regression on data for a sample for seventy-three developing countries using country averages for 1965 through 1987 (1988 when data was available) confirms that growth was significantly related to the factors detailed above (see Table 1 in Annex 1). Growth was found to be positively related to the share of investment in GDP. Holding all other variables constant, a one percent increase in investment would increase the growth rate by a tenth of a percent. Labor force growth also had a significant positive relationship with GDP growth.

The difference between the average export ratio of the most recent five years and the average export to GDP ratio of the first five years of the data was used as a proxy for "openness" of the economy.[36] As in other studies, "openness" was found to have a positive and significant relationship with the growth rate. Government consumption as a share of GDP was found to have a

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[36] This variable was suggested by the work of Romer (1989b).

Figure 1
GDP GROWTH ON INV/GDP
1965-1988
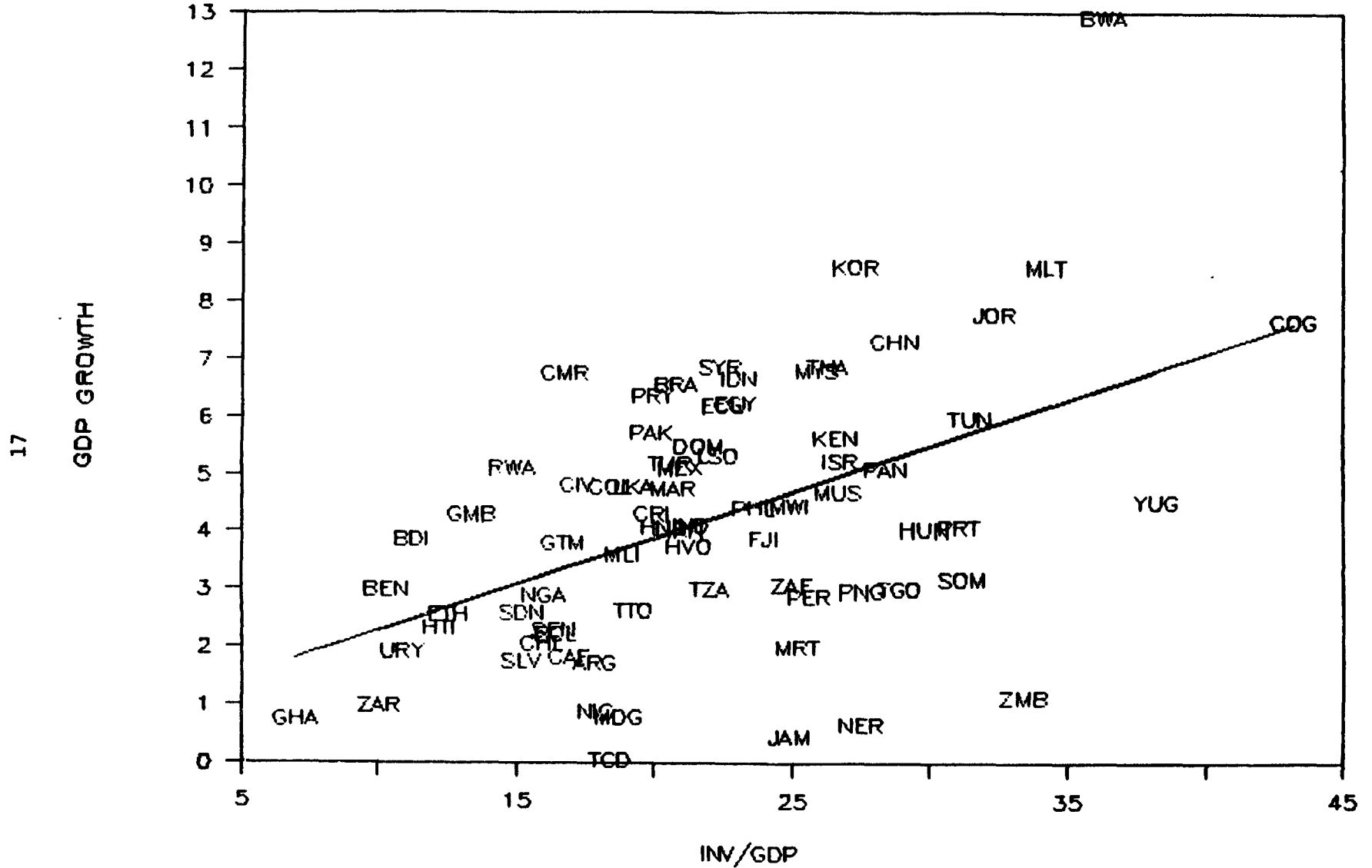
Source: World Bank Data.

negative relationship with growth. A one percent increase in the ratio of government consumption to GDP, holding all other variables constant, would lead to a decline of a tenth of a percent ir the growth rate. This result suggests that the positive contribution of government spending to growth has been outweighed by the negative effects of distortions caused by the taxes used to finance government consumption and by the government crowding out of the private sector.

Two variables were included to account for regional differences which might also reflect some of the institutional differences discussed in section I. Regional variables for both African and Latin American countries were both negative and significant, implying that growth is lower in Sub-Saharan Africa and Latin America even after controlling for other factors. This suggests that our variables do not account for all the factors that affect growth.

Some two-stage least squares regressions were run in order to account for the fact that improved growth is likely to have an impact on investment and on export performance. In the first two-stage regression (see Table 2, Annex 1), only investment is treated as endogenous. Instruments used were demographic and policy variables, as shown in Annex 1. The results of this regression confirm those of our ordinary least squares (OLS) regression. All of the variables considered remain significant at the 5% level except for the dummy for African countries and the dummy for Latin American countries, which indicates that allowing for the endogeneity of investment may help explain some of the features not captured in the OLS regression.

A second two-stage regression was run, this time treating both investment and export performance as endogenous (see Table 3, Annex 1). The results also confirm our original regression, although the significance of export performance is weakened.

2. Distortions and Growth

Ar.other regression was run in order to capture the effects of direct measures of distortions. Due to limited data availability, the size of the sample considered is considerably smaller than in the previous regressions. As in the earlier sample, a significant positive relationship was once again found between the investment share in GDP and growth and a significant negative relationship between government consumption and growth. A negative relationship between the two measures of distortion and growth was also identified.[37]

The first measure is a dummy variable for trade distortion, which indicates whether a country has a trade policy that is inward- or outward- oriented. This is a subjective measure based on analysis of effective tariff protection, quotas, ewport incentives, and exchange rate overvaluation. The negative coefficient on this variable is significant at the 1% level for both OLS and TSLS. The coefficient indicates that inward orientation lowers growth by about 1.5 percentage points[38].

The second measure is a dummy for financial distortion, which indicates whether real interest rates are strongly negative or not imply that high levels of distortion have a significantly negative effect on growth. Strongly negative is defined as less than -5 percent. The variable is significant at the 1% level in both OLS and TSLS, with a coefficient implying that financial repression lowers growth by 1.7 percentage points. These results tend to confirm other studies on

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[37] The relationship between investment share and growth was significant at the 5% level. The relationship between government consumption and growth was significant at just over the 5% level, i.e. the t-statistic was 1.91. See Annex ♭, Table 4 for more detail. See Annex 2 for detail on the distortion variables.

[38] This measure has been criticized for its subjective nature (see Edwards (1989)). The classification itself could be endogenous -- influenced by growth performance, for example, which could make for a spurious correlation.

the negative effect of distortions on growth.

Neither growth of the labor force, nor the regional variables are significant when the distortion variables are introduced. This implies that the distortion variables explain at least some of the regional differences in growth (see Table 4 in Annex 1). Other variables were considered in the regressions but were found to be insignificant at the 5% level. Other variables considered (sample sizes varied and were based on the countries with data for all variables considered) were the ratio of the money stock to GDP, the variability of the real exchange rate, real interest rates, enrollment in primary education, the initial level of income, and population growth. When enrollment in primary education was included in the large regression it was significant at a 10 percent level, but not at a 5 percent level. When both enrollment in primary education and the initial income level were included in the large regression, enrollment in primary education became significant, initial income was marginally significant (with a negative sign), but government consumption in GDP was no longer significant. The other variables considered were not significant.

III. CONCLUSIONS AND CAVEATS

The literature on economic growth provides considerable evidence of empirical links between growth rates and policy variables such as trade intervention, financial repression, and government expenditure. This would suggest that policies that promote investment, liberalize trade restrictions, and remove distortions to financial markets are likely to raise a country's long-run rate of growth.

The empirical work in this paper confirms these findings, but several doubts

about the meaning of the evidence linger. Most of the empirical work in the literature (including in this paper) proceeds without an explicit structural model. Without such a model, the causality and functional form of the relationships remains open to question. Many of the explanatory variables in growth regressions are likely to be endogenous.[39] Clearly, more research is needed to formulate structural models of growth that can give clear guidance on the effect of various policy measures.

Most of the empirical work on growth also does not address the issue of transition to higher long-run growth paths that would result from policy change. Challenges to the exponential trend model of long-run output changes would imply that we cannot easily dismiss transitional effects as irrelevant. Large amounts of theoretical and empirical work have been done on the determinants of long-run growth, but the most important issues still remain unresolved.

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[39]A companion paper (Easterly (1989b)) attempts to address this issue by formulating a structural model of growth with increasing returns, deriving steady state relationships among distortions, government spending, and growth. The results suggest that simple linear relationships as found in most empirical work can be seriously misleading.

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ANNEX I: REGRESSION RESULTS

Table 1

```
LS // Dependent Variable is Y6588
Date: 9-26-1989 / Time: 11:53
SMPL range:      1  -     73
Number of observations: 70
```

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	1.4666681	1.1305687	1.2972835	0.199
IY6588	0.1091513	0.0353577	3.0870592	0.003
LFORCE	1.1792242	0.3092298	3.8134240	0.000
DIFEXP	0.0595169	0.0180365	3.2997982	0.002
GY6588	-0.0977830	0.0441492	-2.2148313	0.030
LADUM	-1.9046779	0.5996525	-3.1763026	0.002
AFDUM	-1.4425643	0.5179855	-2.7849513	0.007

R-squared	0.471407	Mean of dependent var	4.149281
Adjusted R-squared	0.421065	S.D. of dependent var	2.273843
S.E. of regression	1.730117	Sum of squared resid	188.5783
Durbin-Watson stat	1.673639	F-statistic	9.364044
Log likelihood	-134.0113		

Table 2

```
TSLS // Dependent Variable is Y6588
Date: 9-26-1989 / Time: 12:01
SMPL range:      1  -     73
Number of observations: 69
Instrument list: C LFORCE DIFEXP GY6588 LADUM AFDUM PRIM AGL URBPOP
IET2 RIOT CIVLIB
```

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	-0.7011407	1.8319876	-0.3827213	0.703
IY6588	0.2294921	0.0897952	2.5557277	0.013
LFORCE	1.0133875	0.3491735	2.9022459	0.005
DIFEXP	0.0529485	0.0216968	2.4403774	0.018
GY6588	-0.1241806	0.0599143	-2.0726352	0.042
LADUM	-1.3148390	0.7889153	-1.6666415	0.101
AFDUM	-1.0501771	0.6737135	-1.5587887	0.124

R-squared	0.386402	Mean of dependent var	4.166158
Adjusted R-squared	0.327022	S.D. of dependent var	2.286081
S.E. of regression	1.875392	Sum of squared resid	218.0598
Durbin-Watson stat	1.581798	F-statistic	6.507238
Log likelihood	-137.6046		

Annex 1 (Continuation)

Table 3
TSLS // Dependent Variable is Y6588
Date: 9-26-1989 / Time: 16:34
SMPL range: 1   -   73
Number of observations: 32
Instrument list: C LFORCE GY6588 LADUM AFDUM PRIM AGL URBPOP IET2 RI
OT CIVLIB RERSD TTDUM2

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	2.4672395	1.2716152	1.9402407	0.064
IY6588	0.1468687	0.0722230	2.0335452	0.053
LFORCE	0.8796042	0.3364464	2.6143958	0.015
DIFEXP	0.0540633	0.0303997	1.7784154	0.088
GY6588	-0.2252280	0.0962568	-2.3398655	0.028
LADUM	-1.3188960	0.7220679	-1.8265540	0.080
AFDUM	-0.8222876	1.0736029	-0.7659141	0.451

R-squared	0.684085	Mean of dependent var	4.164124
Adjusted R-squared	0.608266	S.D. of dependent var	1.927478
S.E. of regression	1.206383	Sum of squared resid	36.38400
Durbin-Watson stat	1.319851	F-statistic	9.022545
Log likelihood	-47.46033		

Table 4
LS // Dependent Variable is YFT6588
Date: 9-26-1989 / Time: 12:08
SMPL range: 1   -   23
Number of observations: 23

VARIABLE	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C	3.7031913	1.4793810	2.5032032	0.023
IFT6588	0.1739718	0.0345686	5.0326492	0.000
LFORCEFT	0.2578677	0.3220675	0.8006636	0.434
GYFT6588	-0.1667834	0.0873915	-1.9084638	0.073
TDUM2FT	-1.5575002	0.4655863	-3.3452451	0.004
FDUM1FT	-1.7311805	0.4993963	-3.4665463	0.003

R-squared	0.816882	Mean of dependent var	4.299200
Adjusted R-squared	0.763024	S.D. of dependent var	2.106128
S.E. of regression	1.025268	Sum of squared resid	17.86996
Durbin-Watson stat	1.878833	F-statistic	15.16725
Log likelihood	-29.73329		

```
TSLS // Dependent Variable is YFT6588
Date: 9-29-1989 / Time: 17:09
SMPL range:     1  -    23
Number of observations: 23
Instrument list: C LFORCEFT GYFT6588 TDUM2FT FDUM1FT AFDUMFT LADUMFT
 PRIMFT AGLFT URBPOPFT IET2FT RIOTFT CIVLIBFT
=====================================================================
     VARIABLE     COEFFICIENT    STD. ERROR     T-STAT.    2-TAIL SIG.
=====================================================================
         C         3.6112415     1.4910847     2.4218889     0.027
     IFT6588       0.1834878     0.0383169     4.7886956     0.000
     LFORCEFT      0.2450439     0.3235372     0.7573901     0.459
     GYFT6588     -0.1746110     0.0886146    -1.9704534     0.065
     TDUM2FT      -1.5457438     0.4670607    -3.3095139     0.004
     FDUM1FT      -1.7120726     0.5015859    -3.4133189     0.003
=====================================================================
R-squared              0.816066   Mean of Jependent var    4.299200
Adjusted R-squared     0.761967   S.D. of dependent var    2.106128
S.E. of regression     1.027550   Sum of squared resid     17.94961
Durbin-Watson stat     1.866252   F-statistic              15.08485
Log likelihood       -29.78444
=====================================================================


TSLS // Dependent Variable is YFT6588
Date: 9-29-1989 / Time: 17:13
SMPL range:     1  -    23
Number of observations: 22
Instrument list: C LFORCEFT GYFT6588 FDUM1FT AFDUMFT LADUMFT PRIMFT
AGLFT URBPOPFT IET2FT RIOTFT CIVLIBFT RERSDFT RIRFT2
=====================================================================
     VARIABLE     COEFFICIENT    STD. ERROR     T-STAT.    2-TAIL SIG.
=====================================================================
         C         4.0297392     1.7968652     2.2426497     0.039
     IFT6588       0.1762197     0.0395366     4.4571276     0.000
     LFORCEFT      0.2335276     0.3510087     0.6653043     0.515
     GYFT6588     -0.1799308     0.0916823    -1.9625468     0.067
     TDUM2FT      -1.8116901     0.7165778    -2.5282533     0.022
     FDUM1FT      -1.7394032     0.5636737    -3.0858338     0.007
=====================================================================
R-squared              0.810246   Mean of dependent var    4.357849
Adjusted R-squared     0.750948   S.D. of dependent var    2.136381
S.E. of regression     1.066162   Sum of squared resid     18.18724
Durbin-Watson stat     1.965986   F-statistic              13.66397
Log likelihood       -29.12310
=====================================================================
```

DEFINITIONS AND SOURCES OF VARIABLES

Data are for the time period 1965-87 (and 1988 if data are available) unless otherwise specified.

Variables

Y6588 = Average annual growth rate of GDP, calculated by regressing the log of GDP (in constant 1980 prices) for full sample against time. GDP data from BESD.

YFT6588 = Y6588 for intersection of trade and financial policy sample.

IY6588 = Gross Domestic Investment as a share of GDP, 1965-88 average for full sample from BESD.

IFT6588 = IY6588 for intersection of trade policy and financial policy sample.

LFORCE = Average annual growth rate of population of working age (15-64), 1965-1985 for full sample. Based on data in World Development Indicators, World Bank (1987), p. 264.

LFORCEFT = LFORCE for intersection of trade policy sample and financial policy sample.

GY6588 = Government Consumption as a share of GDP, average 1965-88, for full sample. From BESD, National Accounts Database.

GYFT6588 = GY6588 for intersection of trade policy sample and financial policy sample.

DIFEXP = Average export share in GDP for last five years of data (1982-87/1983-88) minus average export share of first five years (1965-70), for full sample. Data from BESD, National Accounts -- export of goods and nonfactor services.

PRIM   ▬ Primary school enrollment as a percent of population of age group,
              1965. For full sample, from World Development Indicators, World
              Bank (1988), p. 280-1.

AGL   ▬ Percent of labor force in agriculture, 1965. For full sample,
              from World Development Indicators, World Bank (1988), p. 280-1.

URBPOP   ▬ Urban population as a percent of total population, 1965. For full
              sample, from World Development Indicators, World Bank (1988),
              p.284-5.

RGDP2   ▬ Real Income per capita in 1965, from Summers and Heston database
              for full sample.

RERSD   ▬ Real exchange standard deviation. Calculations based on real
              exchange rat data of CECMG.

Dummy Variables

AFDUM   ▬ Dummy variable for African countries; 1 if country is African,
              zero otherwise.

LADUM   ▬ Dummy variable for Latin American countries; 1 if country is Latin
              American, zero otherwise.

TDUM2FT   ▬ Dummy variable for trade policy distortions for intersection of
              financial policy and trade policy sample. 1 if country is inward-
              oriented, zero otherwise. Based on country classifications in the
              1987 World Development Report; see Annex 3.

FDUM1FT   ▬ Dummy variable for financial policy distortions for intersection
              of financial policy and trade policy sample. 1 if real interest
              rates are less than -5%, zero otherwise. Based on World

Development Report 1989. Data from 1965-85 from Financial Policy
Division. See Annex 1 for classification.

TTDUM2   = TDUM2FT for whole sample -- note that number of observations
limited to size of trade policy sample.

IET2   = Dummy variable for irregular executive transfers for the period
1958-77; 1 if there was more than 1 irregular executive transfer
(e.g. military coup), zero otherwise. From Taylor and Jodice
(1983). Vol. 2, pp. 92-94.

RIOT   = Dummy variable for riots between 1958 and 1977; 1 if there were
more than 25, zero otherwise. From Taylor and Jodice (1983), Vol.
2; p. 32.

CIVLIB   = Dummy variables for civil liberties. Based on Gastil's index of
civil liberties and freedom. 1 for political systems in which
full democratic elections are blocked constitutionally or have
little significance in determining power distributions through
those that are tyrannies (Gastil's categories 4 through 7); zero
otherwise (Gastil's categories 1-3). See Taylor and Jodice
(1983)Vol. 1, p.58-60 for more information or classification.

ANNEX 2: COUNTRY CLASSIFICATIONS

The dummy variable used as an indicator of trade distortion uses the trade policy classification of the World Development Report 1987 and is based on the effective rate of protection, the use of direct controls such as quotas and import licensing schemes, the use of export incentives, and the degree of exchange rate overvaluation. In determining the classification for the entire period (1965-88) the period from 1973-85 is weighted more heavily than that from 1963-73 because of its longer time span.

strongly outward -oriented	moderately outward-oriented	moderately inward-oriented	strongly inward-oriented
Hong Kong (HKG)	Brazil (BRA)	Cameroon (CMR)	Argentina (ARG)
Korea (KOR)	Chile (CHL)	Colombia (COL)	Bangladesh (BGD)
Singapore (SGP)	Israel (ISR)	Costa Rica (CRI)	Bolivia (BOL)
	Malaysia (MYS)	Cote d'Ivoire (CIV)	Burundi (BDI)
	Thailand (THA)	El Salvador (SLV)	Ethiopia (ETH)
	Tunisia (TUN)	Guatemala (GTM)	Ghana (GHA)
	Turkey (TUR)	Honduras (HND)	India (IND)
	Uruguay (URY)	Indonesia (IDN)	Madagascar (MDG)
		Kenya (KEN)	Nigeria (NGA)
		Mexico (MEX)	Peru (PER)
		Nicaragua (NIC)	Sudan (SDN)
		Pakistan (PAK)	Tanzania (TZA)
		Senegal (SEN)	Zambia (ZMB)
		Sri Lanka (LKA)	
		Yugoslavia (YUG)	

Note that some countries changed classification between the two periods. Cameroon, Colombia, Costa Rica, Cote d'Ivoire, Guatemala and Indonesia moved from the moderately outward-oriented classification in 1963-73 to the moderately inward-oriented classification in the 1973-85 period. Tunisia moved from moderately inward-oriented to moderately outward-oriented. Chile, Turkey and Uruguay moved from the strongly inward-oriented category to the moderately

outward-oriented category. Finally, Bolivia, Madagascar and Nigeria moved from the moderately inward-oriented to the strongly inward-oriented classification. For further detail, see the World Development Report 1987, p. 82-3.

The financial distortion dummy is based on classification of the real rate of interest. Positive real interest rates are those that are greater than zero. Moderately negative real interest rates are between 0 and -5% and strongly negative real interest rates are those that are less than -5%.

Positive	Moderately Negative	Strongly negative
Chile (CHL)	Brazil (BRA)	Algeria (DZA)
India (IND)	Cote d'Ivoire (CIV)	Argentina (ARG)
Korea (KOR)	Indonesia (IDN)	Ecuador (ECU)
Malaysia (MYS)	Malawi (MWI)	Ghana (GHA)
Singapore (SGP)	Morocco (MAR)	Jamaica (JAM)
Sri Lanka (LKA)	Pakistan (PAK)	Mexico (MEX)
Thailand (THA)	Philippines (PHL)	Nigeria (NGA)
	Portugal (PRT)	Peru (PER)
	Senegal (SEN)	Sierra Leone (SLE)
	Tunisia (TUN)	Tanzania (TZA)
	Uruguay (URY)	Turkey (TUR)
		Yugoslavia (YUG)
		Zaire (ZAR)
		Zambia (ZMB)

See Gelb (1989) and World Bank (1989) for further detail.

COUNTRY SAMPLES

Note that in any given regression the number of observations may be less than the sample size due to missing data.

Full Sample

Argentina	Haiti	Pakistan
Benin	Honduras	Panama
Bolivia	Hungary	Papua New Guinea
Botswana	India	Paraguay
Brazil	Indonesia	Peru
Burkina Faso	Iran	Philippines
Burundi	Israel	Portugal
Cameroon	Jamaica	Rwanda
Central African Rep.	Jordan	Senegal
Chad	Kenya	Somalia
Chile	Korea	South Africa
China	Lesotho	Sri Lanka
Colombia	Madagascar	Sudan
Congo	Malawi	Syria
Costa Rica	Malaysia	Tanzania
Cote d'Ivoire	Mali	Thailand
Dominican Republic	Malta	Togo
Ecuador	Mauritania	Trinidad & Tabago
Egypt	Mauritius	Tunisia
El Salvador	Mexico	Turkey
Ethiopia	Morocco	Uruguay
Fiji	Nicaragua	Yugoslavia
Gambia	Niger	Zaire
Ghana	Nigeria	Zambia
Guatemala		

Intersection of Trade Policy Sample and Financial Policy Sample

Argentina	Malaysia	Sri Lanka
Brazil	Mexico	Tanzania
Chile	Nigeria	Thailand
Cote d'Ivoire	Pakistan	Tunisia
Ghana	Peru	Turkey
India	Philippines	Uruguay
Indonesia	Senegal	Yugoslavia
Korea	Singapore	Zambia

	Title	Author	Date	Contact for paper
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