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Economic Convergence and Economic Policies

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I. Introduction

Many of the crucial debates in development economics are encapsulated in the question of economic convergence. Is there a tendency for the poorer countries to grow more rapidly than the richer countries, and thereby to converge in living standards? Or instead, are there tendencies for the "rich to get richer, and the poor to get poorer," so that the gap between rich and poor nations tends to widen over time?

An enormous professional debate over this issue has been underway during the past decade, instigated by several theoretical and empirical insights. Paul Romer (1986) provided a major spur to the debate by introducing a theoretical growth model with increasing-returns-to-scale production technology, which results in a strong tendency for rich countries to maintain or even increase their lead over poorer countries. Romer stressed that the more standard technology assumptions of the Solow growth model lead to the presumption that the poorer countries would experience faster growth. Romer noted that his theoretical model with increasing returns to scale seemed to be broadly consistent with the cross-country growth experience of the post-war era, in which there was no discernable trend for the poorer nations to converge with the richer nations¹.

Romer's point about the absence of convergence is evident in Figure 1. We graph on the x-axis the 1970 level of per capita income of several dozen developing countries, and on the y-axis the growth of per capita income between 1970-89². If convergence predominated in the data, then we would find a negative relationship between initial income in 1970 and subsequent growth between 1970 and 1989. No such tendency is found overall in the world economy during this time period. Many poor countries, particularly those in Sub-Saharan Africa, not only fail to grow faster than the rich countries; they in fact experience negative per capita growth, so that the gap between these countries and the rich countries widens significantly.

Romer's theoretical model and empirical insight set off a decade-long debate which still continues. Many authors, such as Dowrick and Nguyen (1989), demonstrated that convergence seemed to hold among the richest countries alone, specifically those countries in the Organization for Economic Cooperation and Development (OECD). Baumol and others suggested that there may be a "convergence club," meaning a subset of countries for which convergence applies, while countries outside of "club" would not necessarily experience convergence *vis-à-vis* those in the club:

¹ He was also careful, however, to point out the problem of interpreting such simple correlations: *Cross-country comparisons of growth rates are complicated by the difficulty of controlling for political and social variables that appear to strongly influence the growth process.*

² The exact definitions of the data and the selection of countries is described in the Appendix.

It also seems clear that convergence does not apply to the poorest of the world's economies, though the line separating those eligible for membership in the convergence club and those foreclosed from membership has not been determined definitively (Baumol, 1994, p. 82)

Baumol suggested that only countries with an adequate initial level of human capital endowments can take advantage of modern technology to enjoy the possibility of convergent growth. Baumol (1994, p. 65) therefore speaks of the "advantages of moderate backwardness," arguing that while middle-income developing countries can take advantage of their lag in technology to borrow from abroad, the poorest countries are unable to bridge the gap in technology and knowledge.

Barro (1991) and Barro and Sala-i-Martin (1991, 1992) introduced a related notion of "conditional convergence," in which countries purportedly differ in their long-run per capita income levels, with each country tending to grow more rapidly the greater is the gap between its initial per capita income level and its own long-run per capita income level. Formally, country i is assumed to have the long-run per capita income level y_i^* , and initial per capita income level y_i . The rate of growth, \dot{y}_i , is assumed to be an increasing function of the gap between y_i^* and y_i :

$$(1) \quad \dot{y}_i = b (y_i^* - y_i)$$

A positive value of b is said to signify conditional convergence. In turn, y_i^* is proxied by certain "structural" variables, such as the initial level of human capital, according to an equation $y_i^* = Sg_{ji} Z_{ji}$. Barro and co-authors then estimate a regression equation of the form:

$$(2) \quad \dot{y}_i = b (Sg_{ji} Z_{ji} - y_i)$$

They tend to find a positive and significant coefficient for b and significant coefficients on several structural variables Z . Like Baumol, Barro 1991, p. 409) concludes that:

A poor country tends to grow faster than a rich country, but only for a given quantity of human capital; that is, only if the poor country's human capital exceeds the amount that typically accompanies the low level of per capita income.

In summary, there have been three dominant explanations offered in the literature for the absence of convergence in **Figure 1**. The first holds that productive technology is intrinsically kind to the technological leader: the rich tend to grow richer

as a result of increasing returns to scale in one form or another³. The second holds that convergence is a fact of life, but only among countries with a sound human capital base for using modern technology. The third holds that currently poor countries simply have low long-term potential (y_1^*), though countries do tend to grow faster the greater the gap between their current income and their own long-run potential. Any of these explanations, if correct, would lead to profoundly pessimistic conclusions for the poorest countries. Each concept suggests that the poorest countries will be unable to achieve rapid growth needed to close the gap with the richer countries.

We believe that all of these explanations of Figure 1 are too pessimistic regarding the potential for growth and convergence of the poorest countries. Economic growth, and therefore economic convergence, requires reasonably efficient economic institutions. Poorly managed economies -- such as those with the absence of secure property rights, autarkic trade policies, inconvertible currencies, and so forth -- are unlikely to experience convergence no matter what the underlying production technology or initial level of human capital. Since many, if not all, of the non-convergent countries failed to maintain adequate economic institutions during the post-war era, it is possible that it is reversible policy failures, rather than technology or human capital that explains their failure to grow. Put another way, the "convergence club" is better defined according to policy choices rather than initial levels of human capital. We would also suggest that poor policy choices are reversible, not irrevocably linked to low levels of income.

Such an interpretation is more in line with the cross-country evidence than interpretations suggesting an intrinsic failure of convergence. When we examine poor countries that have followed standard market-based economic policies, including respect for private property rights and open international trade, we note an overwhelming tendency towards convergence, even among countries that start with extremely low levels of human capital endowments and extremely low levels of initial per capita income. In fact, it is hard to find a single case in which a poor country actually protected private property rights and maintained economic openness, and yet failed to achieved economic growth. In essence, we subscribe to a much earlier, and widely cited judgment of Adam Smith⁴:

Little else is requisite to carry a state to the highest degress of opulence from the lowest barbarism, but peace, easy taxes, and tolerable administration of justice.

³ Increasing returns to scale is shorthand for a wide variety of technological possibilities, such as learning by doing, spillovers in knowledge accumulation, agglomeration economies among suppliers of specialized inputs to production, etc.

⁴ This aphorism is quoted by A. Leddin and B. Walsh, in The Macroeconomy of Ireland, Gill & McMillan, 1995. These authors in turn refer to the citation in Paul Kennedy, The Rise and Fall of Great Powers.

In our view, as in the view of Adam Smith, burdensome taxes on foreign trade (and related trade distortions such as import and export quotas) are of particular harm, since these not only distort economic incentives (e.g. pushing countries towards inefficient import-substituting industries), but they also cut countries off from international flows of knowledge.

In the next section of the paper, we demonstrate that good behavior in economic policy has been its own reward: all developing countries that have satisfied certain unexceptionable conditions on economic policy have experienced positive economic growth during the decades of the 1970s and 1980s, and in almost all cases these countries have shown a tendency to grow more rapidly than the developed economies, and thereby to converge. After demonstrating this point, we then undertake a cross-country regression analysis based on equation (2), to try to determine some of the specific ways that poor economic policies have affected the growth dynamics of developing countries.

II. Economic Policies and Economic Convergence

In this section we define a subset of countries that have sustained "appropriate" market-based economic policies during the period of observation, 1970-89. We then examine whether there is a tendency towards economic convergence among this subset of qualifying countries during this subperiod. In essence, we examine whether there is a convergence club for all countries that have sustained adequate basic economic policies.

Our selection criteria are as follows. We start with the universe of all 135 countries in the Heston-Summers data series, and then eliminate 18 countries (combined population of 8.4 million) that lack some or all of the necessary underlying data⁵. We then establish two basic subsets of "appropriate" policies: one set related to property rights and one set related to integration of the economy in international trade. All countries that pass both sets of criteria are considered to be countries that have pursued appropriate policies during the observation period. We call these the "qualifying" countries. Countries that fail at least one test are "non-qualifying." We then examine the growth dynamics of the qualifying and non-qualifying economies.

With regard to the property rights test, a country is non-qualifying (i.e. judged to have inappropriate policies) if it is characterized by at least one of the following three conditions:

- (1) a socialist economic structure, according to the list of countries in Kornai (1993).

⁵ Countries dropped from the sample because of a lack of data are: Afghanistan, Bahamas, Bahrain, Comoros, Dominica, Fiji, Grenada, Iceland, Kuwait, Oman, St. Lucia, St. Vincent, Seychelles, Solomon Islands, Surinam, United Arab Emirates.

- (2) civil war or major external war during the period 1970-89;
- (3) extreme deprivation of civil or political rights, according to the Freedom House index, reported in McMillan, et. al. (1994);

These criteria are selected because failure on any of them would tend to undermine efficient long-term private capital accumulation (including human capital accumulation), which is a fundamental feature of economic growth. (Details on the variables and data sources are described in the **Appendix**).

The second test is economic openness. One of the basic tenets of classical and neoclassical economics dating back to Adam Smith is the economic benefits of openness, including: increased specialization, efficient resource allocation according to comparative advantage, diffusion of international knowledge through trade, and heightened domestic competition as a result of international competition.

To test for openness, we include three kinds of measures. First, the country must not impose excessive quotas on imports. Second, the country must not impose excessive quotas, or state monopolies, on exports. Third, the country must maintain a reasonably convertible currency. We judge convertibility according to the gap between the black market and official exchange rate. A large black market premium signals inconvertibility of the national currency, and thereby effective closure from world markets⁶. In addition, we exclude South Africa and the two countries located within South Africa (Lesotho and Swaziland) on the grounds of the international boycott of the South African economy during much of the period of observation.

Specifically, a country fails the openness test as a result of any of the following criteria (with details in the Appendix):

- (1) a very high proportion of imports covered by quota restrictions, according to the index prepared by Lee (1993);
- (2) for Sub-Saharan Africa, a high proportion of exports covered by state export monopolies and state-set prices, according to an index in the World Bank (1993)⁷;

⁶ As is well known, rationing of foreign exchange to importers at the official exchange rate is economically similarly, if not identical, to a quota on imports.

⁷ The World Bank index of monopolization of exports was constructed only for 29 Sub-Saharan African countries in the World Bank (1993) study on African structural adjustment. We are confident that none of the countries outside of Sub-Saharan Africa that we characterize as "qualifying" vis-a-vis openness should be disqualified on the basis of monopolization of exports. More generally, outside of Sub-Saharan Africa, trade quotas are overwhelmingly on the import side rather than the export side.

- (3) a black-market premium over the official exchange rate of 20 percent or more, on average, either for the decade of the 1970s or the decade of the 1980s (or both).

Failure on any of these criteria indicates that the economy is operating in substantial isolation from the world economy.

The list of non-qualifying countries according to any of the political or openness criteria is shown in **Table 1**, and the list of qualifying countries is shown in **Table 2**. A statistical summary of the growth performance of the qualifying and non-qualifying countries is shown in **Table 3**. We see that most countries are excluded on the openness criteria and these have below average growth rates. We expect, therefore, that the qualifying developing countries are more likely to exhibit economic convergence once the non-qualifiers are dropped from the sample. It is notable that 23 of 29 countries with 1970 income levels above \$4,000 passed both the political and openness tests (income is measured in U.S. dollars, in constant 1985 prices and adjusting for purchasing power), in contrast with just 13 out of 88 countries with initial income levels of less than \$4,000. Therefore, the finding that there is convergence of the richer countries is consistent with the view that convergence is due to appropriate economic policies, rather than to high initial income *per se*.

The role of policy choices in convergence is dramatically evident in **Figures 2(a)** and **2(b)**, where we divide the sample in Figure 1 into groups of qualifying and non-qualifying countries. We see in Figure 2(a) that **the qualifying countries display a strong tendency towards economic convergence**, with the countries with the initially low per capita income levels growing more rapidly than the richer countries. The non-qualifiers in Figure 2(b) do not display any tendency towards convergence. The non-qualifying countries in Figure 2(b) are clearly the source of the failure of convergence that we noted in Figure 1.

Even more strikingly, there is not a single country in our sample (which covers 120 countries and approximately 90 percent of the world's population as of 1985) which pursued appropriate policies during 1970-89 and yet which had per capita growth of less than 2 percent per year! There are, on the other hand, 13 developing countries (< \$4,000 initial income) that pursued appropriate policies according to our criteria, and all of these countries grew at more than 2 percent per year. We therefore find no cases to support the frequent worry that a country might "do the right things" in terms of overall policy, and yet fail to grow. Of course, economic reforms take time to work, so that some countries that have recently adopted outward-oriented market reforms (in the late 1980s or early 1990s) might not yet enjoy high growth rates as a result of those reforms⁸.

⁸ On the other hand, there are many recent reformers that are already experiencing rapid economic growth, such as Argentina, Bolivia, and Peru in Latin America, and Poland, Estonia, Slovenia in post-

So far we have argued the case of sufficiency: a set of good policies is sufficient to produce a good economic outcome (i.e. convergent growth). What of necessity? Are there many countries that "broke the rules" and yet achieved high economic growth? There are six countries that failed to qualify on one or more of the criteria and yet that had per capita growth of more than 3 percent per year during 1970-89: Botswana, Cape Verde, China, Hungary, Lesotho, and Tunisia. (Remember that of the 75 developing non-qualifying countries, only 6, or 8 percent, achieved growth of three percent or more, while of the qualifying countries, 11, or 85 percent, achieved growth of three percent or more).

It is relatively straightforward to account for five of these six "exceptions." Botswana failed to qualify on the black-market premium for the 1970s, but did qualify for the 1980s. It passed all other criteria. Overall, therefore, the policies have been relatively well balanced, especially in the 1980s. Moreover, since around 80 percent of Botswana's exports are diamonds, and a remarkably small proportion (less than 5 percent) of the labor force is in agriculture, Botswana avoided the anti-agricultural biases of most of Sub-Saharan Africa.

As for Cape Verde, Hungary, and Tunisia, the "successful" growth during 1970-89 is more apparent than real. All three countries pursued statist development strategies that produced growth in the 1970s and financial crises in the 1980s and early 1990s. In all three cases, there was a serious downturn in growth at the end of the 1980s, as financial crises hit the government. Taken over a slightly longer time period, therefore, these cases would not look like successes and would not be anomalous.

Lesotho was excluded on the general grounds that it was expected to suffer from the worldwide boycott against South Africa. Otherwise it passed the remaining criteria. It appears that its small size (population 1.8 million) allowed Lesotho to make effective use of the South African market (both for goods and for migrant labor) even as South Africa itself was subjected to international sanctions.

In our view, there is only one deep puzzle to these exceptions, the case of China. It is indeed true that China has violated most of the rules: obscure property rights, political repression, high black market premia on the yuan, extensive reliance on trade quotas. Nonetheless, China has experienced a boom. We believe that China's success is strongly related to its particular economic structure at the onset of its market reforms at the end of the 1970s.

In particular, China was a very poor economy in 1978, with three-fourths of the labor force in peasant farming. The essence of Deng Xiaping's reforms at the end of the 1970s was to free the peasant economy from state controls, even while maintaing

communist Central and Eastern Europe. We lack systematic data, however, to bring the record up to the mid-1990s.

the state's grip on the non-peasant state-owned sector (which covered just 18 percent of the labor force). This "two-track approach" (de-control of the peasant sector, with continued control of the state sector) was sufficient to unleash China's growth and labor-intensive export boom, even though it did not solve many problems of poor performance in the state-owned sector. See Sachs and Woo (1993) for further details of the two-track approach in China.

III. Regression Analysis

We now turn to a regression analysis, to confirm and deepen these basic findings. Various regression estimates are reported in **Table 4**, showing the simple bivariate relationship between initial income in 1970 and subsequent growth between 1970 and 1989. We see in regression (1) the absence of convergence for the entire sample of countries (the coefficient on initial income is positive rather than negative, and is statistically insignificant). In regression (2) we see the strong evidence of convergence within the set of qualifying countries. The coefficient on initial income suggests that each percentage point rise in per capita income in 1970 reduces subsequent annual growth by .013 percentage points. Each doubling of 1970 income reduces annual growth by .92 percentage points ($=\ln(2)*1.292$). In regression (3), we confirm the absence of convergence among the non-qualifying countries.

The regressions in **Table 5** confirm the growth effects of the political and openness variables in the overall sample. In regression (4), we regress annual economic growth on the logarithm of initial income and five dummy variables, for the three political and two openness criteria. For each of the variables, a value of 1 signifies "non-qualifying" and a value of 0 signifies "qualifying." Therefore, we should expect negative coefficients on each of these variables in the growth regression. This is indeed what we find. In each case, the coefficient signifies the effect on annual growth, in percentage point terms, of the failure to conform to the particular standard of policy. For example, an excessive black-market premium is estimated to be associated with 1.933 percentage points of reduced annual growth (t-statistic equal to 5.3). In regression (5), we compress the criteria into two variables, a single political variable (PNQ) and an openness variable (ONQ). Again, a value of 1 on either variable signifies "non-qualifying" on the criterion. Both the political and openness criteria are highly negative and statistically significant. An F-test comparing regressions (4) and (5) fails to reject the restriction that the five dummy variables may be reduced to two composite dummy variables.

In **Table 6**, regression (6), we replicate the basic Barro (1991) regression on cross-country growth for our sample and time period. We see that the basic Barro equation performs as expected over our sample and time period, with conditional convergence (a negative, significant coefficient on initial income), positive effects of educational attainment (though not significant), positive effects of the investment-GDP ratio, and negative effects of measures of political instability.

Regression (7) estimates the same equation but includes the two dummy variables for political and openness qualifications (1 for non-qualifiers, 0 for

qualifiers). When we add PNQ and ONQ, we find that the political non-qualifiers grow, on average, by 1.75 percentage points less per year than the political qualifiers, while the openness non-qualifiers grow by 1.86 percentage points less than the openness qualifiers. The rest of the structural variables remain roughly the same as in regression (6), though the initial education levels are even less significant. This is consistent with our view that the growth rate over this period was determined less by initial human capital levels than by policy choices.

We attempted various experiments to interact the PNQ and ONQ dummy variables with the right-hand-side variables in the Barro equation, to see for example whether the effects of education, initial income, investment, and the like were different for the qualifiers and non-qualifiers. To our surprise, the interaction terms generally proved to be small and statistically insignificant. The effect of policy failure was therefore measured to result in a downward step in growth, without clearly affecting the conditional impacts of the other right-hand-side variables.

In equation (7), we add two variables to the basic growth equation that we have explored in earlier work. The first variable, PXI, is a measure of the raw-material intensity of the economy, based on the share of raw-materials exports in total exports in 1970. The second variable, DTT, is a measure of the change in the terms of trade of the country during 1970-89. As we argued in Sachs and Warner (1994), there are reasons to believe that resource-rich countries will experience lower growth than resource poor countries, all other things equal, because the natural resource base will push resources into the non-tradeables sector at the expense of the manufacturing tradeables sector. If, as is sometimes argued, the manufacturing sector is the site of technological spillovers and learning by doing, then the shift of resources to non-tradeables could slow aggregate growth in the medium and long term.

As in our earlier paper, we find in regression (7) that the natural resource proxy variable does indeed help to account for cross-country growth, and this is true even controlling for PNQ and ONQ. Specifically, countries that specialized in natural resource exports at the start of the period tended to grow more slowly than manufacturing exporters. There is also some evidence, though not statistically significant, that a rising terms-of-trade over the period raised average growth over the period. While the inclusion of the PXI variable seems to be justified even after controlling for ONQ and PNQ (which remain highly significant in the regression), the presence of PXI tends to eliminate the statistical significance of the investment-to-GDP ratio. Raw-materials exporters systematically had lower rates of physical investment relative to GDP. When the equation must choose between PXI and investment-to-GDP as an explanation of growth, the PXI variable dominates.

In other regressions, not reported in the table, we instrument the PXI variable in order to eliminate the possibility that high-resource intensity of exports is a result of poor growth performance rather than a cause. As in Sachs and Warner (1994) we use an instrument suggested originally by Adrian Wood: the ratio of aggregate years of schooling in the country divided by total land area of the country. Countries with high schooling-to-land ratios should be expected, on Heckscher-Ohlin-Samuelson trade

theoretic grounds, to be manufacturing exporters, while countries with low ratios should be raw-materials exporters. The use of this instrument does not change our finding with regard to the negative effect of PXI on subsequent growth.

In regressions (9) and (10) we run the Barro equation, augmented by PXI and DTT, separately for the two subsets of countries, the qualifiers and the non-qualifiers. For the qualifying countries, in regression (9), the basic equation remains satisfactory, with evidence of conditional convergence (a negative, statistically significant effect of initial income on subsequent growth), and with the continuing importance of the PXI variable. For the non-qualifiers, in regression (10), there is also (surprising-though not quite significant) evidence of conditional convergence, with the initially poorer countries tending to grow faster after controlling for the other right-hand-side variables. Of course, the constant term in (10) is lower than in (9), reflecting the overall drag on growth of inappropriate policies.

In regression (8), we had found that PNQ and ONQ reduced overall growth when controlling for the other variables. Since poor policies might also affect the rates of investment relative to GDP and the rates of human capital accumulation, we would expect indirect adverse growth effects of poor policies as a result of slower capital accumulation (both physical and human). In regressions (11) - (13), we therefore check whether the qualifying and non-qualifying countries differed systematically in the rates of capital accumulation, once we control for initial income and resource-intensity of initial production (as proxied by PXI). In regression (11) we find that the openness non-qualifiers (ONQ = 1) had significantly lower investment-to-GDP ratios, with ONQ reducing the investment ratio by an average of 5.8 percentage points. Interestingly, there is also some evidence that richer countries have higher investment rates than poorer countries.

In regressions (12) and (13), we ask whether the increase in educational attainment between 1970 and 1985 was different for the two subsets of countries, again controlling for initial income levels and PXI. We find no evidence that the non-qualifiers had a lower improvement in the coverage of primary and secondary education than did the qualifiers. It is clear, though, that the more developed economies had less improvement in educational coverage than did the poorer countries (as evidenced by the significant, negative sign on initial income in both regressions).

Based on the regression analysis, we may make five conclusions:

- (1) there is strong evidence of unconditional convergence for qualifying countries, and no evidence of unconditional convergence for non-qualifying countries;
- (2) non-qualifying countries grew systematically more slowly than did the qualifying countries, so that "good" policies mattered;
- (3) each of the policy criteria played a role in determining average growth rates;

(4) the role of the policy criteria remains in place after controlling for other growth factors, as in a standard Barro cross-country growth equation;

(5) poor policies seem to affect growth directly, controlling for other factors, while poor trade policies also seemed to affect the rate of accumulation of physical capital.

IV. Discussion and Conclusions

The absence of strong evidence across countries of unconditional economic convergence has led to a number of disparate views in the economics profession in recent years. Some have argued that non-convergence is a technological fact of life. Others have suggested that laggard countries require special remedial policies to provoke high-speed growth, lest they get trapped in a low-growth economy. Industrial policies *a la* East Asia have sometimes been posited as a model for such lagging countries. The evidence in this paper strongly calls into question these views.

A more parsimonious interpretation of the evidence is that convergent growth can be achieved by all or virtually all countries that follow a reasonable set of political and economic policies, including civil peace, basic adherence to political and civil rights, and an open economy, through the absence of trade quotas, export monopolies, or inconvertible currencies. All countries that followed such a pattern achieved per capita growth between 1970 and 1989 of two percent per year or greater.

We note that many authors have introduced political and openness data into cross-country growth equations, and indeed we use many of the criteria suggested by others⁹. Our contribution is not to show that trade "matters" for growth, since this has already been done. Our contribution, we believe, is to show the strength of convergence among all well-behaving countries. We believe that this simple and important fact has been obscured among growth theorists.

Another way to summarize the message for the poorer countries is to consider the following matrix. In this matrix, the group of countries with real GDP in 1970 of less than \$4,000 are sorted in two dimensions: those that do or do not satisfy the criteria; and those that have grown quickly ($G7089 > 3.0$), moderately ($3.0 > G7089 > 2.0$), and slowly ($G7089 < 2.0$).

⁹ A partial list of these studies includes Barro (1991), DeLong and Summers (1991), Levine and Renelt (1992), King and Levine (1993), Svensson (1994), Alesina, Ozler, Roubini, and Swagel (1992).

All Countries with GDP70<4000	Satisfy Criteria	Do Not Satisfy Criteria
Fast Growth (G7089>3.0)	11	6
Moderate Growth (3>G7089>2)	2	18
Slow Growth (G7089<2.0)	0	51

Most of the countries of course lie either in the upper left or lower right cells, reiterating the finding that growth is strongly associated with whether a country satisfies the criteria. What is surprising is that so few of the countries lie in the lower left or upper right cells. In particular, there is not a single country that falls in the bottom left cell, of good policies and slow growth. This fact lends support to the view that the criteria we consider are sufficient for growth. On the other hand, the fact that there are 6 countries in the upper right cell shows that these criteria are not necessary for growth: some countries have indeed grown rapidly without satisfying our criteria. We have argued, however, that in fact 5 of these 6 countries really conform with the general pattern, when difficulties with timing and specific patterns of policy are taken into account. Only China is really heterodox by our standards, and even there we have reasons to suspect that China's particular growth pattern could not easily be emulated by other countries.

The findings above may also be expressed in terms of conditional probabilities. Suppose a representative poor country back in 1970 found itself behind a Rawlsian "veil of ignorance". The policymakers could know the numbers in the matrix, but not the specifics of the country, in choosing which path to follow. Would such a country gamble that it would come out like China based on the numbers above? Conditional on closed policies, the probability of growing at 3 percent or more would be only 0.08 (6 divided by the 76 disqualified countries with low income). On the other hand, the gamble based on good policies would yield vastly better odds.

It is natural to ask whether our results are a case of reverse causation, in which slow economic growth led to bad policies -- for example, if stagnant economies tried to experiment with trade barriers in order to speed economic growth. We think this is highly unlikely. In most cases, the "bad" policies were selected early in the post-war era, long before a track record on growth had occurred. These countries stuck with the policy choices until quite recently, certainly into the 1970s and 1980s, the interval of observation. Moreover, the few cases of developing countries that pursued outward oriented policies did so in part because of their particularly close security relations with the United States or with European nations. For these reasons, we believe that it is appropriate to take the policy regime "as given," for purposes of studying the effects of policy choices on growth. In a follow up study, we propose to examine the sources

of basic development strategies of these nations, according to geography, colonial history (if any), date of independence and therefore experience of government, and economic structure.

In conclusion, we believe that are findings are significant. Dozens of countries in Latin America, Africa, Eastern Europe, and the former Soviet Union have recently undertaken market-reform policies that will shift them from the non-qualifying to the qualifying category of nations. Our results suggest that most or all of these reforming nations have a good chance to benefit from these reforms with higher economic growth. Indeed, we can already see the fruits of reform in several economies in Latin America (e.g. Argentina, Peru, Bolivia), in Asia (e.g. the Philippines), and in Africa (e.g. Mauritius, Botswana).

Tables & Figures

Table 1. List of Non-qualifying Countries
(value of 1 means disqualification)

	Reason for disqualification:							G7089	GDP70
	SOC	WAR	RIGHT	BMP	TRADE	ONQ	PNQ		
Algeria	0	0	1	1	0	1	1	2.216	1833
Angola	1	1	1	1	0	1	1	-2.715	1110
Argentina	0	0	0	1	0	1	0	-0.758	4169
Bangladesh	0	0	0	1	1	1	0	1.640	922
Benin	1	0	1	0	1	1	1	-0.935	1138
Bolivia	0	0	0	1	0	1	0	-0.046	1612
Botswana	0	0	0	1	na	1	0	7.118	867
Brazil	0	0	0	1	0	1	0	2.931	2390
Burkina Faso	0	0	0	0	1	1	0	1.615	399
Burundi	0	0	1	1	1	1	1	2.500	324
Cameroon	0	0	1	0	1	1	1	2.145	866
Cape verde	0	0	1	na	na	1	1	3.267	689
C. African Rep.	0	0	1	0	1	1	1	-1.140	695
Chad	0	0	1	0	1	1	1	-1.848	543
Chile	0	0	0	1	0	1	0	0.443	3695
China	1	0	1	na	0	1	1	5.518	825
Colombia	0	0	0	0	1	1	0	2.159	2100
Congo	1	0	1	0	1	1	1	1.791	1581
Costa Rica	0	0	0	1	1	1	0	1.302	2793
Cote d'Ivoire	0	0	na	0	1	1	na	-0.162	1322
El Salvador	0	0	0	1	0	1	0	-0.009	1740
Ethiopia	1	1	1	1	0	1	1	-0.094	287
Gabon	0	0	1	0	1	1	1	-0.094	3679
Gambia	0	0	0	0	1	1	0	0.347	603
Ghana	0	0	0	1	1	1	0	-1.159	1017
Guatemala	0	0	0	0	1	1	0	.244	2004
Guinea	0	0	1	na	1	1	1	0.103	353
Guinea-Bissau	0	0	1	na	1	1	1	-0.016	661
Guyana	0	0	0	1	0	1	0	-1.932	1711
Haiti	0	0	1	0	0	0	1	0.040	787
Honduras	0	0	0	0	1	1	0	0.599	1206
Hungary	1	0	na	na	na	1	1	3.466	3373
India	0	0	0	1	1	1	0	2.093	703
Iran, I.R. of	0	1	0	1	1	1	1	-1.696	4214
Iraq	0	1	1	1	0	1	1	-0.525	4270
Israel	0	0	0	1	na	1	0	2.074	5705
Jamaica	0	0	0	1	0	1	0	-0.571	2688
Kenya	0	0	0	1	0	1	0	2.236	582
Lesotho	0	0	0	0	1	1	0	4.875	387
Liberia	0	1	0	0	na	na	1	-1.090	949
Madagascar	0	0	0	1	1	1	0	-2.668	1125
Malawi	0	0	1	1	1	1	1	0.816	431
Mali	0	0	1	0	1	1	1	1.781	389
Mauritania	0	0	1	1	1	1	1	-0.697	881
Mexico	0	0	0	1	0	1	0	1.418	3951
Mozambique	1	0	1	1	1	1	1	-3.408	1461
Myanmar (Burma)	0	0	1	1	na	1	1	2.037	392
Nepal	0	0	0	1	0	1	0	2.026	644
Nicaragua	1	1	0	1	1	1	1	-2.008	2184
Niger	0	0	1	0	1	1	1	-2.456	749
Nigeria	0	0	0	1	1	1	0	-0.202	770
Pakistan	0	0	0	1	0	1	0	1.572	997

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Panama	0	1	0	0	na	na	1	0.303	2501
Papua N Guinea	0	0	na	1	0	1	na	-0.981	1744
Paraguay	0	0	0	1	0	1	0	2.368	1434
Peru	0	0	0	1	0	1	0	-1.014	2642
Philippines	0	0	0	0	1	1	0	1.227	1369
Poland	1	0	0	na	na	1	1	2.286	2981
Rwanda	0	0	1	1	1	1	1	0.287	625
Senegal	0	0	0	0	1	1	0	-0.120	1107
Sierra Leone	0	0	0	1	1	1	0	-0.750	1050
Somalia	1	1	1	1	0	1	1	0.148	842
South africa	0	0	0	0	1	1	0	0.254	3160
Sri Lanka	0	1	0	1	0	1	1	2.825	1307
Swaziland	0	0	0	0	1	1	0	-0.476	2390
Syria	0	0	1	1	1	1	1	2.763	2205
Tanzania	0	0	1	1	1	1	1	0.318	431
Togo	0	0	1	0	1	1	1	0.059	620
Trin & Tobago	0	0	0	1	0	1	0	1.159	6715
Tunisia	0	0	0	0	1	1	0	3.601	1400
Turkey	0	0	0	0	1	1	0	2.321	2180
Uganda	0	0	0	1	1	1	0	0.879	763
Uruguay	0	0	0	1	0	1	0	0.572	3876
Venezuela	0	0	0	1	0	1	0	-1.508	7607
Yugoslavia	1	0	na	na	na	1	1	2.854	3338
Zaire	0	1	1	1	0	1	1	-2.429	643
Zambia	0	0	0	1	1	1	0	-2.173	1096
Zimbabwe	1	0	0	1	1	1	1	0.987	1072
Average								0.708	

Notes: SOC is a dummy variable that equals 1 for Socialist countries (following the classification of Kornai (1992), table 1.1). WAR is a dummy for countries with a major war or civil unrest on their territory during the period 1970-1989. RIGHT is a dummy for countries that have a high score (6 or 7) on Freedom House's index of denial of political or civil rights. BMP is a dummy for countries that had an average black market premium higher than 20 percent for either the decade of the 1970's or the 1980's. TRADE is a constructed dummy variable that equals 1 for countries with a high degree of trade protection, based on data on import quotas in Lee (1993) or the World Bank (1994). ONQ is a dummy for countries that get disqualified on either BMP or TRADE, and PNQ is a dummy for countries that get disqualified on either SOC, WAR, or RIGHTS. G7089 is annual growth in real GDP per capita between 1970 and 1989, using version 5.5 of the Summers-Heston data. GDP70 is real GDP per capita in 1970 (units are 1985 international dollars).

Table 2. List of Qualifying Countries

	G7089	GDP70
Australia	1.636	10947
Austria	2.620	7569
Barbados	2.574	4768
Belgium	2.324	8459
Canada	2.956	10169
Cyprus	3.907	3777
Denmark	1.787	9698
Finland	2.946	8272
France	1.860	9625
Germany, West	1.987	9586
Greece	2.379	4236
Hong Kong	6.229	4453
Indonesia	5.098	699
Ireland	2.894	4883
Italy	2.542	7675
Japan	3.349	7509
Jordan	2.580	1409
Korea	7.120	1680
Luxembourg	2.516	10024
Malaysia	4.010	2116
Malta	5.409	2383
Mauritius	4.465	2338
Morocco	2.393	1303
Netherlands	1.571	9241
New Zealand	1.233	9352
Norway	3.142	8144
Portugal	3.374	3341
Singapore	6.388	3156
Spain	2.313	6025
Sweden	1.628	10688
Switzerland	1.237	13299
Taiwan	6.742	2376
Thailand	4.072	1512
United Kingdom	2.811	7703
United States	1.954	12706
Yemen, N.Arab	5.451	588
Average	3.264	

Note: All of these countries had 0's for the dummy variables reported in table 1.

Table 3. Summary of Growth Performance

	Number of Countries	Mean of G7089
All Countries	117	1.495
High Income Countries (GDP70>4000)		
Qualifying	23	2.456
Non-Qualifying because of:		
Politics alone	0	na
Openness alone	4	0.242
Both	2	-1.110
Low Income Countries (GDP70<4000)		
Qualifying	13	4.693
Non-Qualifying because of:		
Politics alone	1	0.040
Openness alone	38	1.058
Both	32	0.635
Insufficient Data	4	0.111

Table 4. Simple Convergence Regressions

	Dependent Variable: G7089		
	All Countries (1)	All Qualifying Countries (2)	All Excluded Countries (3)
Constant (t-ratio)	-1.239 (-0.797)	14.191 (6.856)	2.116 (1.032)
LGDP70 (t-ratio)	0.362 (1.774)	-1.292 (-5.305)	-0.196 (-0.690)
R Bar 2	0.018	0.437	-0.007
Mean of G7089	1.495	3.264	0.708
Sigma	2.171	1.214	1.951
Sample Size	117	36	81

Notes: G7089 is annual growth in real GDP per capita between 1970 and 1989, using version 5.5 of the Summers-Heston data. LGDP70 is the log of real GDP per capita in 1970 (in this case GDP70 is measured in thousands of 1985 international dollars).

Table 5. Growth Effects of the Political and Openness Measures

	Dependent Variable: G7089	
	(4)	(5)
Constant	8.832	8.282
(t-ratio)	(4.932)	(4.408)
SOC	-0.490	(-0.693)
WAR	-1.116	(-1.530)
RIGHT	-1.254	(-2.680)
PNQ	-0.891	(-2.091)
BMP	-1.933	(-5.305)
TRADE	-2.014	(-4.989)
ONQ	-2.776	(-5.973)
LGDP70	-0.705	-0.604
	(-3.307)	(-2.744)
R bar 2	0.438	0.306
Mean dv.	1.430	1.565
Standard Error	1.629	1.828
Sample Size	102	113

Significance levels for F tests:

H0: b(SOC)=b(WAR)=b(RIGHT) 0.714

H0: b(BMP)=b(TRADE) 0.878

H0: b(PNQ)=b(ONQ) 0.008

Notes: SOC is a dummy variable that equals 1 for Socialist countries (following the classification of Kornai (1992), table 1.1). WAR is a dummy for countries with a major war or civil unrest on their territory during the period 1970-1989. RIGHT is a dummy for countries that have a high score (6 or 7) on Freedom House's index of denial of political or civil rights. BMP is a dummy for countries that had an average black market premium higher than 20 percent for either the decade of the 1970's or the 1980's. TRADE is a constructed dummy variable that equals 1 for countries with a high degree of trade protection, based on data on import quotas in Lee (1993) or the World Bank (1994). ONQ is a dummy for countries that get disqualified on either BMP or TRADE, and PNQ is a dummy for countries that get disqualified on either SOC, WAR, or RIGHTS. See the notes to table 4 for descriptions of G7089 and LGDP70 and the data appendix for further details.

Table 6. Growth Regressions based on Barro (1991)

	Dependent Variable: G7089				
	(6)	(7)	(8)	(9)	(10)
Constant	7.036 (2.470)	12.425 (2.566)	18.037 (6.079)	30.190 (7.160)	9.051 (2.116)
ONQ	-1.920 (-4.284)	-1.411 (-2.985)			
PNQ	-1.437 (-3.108)	-1.446 (-3.095)			
LGDP70	-1.013 (-2.588)	-1.343 (-3.108)	-1.874 (-5.081)	-2.923 (-6.173)	-0.917 (-1.653)
SEC70	3.732 (1.729)	1.194 (0.642)	3.044 (1.571)	1.744 (0.921)	4.344 (1.196)
PRI70	0.324 (0.302)	-0.155 (-0.167)	1.052 (0.961)	-1.415 (-0.961)	0.534 (0.351)
GVXDXE	-5.818 (-1.574)	-7.269 (-2.284)	-8.872 (-2.779)	1.064 (0.169)	-5.881 (-1.561)
REVCoup	-0.358 (-0.405)	-0.064 (-0.086)	-0.095 (-0.127)	-3.328 (-1.889)	-0.100 (-0.106)
ASSASSP	-1.931 (-1.211)	-1.984 (-1.484)	-2.367 (-1.673)	-2.148 (-0.214)	-2.245 (-1.363)
PPI70DEV	-0.993 (-2.240)	-0.749 (-1.954)	-0.951 (-2.530)	0.712 (0.424)	-0.964 (-2.177)
INV7089	11.954 (3.314)	8.538 (2.658)	5.170 (1.599)	-0.082 (-0.025)	4.113 (0.849)
PXI71		-2.344 (-3.430)	-3.024 (-5.164)	-2.572 (-2.238)	
DTT7189		0.854 (1.573)	-0.640 (-0.772)	0.182 (0.252)	
R bar 2	0.364	0.555	0.615	0.811	0.227
Mean dv.	1.587	1.638	1.635	3.226	0.638
s.e.	1.644	1.374	1.305	0.742	1.464
N	81	79	73	28	46

Notes: SEC70 is the secondary school enrollment rate. PRI70 is the primary school enrollment rate. GVXDXE is the ratio of real government 'consumption' spending net of spending on the military and education to real GDP. REVCoup is the number of revolutions and coups per year, averaged over the period 1970-1985. ASSASSP is the average number of assassinations per million population, 1970-1985. PPI70DEV measures the relative price of investment goods: the deviation of the log of the price level of investment (PPP I / Xrate relative to the U.S.) from the cross country sample mean in 1970. INV7089 is the ratio of real gross domestic investment (public plus private) to real GDP, averaged over the period 1970-1989. PXI71 is the ratio of exports of primary products to total exports in 1971. DTT7189 is the change in the log of the external terms of trade between 1971 and 1989.

Table 7. The Effects on Human and Physical Capital Accumulation

	Dependent Variables:		
	INV7089	DSYR	DPYR
	(11)	(12)	(13)
Constant	-0.143 (-1.810)	0.124 (2.748)	0.162 (4.311)
ONQ	-0.040 (-2.312)	0.002 (0.196)	0.003 (0.341)
PNQ	0.029 (1.856)	0.015 (1.617)	0.000 (0.034)
LGDP70	0.049 (5.700)	-0.010 (-1.982)	-0.018 (-4.186)
PXI71	-0.041 (-0.878)	-0.006 (-0.402)	-0.007 (0.588)
R bar 2	0.555	0.104	0.254
Mean d.v.	0.187	0.048	0.024
s.e.	0.059	0.032	0.027
N	106	89	84

Notes: INV7089 is the ratio of public and private investment spending to GDP, averaged over the period 1970-1989. DSYR is average accumulation of secondary schooling over the period 1970-1985. Specifically, $DSYR = [\log(SYR85) - \log(SYR70)]/15$, where SYRxx is person-years of secondary schooling divided by the total population over age 15. DPYR is accumulation of primary schooling, similarly calculated.

Figure 1. G7089 against GDP70

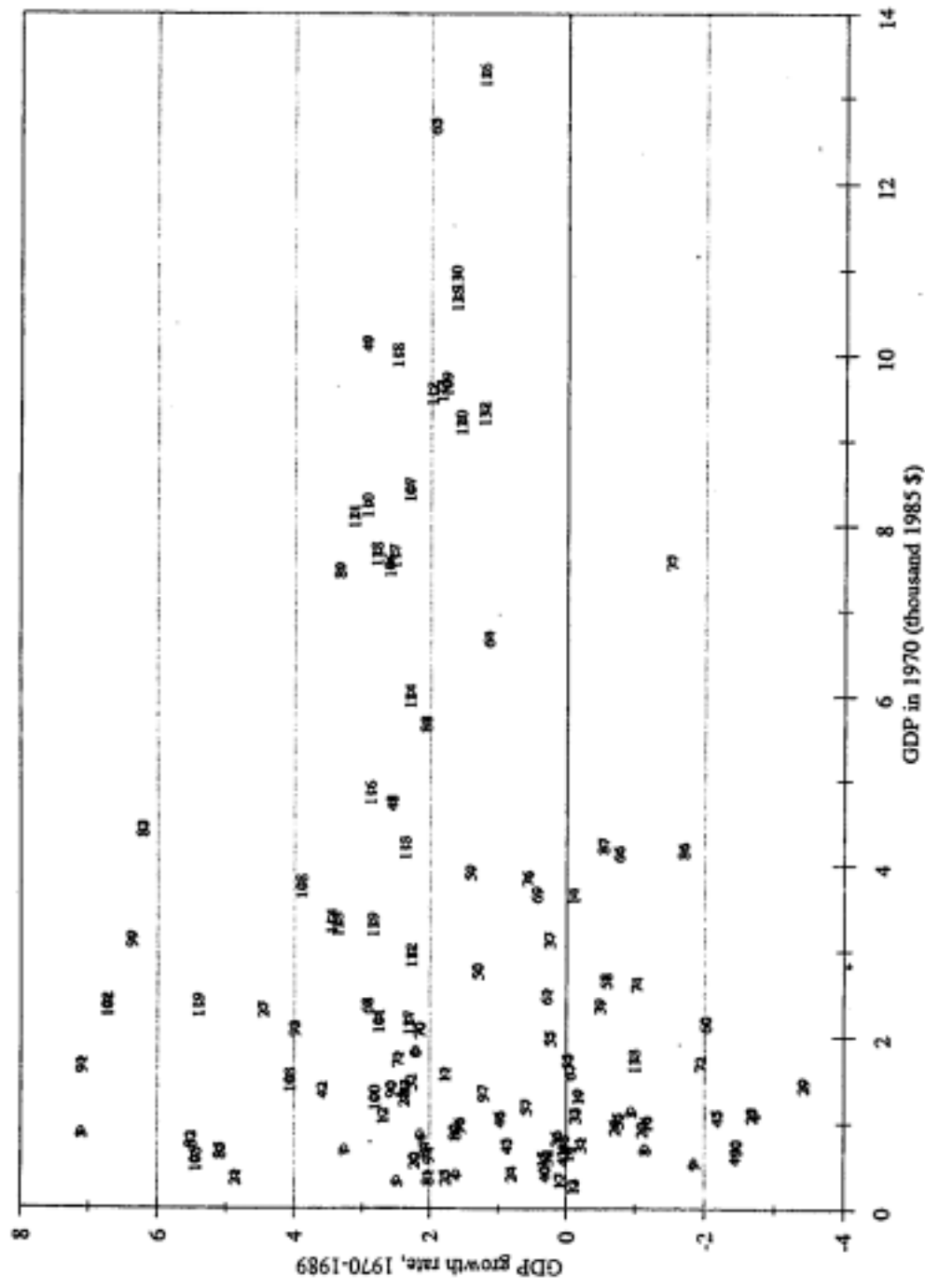


Figure 2 (a). Qualifying Countries

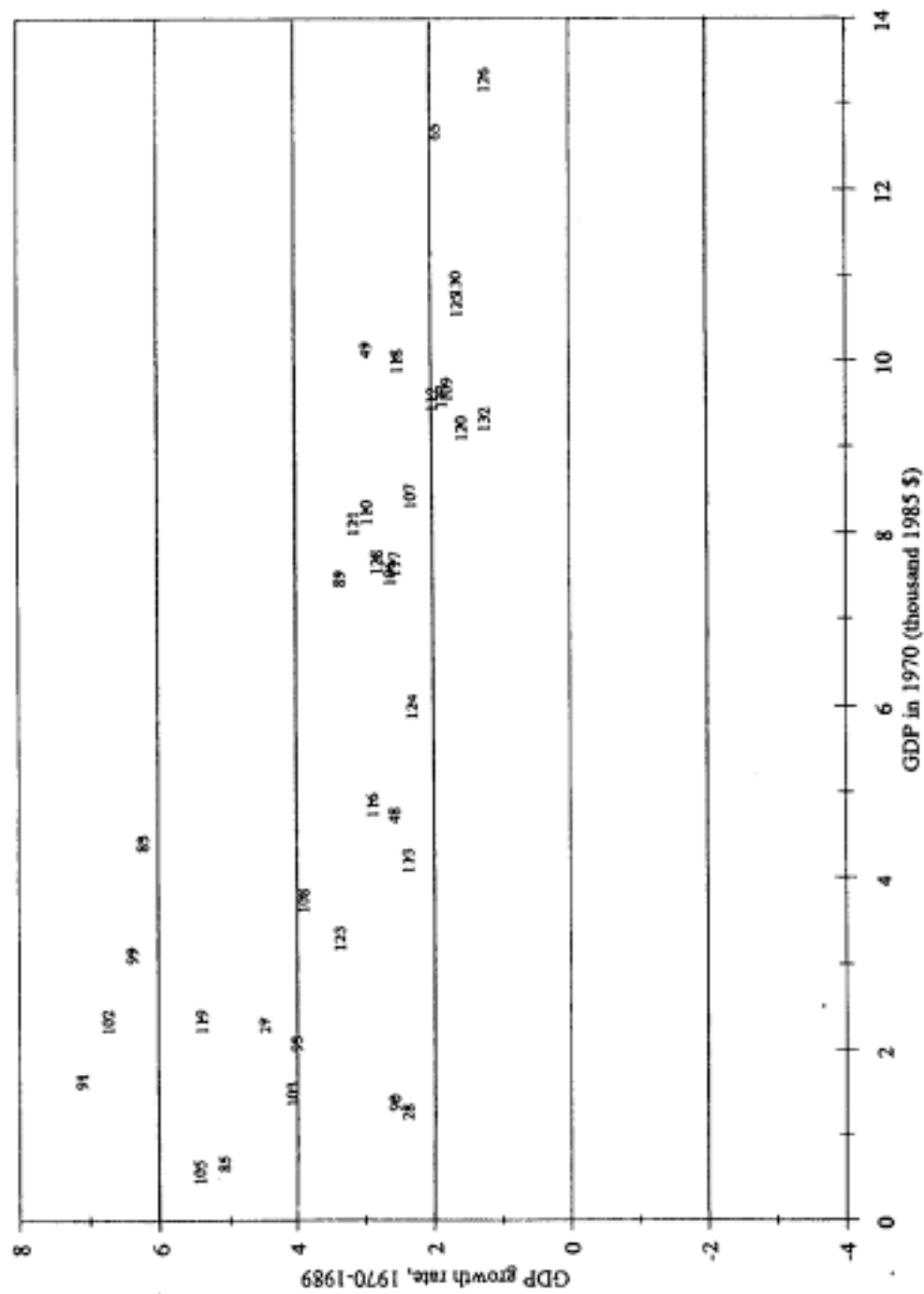
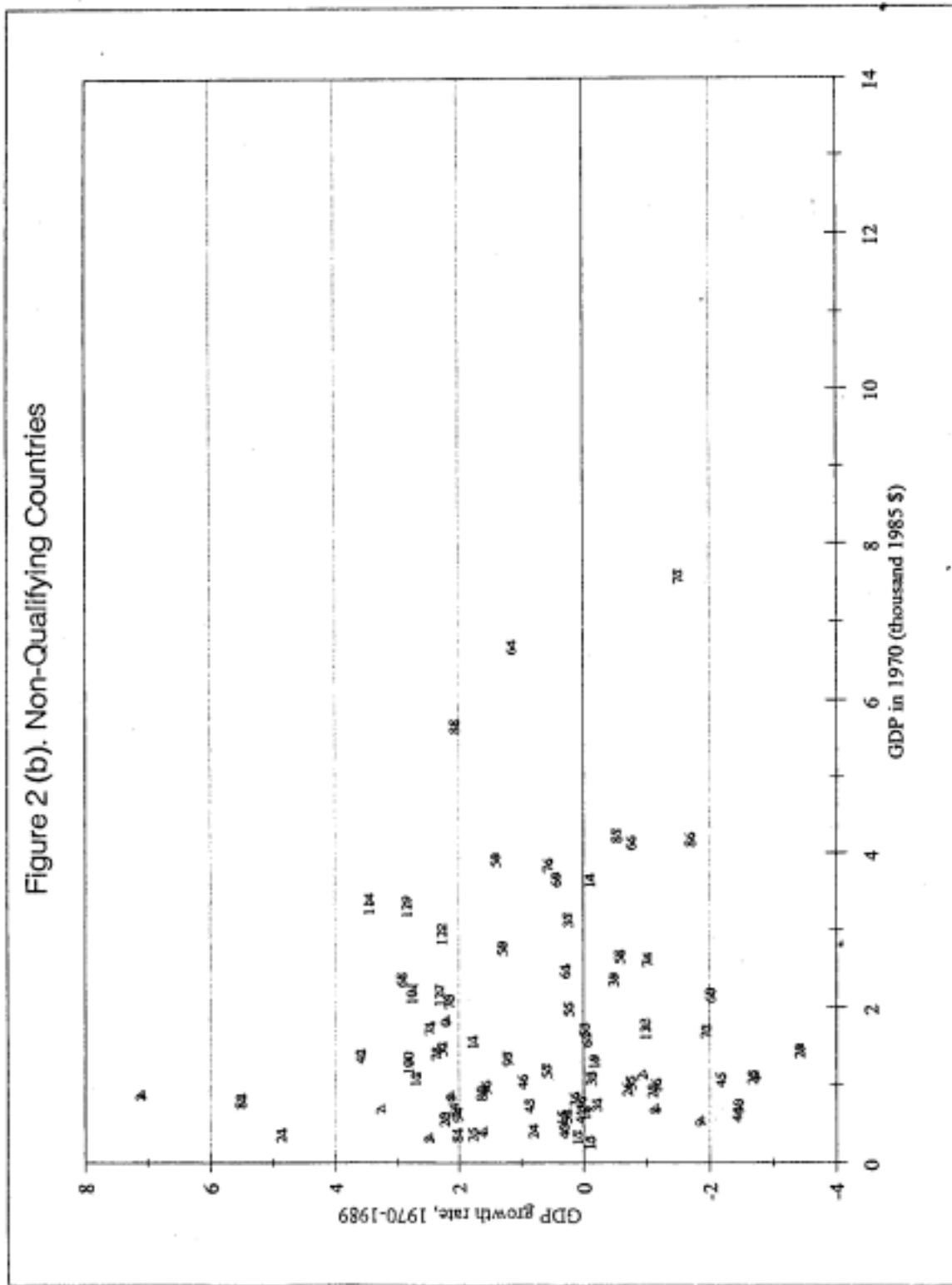


Figure 2 (b). Non-Qualifying Countries



Legend:

0	Algeria	34	Seychelles	68	Brazil	102	Taiwan
1	Angola	35	Sierra Leone	69	Chile	103	Thailand
2	Benin	36	Somalia	70	Colombia	104	United Arab Emirates
3	Botswana	37	South africa	71	Ecuador	105	Yemen, N.Arab
4	Burkina Faso	38	Sudan	72	Guyana	106	Austria
5	Burundi	39	Swaziland	73	Paraguay	107	Belgium
6	Cameroon	40	Tanzania	74	Peru	108	Cyprus
7	Cape verde	41	Togo	75	Suriname	109	Denmark
8	Central African Rep.	42	Tunisia	76	Uruguay	110	Finland
9	Chad	43	Uganda	77	Venezuela	111	France
10	Comoros	44	Zaire	78	Afghanistan	112	Germany, West
11	Congo	45	Zambia	79	Bahrain	113	Greece
12	Egypt	46	Zimbabwe	80	Bangladesh	114	Hungary
13	Ethiopia	47	Bahamas, The	81	Myanmar (Burma)	115	Iceland
14	Gabon	48	Barbados	82	China	116	Ireland
15	Gambia	49	Canada	83	Hong Kong	117	Italy
16	Ghana	50	Costa Rica	84	India	118	Luxembourg
17	Guinea	51	Dominica	85	Indonesia	119	Malta
18	Guinea-Bissau	52	Dominican Rep.	86	Iran, I.R. of	120	Netherlands
19	Cote d'Ivoire	53	El Salvador	87	Iraq	121	Norway
20	Kenya	54	Grenada	88	Israel	122	Poland
21	Lesotho	55	Guatemala	89	Japan	123	Portugal
22	Liberia	56	Haiti	90	Jordan	124	Spain
23	Madagascar	57	Honduras	91	Korea	125	Sweden
24	Malawi	58	Jamaica	92	Kuwait	126	Switzerland
25	Mali	59	Mexico	93	Malaysia	127	Turkey
26	Mauritania	60	Nicaragua	94	Nepal	128	United Kingdom
27	Mauritius	61	Panama	95	Oman	129	Yugoslavia
28	Morocco	62	St.Lucia	96	Pakistan	130	Australia
29	Mozambique	63	St. Vincent & Grens.	97	Philippines	131	Fiji
30	Niger	64	Trinidad & Tobago	98	Saudi Arabia	132	New Zealand
31	Nigeria	65	United States	99	Singapore	133	Papua New Guinea
32	Rwanda	66	Argentina	100	Sri Lanka	134	Solomon Islands
33	Senegal	67	Bolivia	101	Syria		

Data Appendix

The data set in this paper begins with the sample of 135 countries included in the Summers and Heston data set. For most of these countries, the growth variable (G7089) was calculated directly from the Summers and Heston data. For seven countries, Comoros, Ethiopia, Liberia, Tanzania, Nicaragua, Iraq, and Nepal, growth was calculated using 1985 data rather than 1989 data. In all cases growth is annual growth in per-capita real GDP, and is expressed in a common set of prices (1985 international prices, in the Summers and Heston terminology).

13 countries remained that did not have adequate growth data, either because it was not available at all, or because it was not available for a sufficiently long time span. These countries were Afghanistan, Bahamas, Bahrain, Dominica, Grenada, Kuwait, Oman, St. Lucia, St. Vincent, Solomon Islands, Saudi Arabia, Sudan, and United Arab Emirates. So, in summary, there were 122 countries with adequate growth data.

Of these 122 countries, 28 had missing data on at least one of our criteria. Of these 28, 15 would have been disqualified anyway, based on criteria for which data was available, so there was no need to obtain the missing data. Of the remaining 14 that would not have been disqualified on other grounds, we made some effort to obtain the missing data. These cases are discussed briefly in the next paragraph.

Australia, Luxembourg, Malta, and New Zealand were only missing data on trade orientation. Our judgement was that these countries should be classified as "open", bearing in mind that we only wish to exclude the extreme cases of non-integration with the world economy. Lesotho and Swaziland were also missing data on trade orientation. We decided that these two economies were so closely integrated with the South African economy that they should be considered "closed" because of the internationally-imposed isolation of South Africa during most of the 1970-1989 period. Hong Kong was missing data on the variable to capture respect for property rights and basic civil rights. Hong Kong passed because it has operated under the British legal framework. After these assessments, there remained five small countries for which we had insufficient data to make an informed assessment: Comoros, Iceland, Fiji, Seychelles, and Suriname. Adding these 5 countries to the 13 excluded for lack of growth data, in total 18 countries were excluded from the sample for lack of data, leaving us with a sample of 117 countries to be divided into the qualifying and non-qualifying groups.

The list of these 117 countries are in table 1 (non-qualifying) and table 2 (qualifying), along with the data for each country on G7089 and GDP70. Tables 1 and 2 also contain the values for the dummy variables we constructed for this paper, and these new variables are described partly in the text, but also in the notes to table 1. Descriptions for the other variables used in this paper, along with sources, are given below.

GDP70	Real GDP per capita from Summers and Heston version 5.5 in 1970 (1985 International Prices).
GDP89	Same variable for 1989.
G7089	Real per capita growth rate of GDP, per annum: $G7089 = [\text{LN}(\text{GDP89}) - \text{LN}(\text{GDP70})]/19$.
SEC70	Secondary school enrollment rate. Source: Barro and Lee, 1994.
PRI70	Primary school enrollment rate. Source: Barro and Lee, 1994.
GVXDxE	Ratio of real government 'consumption' spending net of spending on the military and education to real GDP. Source: Barro and Lee, 1994, who in turn used Summers and Heston v. 5.5.

REVCOU	Number of revolutions and coups per year, averaged over the period 1970-1985. Source Barro and Lee, 1994.
ASSASSP	Number of assassinations per million population per year, 1970-1985. Source: Barro and Lee, 1994.
PPI70DEV	The deviation of the log of the price level of investment (PPP I / Xrate relative to the U.S.) from the cross country sample mean in 1970. Source: Authors calculation based on the PISH5 price data in Barro and Lee, 1994.
INV7089	Ratio of real gross domestic investment (public plus private) to real GDP, averaged over the period 1970-1989. Source: Barro and Lee, 1994, who in turn used Summers and Heston v. 5.5.
PXI71	Primary export intensity in 1971. Ratio of exports of SITC (revision 1) categories 0, 1, 2, 3, 4, and 68 to total exports in 1971, with both the numerator and denominator expressed in nominal dollars. These SITC categories include: food and live animals, beverages and tobacco, inedible crude materials, oils and fats, mineral fuels and lubricants and related materials, and non-ferrous metals. Source: World Bank, World Tables, 1993, for all countries except Taiwan, Singapore and South Africa. Data for Taiwan was obtained from the <i>Taiwan Statistical Data Book</i> , 1992. Data for South Africa was obtained from <i>Bulletin of Statistics</i> , The Republic of South Africa, Pretoria, Dec. 1972 and June 1992, (exports of raw diamonds and gold were included). Data for Singapore was estimated as 0.01 based on GDP and labor force data indicating that Singapore produces no mining, no primary energy and only a very small amount of agriculture, forestry and fishing products. The data for Bangladesh is for 1972 rather than 1971. The data for Cameroon was set to 1.0 -- it exceeded 1.0 using the published data.
DTT7189	Change in the log of the external terms of trade between 1971 and 1989. $DTT7189 = \text{LN}(TT89) - \text{LN}(TT71)$, where TT is the ratio of a U.S. dollar export price index (1987=100) to an import price index in similar units. Source: World Bank, World Tables, 1993, and National statistical sources for Taiwan and South Africa.

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