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Looking at the Facts

What We Know about Policy and Growth from Cross-Country Analysis

Ross Levine
and
Sara Zervos

Cross-country regressions should not be used to predict by how much long-run growth will change when policies change — *at best,* they suggest interesting empirical regularities. But beliefs about policy and growth that are not supported by cross-country evidence will tend to be viewed skeptically.

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What has the profession learned from cross-country regressions about the links between long-run growth and indicators of fiscal, monetary, trade, financial, and exchange-rate policies?

Levine and Zervos find that:

- Indicators of financial development are strongly associated with long-run growth.

- Other individual policy indicators are only weakly linked to growth.

- It is particularly difficult to find a consistent relationship between inflation and long-run growth. For example, the inclusion or exclusion of one or two countries (Nicaragua and Uganda) out of more than 100 countries in the sample can lead to reach three quite different conclusions: (1) that only very high inflation is bad for growth, (2) that very high inflation in itself is not bad for growth, but small increases in inflation in moderate-inflation countries slow growth, or (3) that inflation is unrelated to growth.

The connections between policy indicators and growth are quite sensitive to slight alterations in the right-hand-side variables and to small changes in the sample of countries.

And the daunting array of methodological problems limiting our ability to interpret cross-country regressions implies that, *at best*, they suggest interesting empirical regularities. Cross-country regressions should not be used to predict by how much long-run growth will change when policies change. But beliefs about policy and growth that are not supported by cross-country evidence will tend to be viewed skeptically. So, future work on the policy-growth nexus should integrate broad cross-country analyses with country case studies and investigations of specific firms.

Looking at the Facts:

What We Know about Policy and Growth from Cross-Country Analysis

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I. INTRODUCTION

Economists have been seeking to comprehend why some countries are rich and others poor for well over 200 years. A better understanding of the national policies associated with long-run growth would both contribute to our ability to explain cross country differences in per capita incomes and provide a basis for making policy recommendations that could lead to improvements in human welfare. Recently, economists have used cross country regressions to search for empirical linkages between long-run growth and indicators of national policies (e.g., Roger Kormendi and Philip Meguire, 1985; Robert J. Barro, 1991). The large cross country growth literature has identified various fiscal, monetary, trade, exchange rate, and financial policy indicators that are significantly correlated with long-run growth. Yet, Ross Levine and David Renelt (1992) show that many of these findings are fragile to small alterations in the conditioning information set. That is, small changes in the right-hand-side variables produce different conclusions regarding the relationship between individual policies and growth. This paper's purpose is to take stock of what the profession has learned from cross country regression studies of the linkages between long-run growth and indicators of monetary, fiscal, exchange rate, trade, and financial policies.

1. Why use cross-country regressions?

To gauge what we have learned - and may potentially learn - from cross country regressions, we should humbly face the daunting array of methodological, conceptual, and measurement problems that plague our ability to interpret cross-country growth regressions confidently (see Levine and Renelt (1991)). While the title of this paper is "Looking at the Facts ...," the inherent problems associated with cross-country

studies imply that, at best, we can only expect to unearth suggestive empirical regularities. Even setting aside measurement difficulties and issues of data consistency across countries and time, numerous interpretational problems plague cross-country investigations. It is not clear that we should include vastly different countries in the same regression. Regression analysis presupposes that observations are drawn from a distinct population, but as argued by Arnold Harberger (1987), Thailand, the Dominican Republic, Zimbabwe, Greece, and Bolivia may have little in common that merits their being put in the same regression. Thus, the statistical basis upon which we draw inferences from cross country analyses may be in doubt.

Furthermore, it is conceptually difficult to interpret the coefficients on regressions that involve data for over 100 countries averaged over thirty years during which time business cycles, policy changes, and political disturbances have influenced economic activity. Many papers interpret the coefficients as elasticities, suggesting that if a policy indicator changes by one percent, growth will change by a percent corresponding to the coefficient on the policy indicator. These types of conceptual experiments should be treated skeptically as cross country regressions do not resolve causal issues, nor do the regressions "... describe a single piece of machinery through time." (Harberger, 1987, p. 256) Cross country regressions should be viewed as evaluating the strength of partial correlations and not as behavioral relationships that suggest how much growth will change when policies change.

"Looking at the facts" becomes even more opaque when the objects of analysis are national policies. In theoretical models of policy and growth, economists typically represent policy distortions with the greek letter tau. Not only do international data sets such as the International Financial Statistics and the Summers and Heston (1988) data not contain data series called tau, but it is very difficult to construct

proxies that measure policy actions. Instead of measuring executable policies, cross country regressions use policy indicators, such as the average ratio of exports to GDP or the average ratio of broad money to GDP over the past 30 years. Cross country regressions, therefore, do not typically link executable policies with growth.[1]

The inherent statistical and conceptual obstacles to interpreting cross country studies limit what economists can learn about policy and growth from cross country regressions. Even if cross country regressions yield very "strong" results, these results should be viewed as suggestive empirical regularities, not as stylized facts nor as behavioral relationships on which to measure responses to policy changes. Cross country regressions, however, can be very useful. Along with other analytical methods, demonstrating that certain policy-growth relationships hold well across countries will influence beliefs about policy and economic performance. Similarly, beliefs about policy and growth that are not supported by cross country evidence will tend to be viewed skeptically.

2. Back to the "facts"

To examine the strength of the empirical relationship between long-run growth and various policy indicators, we slightly modify the approach taken in Levine and Renelt (1992), henceforth LR. LR examine whether the conclusions from existing cross-country studies of growth and policy are robust or fragile to small alterations in the conditioning set of information, i.e., do slight alterations in the right-hand-side variables change the results for the variables of primary interest? LR examine the relationship between economic growth and a wide assortment of fiscal expenditure, fiscal revenue, monetary, trade, and exchange rate policy indicators as well as political and economic stability indexes for a broad cross-section of countries over the 1960-89 and 1974-89 periods.

They find that almost all cross-country regression results are sensitive to minor alterations in the conditioning set of variables.

This paper has three parts. The first part modifies the LR analysis in four ways. First, based on work by King and Levine (1992a,b,c,d), we include indicators of the level of domestic financial sector development that were not included in LR. Second, based on work by Jong-wha Lee (International Monetary Fund), we use an improved measure of the black market premium. Third, based on Easterly and Rebelo (1993), we use a measure of the total public sector surplus. Fourth, we use a reduced form specification based on Barro (1991) since these "Barro-style" regressions are frequently used.[2]

We find a few robust regularities. First, various indicators of financial sector development are robustly associated with long-run growth (as first noted by King and Levine (1992c)). Second, unlike LR, the black market exchange rate premium is negatively related to long-run growth in the "Barro-style" regression framework used in this paper. Third, as in LR, a host of monetary, fiscal, and trade indicators are not robustly related to growth even in the Barro-framework.

The second part of this paper studies the relationship between inflation and growth. Here we move beyond simply altering the conditioning information set. After demonstrating that inflation and growth are not strongly correlated in simple regressions, we attempt to discover whether the relationship between growth and inflation is different in "very" high inflation countries as opposed to countries with more "moderate" inflation rates. This allows us to illustrate a number of additional difficulties - such as defining "outliers" and altering the sample of countries - associated with attempting to draw interpretable results from cross-country regressions. We find that although economists would almost unanimously argue that high inflation is bad for growth, this result is difficult to find in a broad cross-section of countries.

Finally, instead of focusing on the partial correlation between individual policy indicators and growth, we construct three indexes designed to characterize the macroeconomic, international, and domestic financial sector environments. These three indexes are constructed by combining individual policy indicators. In this way, we attempt to broaden the scope of our analysis by moving away from the narrow focus on individual indicators and moving toward, for example, an overall index of macroeconomic stability. Furthermore, using these overall indexes, we study policy regimes. By classifying countries as having "good" or "bad" financial, macroeconomic, and international policies, we can categorize countries into eight different "regimes." The investigation of policy regimes suggests that the state of the financial sector is importantly associated with long-run growth and the overall index of macroeconomic stability is more strongly linked with growth than any individual fiscal or monetary indicator.

II. EXTREME BOUNDS ANALYSIS

1. Motivation

Previous cross-country growth analyses identify over fifty different policy and political indicators as significantly correlated with long-run per capita growth rates.[3] Are these results believable? Should they change our views and policies? To answer these questions, we need an empirical definition of "believable." Levine and Renelt (1992) (LR) use a narrow definition to show that most existing "empirical facts" are not believable. Their definition of believable is derived from Edward Leamer's work on extreme bounds analysis (EBA).[4] Basically, LR show that small alterations in the conditioning information set, i.e., small alterations in the right-hand-side variables, change the statistical significance of most existing results. LR term results that

do not withstand small alterations in the conditioning information set "fragile" and those results that do withstand these alterations "robust." Furthermore, LR show that past results typically rely on searching beyond standard regression specifications to find the "right" set of right-hand-side variables that produce "good" results. We use the LR approach to further investigate the robustness of partial correlations between growth rates and "policy" variables over the 1960-1989 period for broad cross-section of about 100 countries.

2. Technique

The EBA employs the linear, ordinary least squares regression framework:

$$GYP = \beta_1 I + \beta_2 M + \beta_3 Z + u \qquad (1)$$

where GYP is the growth rate in GDP per capita averaged over the 1960-1989 period for a cross-section of up to 100 countries, I is a set of base variables always included in the regression, M is the variable of particular analytical interest, and Z is a set of variables chosen from a pool of variables that we believe represent appropriate conditioning information. The EBA involves varying the Z variables to determine whether the coefficient on the M variable is consistently significant and of the same sign when the conditioning information set varies. If the coefficient on the M variable is consistently significant and of the same sign we call this result "robust." If the coefficient on the M variable changes sign or becomes insignificant, we call this result "fragile."

Our I variables - the base set of variables that we always include in the regressions - are LSEC, the log of the initial (1960) secondary school enrollment rate, LYO, the log of initial real GDP per capita, and REVC, the number of revolutions and coups.[5] This is a different set of I variables from the set used in LR. We choose this new set of I variables because they correspond to the "Barro-style" regressions that have become the standard cross-country growth regression. Thus, choosing these I variables facilitates comparisons with other studies. We began by using the complete set of Barro (1991) control variables but dropped the log of the initial primary school enrollment rate, the number of assassinations, and the 1960 average deviation from unity of the purchasing power parity index for investment goods since the inclusion of these variables did not importantly alter our findings.[6] Thus, equation (1) becomes

$$GYP = C + \beta_1 LYO + \beta_2 LSEC + \beta_3 REVC + \beta_M M + \beta_Z Z + u. \qquad (2)$$

First, for each variable of interest, M, we run a base regression with only the basic set of variables included, i.e., we do not include any Z variables. This base regression determines whether the variable of interest is significantly correlated with long-run growth after controlling for a base set of variables designed to control for initial conditions and the degree of political stability.

Second, we run separate regressions including each variable - one at a time - from the pool of potential Z variables in regression equation (2). Then we run separate regressions including every combination of <u>two</u> variables from the pool of potential Z variables; finally, we run separate regressions including every combination of <u>three</u> variables from the pool of potential Z variables. Out of all of these regressions, we

compute the extreme upper and lower bound on the coefficient β_M. The extreme upper bound is equal to the highest calculated value of β_M + 2 * the standard error of β_M; the extreme lower bound is the lowest calculated value of β_M - 2 * the standard error of β_M. For example, in some cases the addition of only one Z variable may produce the extreme upper bound for β_M, while the addition of three Z variables produces the extreme lower bound.

These extreme bounds can help clarify the degree of confidence that one can place in the partial correlation between growth (GYP) and the M variable. If a policy indicator is robustly correlated with long-run growth, then one should feel more confident about its association with growth than an indicator which has a fragile link. If a result is fragile, the following tables will also indicate how many and which Z variables are causing the "weakness." For instance, if a result is classified as fragile: 0, the zero indicates that the M variable is insignificant without adding any additional Z variables; i.e., the M variable enters insignificantly in the base regression. If a result is classified as fragile: 1, the "one" indicates that the M variable is significantly correlated with growth in the base regression but the inclusion of only one additional right-hand-side variable causes the partial correlation between growth and the M variable to turn insignificant.

The pool of variables from which we allow the EBA to choose Z-variables includes the average inflation rate (PI), the standard deviation of inflation (STPI), the government fiscal surplus ratio to GDP (SURY), imports plus exports as a share of GDP (TRD), the black market premium (BMP), and liquid liabilities as a ratio to GDP (LLY), for a total of seven possible Z variables.[7] We believe this broad set of policy indicators represents a reasonable set of information upon which to condition our beliefs regarding the association between individual

policy indicators and growth. For each M variable, this pool is restricted by excluding any variable which, a priori, we think may measure the same phenomenon. For example, when TRD is the M variable, we exclude the black market premium from the Z pool as both variables may reflect aspects of international policy. By eliminating such duplication, we give each M variable a better chance at achieving the "robust" status.

3. Fiscal policy indicators

Table 1 presents the sensitivity results for four fiscal policy indicators. Many empirical investigations into the relationship between average per capita growth and fiscal policy use measures of the size of government in the economy and measures of government deficits. Consequently, we examine two of each of these types of fiscal policy indicators.

The first variable GOV, the ratio of government consumption to GDP, attempts to measure the role of the government in economic activity. Barro (1990) shows that if countries are choosing the optimal amount of fiscal expenditures and taxes, then the ratio of government expenditures or revenues to GDP should be unrelated to long-run growth. On the other hand, many policy arguments are based on the assumptions that the size of government expenditures is typically larger than optimal and that government expenditures are spent on the wrong things. However, measuring whether government spending is "too" large or whether expenditures are "mis-spent" is difficult. An important problem with GOV is that it is an aggregate measure of government size and, therefore, does not capture the distribution of expenditures, the efficiency with which the government uses any given level of expenditures, or whether the government size is suboptimal.

The EBA results for GOV show that regardless of the conditioning set of information, the partial correlation between GOV and growth is always negative but never significant at the 0.05 level. This may reflect optimal fiscal policy or that GOV is poorly measured.

Further examining the link between fiscal policy and growth, Barro (1991, p. 430) argues that "expenditures on education and defense are more like public investment then public consumption," and therefore he constructs the variable government consumption expenditures minus education and defense expenditures divided by GDP, over the 1970-85 period, and calls this variable HSGVXDXE. This variable is also fragile. When LLY, TRD, and STPI are included the coefficient on HSGVXDXE is insignificant.[6]

In another attempt to link government actions and growth, many studies examine the role of government fiscal surpluses and deficits. Government deficits are frequently considered bad for growth, or, sometimes, deficits are viewed as indicative of structural problems associated with poor growth. We use two measures of fiscal financing to investigate these claims. First, we study the ratio of the central government surplus to GDP (SURY). The EBA shows that only with particular combinations of explanatory variables does this variable have a significant partial correlation with growth. SURY does not enter significantly in the base regression, but the EBA finds that when PI, STPI, LLY are included the coefficient on SURY becomes significant. In our sample, we found two outliers for the variable SURY as shown in Graph 1 (Bolivia and Israel). Removal of these countries did not change the EBA results. Running the entire EBA after first omitting outliers on all variables does not change this paper's conclusions.

SURY, however, does not accurately measure the size of the entire public sector deficit and may, therefore, be both incomplete and inconsistent across countries. For example, in many countries, the

government owns public enterprises and local governments and municipalities play important fiscal roles. Therefore, Easterly and Rebelo (1993) calculate a measure of the total public sector surplus, PSSUR, in an attempt to rectify these measurement problems. As can be seen at the end of Table 1, however, PSSUR is also fragile. Thus, even when extensive efforts are made to measure the total public sector surplus in a consistent fashion across countries, it is difficult to find an insensitive relationship between fiscal financing and long-run growth.

Though all four of these fiscal variables enter with the predicted sign, none is robust to slight alterations in the conditioning set of information. These results make us uncomfortable with using these (frequently cited) fiscal indicators in making policy recommendations. The fragile relationship between aggregate fiscal policy indicators and growth, however, does not rule out fiscal policy's importance in affecting long-run growth. As mentioned above, these indicators are not equal to policies; they suffer from measurement problems, and they may be too aggregate to be informative. We conclude that there may be no substitute for a detailed examination of the types of fiscal expenditures and taxes, and the efficiency with which government provides services and collects taxes, within the context of individual country circumstances.

4. Monetary policy indicators

Inflation may be related to growth through many channels. Although we discuss these channels and examine the relationship between inflation and growth in greater detail in the next section, Table 2 shows the results for two monetary policy indicators, the average rate (PI) and the standard deviation of the inflation rate (STPI). Though they reflect not only monetary policy but also shocks and other policies, these have been widely used in empirical investigations of the link between monetary policy and growth (see, for example, Kormendi and Meguire (1985)). The

results of the sensitivity analysis show that both variables are fragile; no specification yields a significant partial correlation. Even after removing BMP from the Z variable pool, since BMP may reflect an inconsistent combination of exchange rate and monetary policies, PI and STPI remain fragile.

5. International distortion indexes

Much theory suggests that openness to international trade will spur economic growth.[9] Unfortunately, there does not exist a good indicator of international trade policy. In an impressive empirical paper, Pritchett (1991) shows that most cross-country indicators of trade policy are not highly correlated with themselves! Thus, different trade policy indicators tend to produce different rankings of countries in terms of openness. Following tradition, we use the share of total trade in GDP (TRD).[10] TRD is fragile. The addition of LLY, the ratio of liquid liabilities to GDP, produces an insignificant coefficient on TRD. As depicted in Graph 2, we found three TRD "outliers" (Hong Kong, Luxembourg, and Malta). When these three countries are removed from the sample, TRD is insignificantly correlated with growth even in the base regression.

The black market premium, BMP, is often used as a general index of international distortions. Intuition suggests that larger black market premia will be associated with slower growth. However, the black market premium suffers several drawbacks as an indicator of policy. One problem with the BMP is that it is a general index of distortion.. A country could have a freely floating currency and zero black market premium but still impose severe trade restrictions. Similarly, the combination of a fixed exchange rate and inflationary monetary policy could produce a large black market exchange rate premium even with a

relatively open trade regime. Thus, it is difficult to link BMP with any single policy.

We use a measure of the black market premium constructed by Jong-wha Lee that improves upon the measure used in the LR. Lee precisely matches the date at which the official and black market exchange rates are compared to better calculate the black market premium for each country. As shown in Table 2, BMP has a robust negative correlation with long-run growth. Though difficult to interpret precisely, this result suggests a negative association between international distortions and growth. As shown in Graph 3, there are three countries with BMP values that appear to constitute outliers (Ghana, Burma, and Uganda). Excluding these countries alone does not change the robust finding.[11]

5. Financial policy indicators

The traditional view of financial intermediaries depicts these institutions as passive coordinators between households who save and businesses which invest. In contrast, new research suggests an intrinsic link between financial intermediaries and economic growth.[12] This new view posits that economies with more developed and more efficient financial systems will be able to more effectively allocate savings to the best investments. This in turn leads to increased productivity, potentially higher savings rates, and faster growth.

To examine the relationship between financial policy and growth, we use three variables constructed by King and Levine (1992a) to reflect the level of financial sector development. To represent the size of the financial system, we use LLY, the ratio of liquid liabilities to GDP.[13] As shown in Table 3, LLY earns the robust classification. The significant, positive partial correlation between growth and LLY shows that countries with larger per capita growth rates tend to have larger

financial systems. Omitting the outliers depicted in Graph 4 does not alter this result.

To examine the relationship between growth and the types of financial intermediaries that are conducting financial intermediation, we examine the variable BANK, which equals deposit money bank domestic credit divided by deposit money banks domestic credit plus central bank domestic credit. Again confirming the findings in King and Levine (1992c), BANK is positively and robustly correlated with long-run growth.

Finally, to examine the importance of where the financial system allocates credit, we perform the EBA on the variable PRIVATE, which equals the credit to the private sector divided by total domestic credit. Once again, PRIVATE enters with a positive and robust coefficient. These findings help support the new view of the role of financial intermediary services in long-run growth.

III. TRYING TO FIND FACTS: AN EXAMPLE

1. Setup

Arguably, the single most studied issue in economics is the relationship between money and economic activity.[14] Theory suggests that inflation may affect growth by influencing capital accumulation, inducing agents to shift out of socially productive endeavors into rent-seeking activities, or causing people to substitute out of money exchange into transactions technologies that require more time and effort. Similarly, inflation may influence investment decisions by increasing uncertainty. In addition to the many existing models, many more could (and certainly will be) created that exemplify the linkages between inflation and long-run growth.

Perhaps just as important as the debates surrounding theoretical models of inflation and growth is the generally accepted policy

conclusion that inflation is, in most cases, bad for long-run growth. A poll of economists would probably find us recommending that ceteris paribus lower inflation is better than higher inflation. If we went to a country with a 100 percent inflation, we would tend to recommend that the country pursue policies designed to reduce the inflation rate. Moreover, international organizations in the business of giving economic policy advice would, almost unanimously, argue that a policy of lower inflation is better than a policy of higher inflation; one rarely sees the International Monetary Fund or the World Bank recommending that countries increase their inflation rates. Given this uncharacteristically unified view among economists and policy analysts, we should expect a negative relationship between growth and inflation to "jump-out" at us from the data. Yet, no empirical evidence strongly supports the contention that countries with higher inflation rates tend to have slower long-run growth rates ceteris paribus. A cross-country analysis of the relationship between growth and inflation, therefore, offers a particularly appealing opportunity to illustrate a few of the difficulties inherent in trying to identify the "facts" concerning policy and growth.

2. Initial findings

In a cross-section of 102 countries, the correlation between the average annual real per capita growth rate (GYP) and the average annual inflation rate (PI) over the 1960-1989 period is -0.17 with a P-value of 0.10. Though weak, any model would suggest controlling for other factors when examining the relationship between inflation and growth.

Thus, we run a regression of GYP on PI including the logarithm of real per capita GDP in 1960 (LYO) to control for initial income, the logarithm of the secondary school enrollment rate in 1960 (SEC) to control for initial investment in human capital, and the number of revolutions and coups over the 1960-89 period (REVC) to control for

political instability.[15] The results presented in Table 1 suggest that initially rich countries grow more slowly than initially poorer countries, that those countries that began the thirty year period with more students enrolled in secondary schools grew faster than countries with lower secondary school enrollment rates, and that countries that experienced more revolutions and coups grew more slowly than more stable societies. But, the regression results presented in Table 4 indicate that inflation is not significantly related to long-run growth at standard significance levels as the t-statistic for the coefficient on inflation is only 0.58. Thus, a simple negative association between inflation and growth still does not "jump-out" at us.[16]

3. Outliers: Inflation greater than 80 percent per annum

The relationship between inflation and growth may, however, be discontinuous or non-linear. Consider, for example, two alternative hypotheses about the growth-inflation relationship. First, inflation rates may have to reach extremely high levels before people significantly alter how they allocate their time and resources. Thus, marginal changes in moderate inflation rates - say from one to two percent - may not be negatively associated with growth, but very high inflation rates - say over 80 percent - may be associated with a break-down in normal economic relationships and slower long-run growth rates. We call this the "high-pi" hypothesis since the greek letter pi often represents inflation.

Alternatively, people in countries with very high inflation for very long periods may become inured to inflation and develop a host of mechanisms for coping with inflation, so that growth is unrelated to very high inflation. Changes in inflation in moderate inflation countries may, however, be negatively associated with growth since moderate inflation countries have not become "desensitized." We call this the desensitize hypothesis.

These two hypotheses obviously do not cover the full range of potential explanations relationship between inflation and growth. Furthermore, perspectives on the inflation-growth nexus should be exemplified in models that clarify hypotheses and suggest appropriate econometric specifications.[17] Here, we use simple dummy variable procedures to identify and control for countries with very high inflation rates. We allow countries with very high inflation rates to have different slope and intercept coefficients from moderate inflation countries. Then, we test versions of the high-pi and desensitize hypotheses.

Consider the simple scatter plot of the average annual inflation rates for 102 non-oil producing countries in Graph 5. There are clearly outliers in the sample, but where should one draw the line between high and moderate? As can be seen in the scatter plot, the inflation rates of both 80 and 40 percent suggest relatively clear demarcations. We examine both.

First define high inflation as those countries with inflation rates over 80 percent. Define the dummy variable HIPI80 as having a value of 1 for those countries with average inflation rates greater than 80 percent over the 1960-1989 period and a value of 0 otherwise. We run the regression:

$$GYP = \beta_1 C + \beta_2 LRGDP + \beta_3 LSEC + \beta_4 REVC + \beta_5 HIPI80 + \beta_6 PI*HIPI80 + \beta_7 PI. \quad (3)$$

The coefficient on HIPI80, β_5, indicates whether countries with inflation rates over 80 percent per annum have a different intercept than countries with inflation rates of less than 80 percent. The regression defined in equation (3) also permits the slope coefficient on inflation to differ

between high and non-high inflation countries. The regression implies that a marginal increase in inflation is associated with a change in per capita growth defined by

$$\frac{\partial GYP}{\partial \pi} = \beta_6 HIPI80 + \beta_7$$
$$\frac{\partial GYP}{\partial \pi}\Big|_{HIPI80=1} = \beta_6 + \beta_7 \qquad (4)$$
$$\frac{\partial GYP}{\partial \pi}\Big|_{HIPI80=0} = \beta_7 .$$

Thus, if β_6 is significantly different from zero, high inflation countries respond differently from non-high inflation countries to changes in the inflation rate. If β_6 plus β_7 is not significantly different from zero, then a marginal increase in inflation in a high inflation country is not associated with a change in real per capita GDP.

Regression 2 of Table 4 incorporates these new variables and demonstrates a potentially appealing "finding." When we define high inflation as countries with average annual inflation rates over the 1960-1989 period of greater than 80 percent, we find support for the desensitize hypothesis; very high inflation is not negatively associated with growth, but increases in inflation in moderate inflation countries are negatively linked with growth. If a country such as Italy, with a thirty year average annual inflation rate of 10 percent instead had an average inflation rate of 5 percent, this regression (taken literally) implies that Italy would have grown an extra 0.2 percent per year in per capita terms. Cumulating over thirty years, this means that Italy's per capita income in 1990 would be about 1.3 million Lira higher.[18] These results are consistent with the story that countries with high inflation rates over 30 years become "desensitized" to inflation, but countries

with moderate inflation rates exhibit a significant negative relationship between growth and inflation.

4. Outliers: Inflation greater than 40 percent per annum

In contrast, when we define high inflation as countries with average inflation greater than 40 percent, we find evidence for the high-pi hypothesis; countries with very high inflation rates have slower growth, but inflation increases in moderate inflation countries are not negatively linked to growth (regression 3 in Table 4).[19] Thus, using 40 percent inflation as the definition of "high" leads to a different conclusion from when we defined "high" as inflation greater than 80 percent per annum.

5. Resolution: The "over-importance" of a couple of countries?

The dichotomous interpretations evoked by the two outlier choices warrant some additional digging. One or some of the five countries with inflation between 40% and 80% are causing the coefficients in the regressions to jump around. These countries are Israel, Nicaragua, Uganda, Uruguay and Zaire. When these countries are included as high inflation countries, we conclude that (1) high inflation is negatively associated with growth, but (2) increases in inflation in moderate-inflation-countries are not linked to growth. On the other hand, if these five countries are not counted as high inflation countries, we conclude that (1) high inflation is not negatively associated with growth, but (2) increases in inflation in moderate-inflation-countries are negatively linked to growth.

Of these five crucial countries, two experienced extreme political disruptions over the sample period: Uganda and Nicaragua. Do we want the experiences in Uganda and Nicaragua to determine our opinion of the relationship between growth and inflation? We believe that most

economists would feel uncomfortable with the complex events that occurred in Uganda and Nicaragua playing such a pivotal role.

To test whether these two countries are responsible for the variations in results, the same regressions are run excluding these countries. Support for both hypotheses breaks down at the 0.05 significance level. Removal of both countries causes a reversion to the original results that inflation is unrelated to growth (regressions 2A and 3A in Table 4). These results demonstrate that it is difficult to find "facts." Unless researchers study the sensitivity of their results to small variations in the sample of countries and changes in the conditioning information set, the results should be regarded with skepticism.

6. Ceteris paribus

Finally, we think it is worth pointing out that the relationship between inflation and growth depends importantly on which explanatory variables are included in an attempt to hold other things equal. For example, in the last regression which defines high inflation as greater than 80 percent but excludes Nicaragua and Uganda (regression 2A), regression 5 indicates that when we add the ratio of government consumption expenditures to GDP (GOV), we again find support for the desensitize hypothesis; inflation becomes significantly negatively correlated with growth in moderate inflation countries. But, regression 6 shows that when we include both GOV and TRD, inflation is not significantly related to growth "ceteris paribus." Thus, the choice of the conditioning information set, i.e., the definition of ceteris paribus, importantly alters the conclusions one would draw on the relationship between growth and inflation.

Besides forming the conclusion that inflation is not robustly linked to growth, this evidence suggests that any link between policies

and long-run growth must be scrutinized carefully. The investigating economist can easily "find" several distinct but appealing "facts." Not only must the result be robust to variations in the explanatory variables, but it must also be checked for outliers, changes in the *definition* of an outlier, and for small variations in the sample.[20]

IV. BROAD POLICY INDEXES AND REGIMES

The results thus far are disturbing. Except for the black market premium and the indicators of the development of the domestic financial system, there is not a strong statistical association between an assortment of economic indicators and long-run growth. The macroeconomic policy indicators are not strongly linked to growth, indicators of trade performance are also not closely tied to growth, and the strong negative association between growth and the black market premium is difficult to interpret since the black market premium reflects many policies. Yet, when giving policy recommendations, most economists would still argue that "macroeconomic stability" and "openness to the international market place" help countries grow faster. Where the term "macroeconomic stability" refers to a conglomerate evaluation of the macroeconomic environment and not any one indicator; and, "openness to the international market place" refers to a conglomeration of tariff, non-tariff, and exchange rate policies meant to quantify the ease with which residents can interact with the rest of the world. Therefore, instead of examining the partial correlation between individual indicators and growth, it may be worthwhile studying the relationship between indexes designed to measure the overall macroeconomic environment and the overall openness to international interactions. Furthermore, these indexes allow us to study policy regimes.

Levine and Renelt (1992) use factor analysis to construct international, macroeconomic, and uncertainty indexes by extracting the largest principle component from a group of individual indicators. They find that none of these indexes is robustly correlated with long-run growth. We try a more subjective approach.

1. Conglomerate indexes

We form a conglomerate index for international, financial and macroeconomic policy indexes. Each of these indexes is composed of transformed variables. After removing all outliers in the sample as defined in Graphs 1-5,[21] each variable (V) which is to be incorporated into an index is transformed as follows:

$$T_i(V) = (V_i - ABS\ (MEAN\ (V))\ )\ /\ ABS\ (MEAN\ (V)\ ),$$

where i indicates a country, ABS is the absolute value operator, and MEAN (V) represents the mean of the variable V across countries. Therefore, the transformation involves a standardization of each series around the mean of the series. If the value of V is exactly at the mean, the value of T(V) is zero. A value of V above the mean corresponds to a value of T(V) greater than zero.

We wanted growth to be positively associated - from an intuitive perspective - with higher values of the transformed variables. Thus, for variables such as inflation and the black market premium, which are thought to be negatively correlated with growth, the transformation is multiplied by negative one. Therefore, countries with a high fiscal surplus relative to the mean will have a positive value for the transformed variable while countries with high inflation relative to the mean will have a negative value for the transformed variable.

The separate international, finance, and macro indexes are formed by summing the pertinent transformed variables. The international index, INTL, is composed of the transformed BMP and TRD, the finance index, FINANCE, is the sum of transformed LLY, BANK and PRIVATE, and the macro index, MACRO, is the sum of the transformed PI and SURPLUS. As mentioned before, these indexes are formed so that a higher value of the index intuitively corresponds to higher growth.

2. Results

As an initial test of the partial correlation between these indexes and growth, these variables were included in the basic regressions shown earlier. Table 5 shows that in this basic framework, each index is positively, significantly correlated with growth. However, when all three indexes are included together, only FINANCE remains significant at the 0.05 level (MACRO is significant at the 0.08 level and INTL at the 0.12 level). Still, these results suggest that a "sound" economic environment, defined in terms of financial, international, and macroeconomic policies is positively linked with growth.[22]

We also created and attempted to examine the importance of policy regimes. All three of the indexes were ranked in descending order and then the sample was divided in half. For each index, the top half of the countries (those with larger indexes and thus "better" policies) were given a value of 1 while the bottom half (those with "worse" policies) were given a value of 0. Consequently, this categorization defines eight different policy regimes. For example, countries can have a 1,0,0 which means good FINANCE but bad INTL and MACRO, while 1,0,1 indicates good FINANCE and MACRO but bad INTL, and so forth.

We report the average growth rate of the countries in each regime in Table 6. Those countries with the "best" economic regime (1,1,1) have an average growth rate three times that of the "worst" regime (0,0,0).

One of the most prominent features of this analysis is the strength of the relationship between the measures of financial sector development and growth. For example, going from the "all bad" regime (0,0,0) to good FINANCE but bad INTL and MACRO doubles the average growth rate. In general, the effects of having a good versus bad INTL or MACRO rank are mixed.

VI. CONCLUSION

We identify two broad findings. First, cross country regressions show that indicators of financial development are strongly associated with long-run growth. Since changes in these financial development indicators are linked to changes in financial sector policies (see e.g., King and Levine, 1993b), the link between financial sector policies and long-run growth deserves more attention. Second, it is extremely difficult to identify believable links between a wide assortment of indicators of individual policies and long-run growth, although there is some evidence that general indicators of international distortions are negatively associated with growth. Most notably, we could not find robust ties between indicators of monetary or fiscal policy and long-run growth.

The empirical connection between policy indicators and growth seems to be quite sensitive to slight alterations in the right-hand-side variables and to small changes in the sample of countries. Future cross country work on the relationship between policy and long-run growth will need to develop innovative ways of improving available policy indicators, defining policy regimes, and examining interactions among policies and their effects on growth. Easterly and Rebelo (1993), for example, importantly improve existing measures of a range of fiscal revenue and expenditure indicators for many countries over the 1960-1990 period.

Finally, however, broad cross country regression analyses of policy and growth will need to be closely integrated with country case studies and firm level investiga ions.

NOTES

1. Moreover, when studies measure the average inflation rate or average tax rate over the last 30 years, they do not distinguish between, say, a hyper-inflationary episode lasting a few years and sustained high inflation lasting 30 years.

2. Levine and Renelt (1992) use a different specification from Barro (1991). The differences are noted below.

3. See Levine and Renelt (1991).

4. See Leamer (1973, 1983, 1985) and Leamer and Leonard (1983).

5. Note that this basic set of always included variables is different from those used in LR. When GYP is the dependent variable, LR's I variables are initial income, initial secondary school enrollment, population growth, and the ratio of investment to GDP. LR also investigate the robustness of the partial correlation between the investment share and each M variable.

6. In addition, we do not include the ratio of real government consumption less defense and education expenditures to GDP, which is part of Barro's (1991) set of control variables, because (1) this fiscal variable is a contemporaneous economic policy indicator and not a variable to control for initial conditions or political stability and (2) it is averaged over the 1970-85 period rather than over the 1960-89 period that we examine. We do, however, examine this fiscal expenditure variable as an M variable.

7. For the pool of Z variables, LR use PI, STPI, GOV, TRD, REVC, the growth rate of domestic credit, and the standard deviation of the growth rate of credit.

8. When the average growth rate of domestic credit (GDC) is added to the pool of Z variables, HSGVXDXE changes to the classification fragile: 2. The addition of LLY and GDC to the base regression causes β_M to become insignificant.

9. See Grossman and Helpman (1990, 1991) and Rivera-Batiz and Romer (1991).

10. As LR show, very similar results emerge with the export to GDP ratio or the import to GDP ratio.

11. If these outliers are excluded and the standard deviation of domestic credit growth, STGDC, is added to the Z variable pool, BMP becomes "fragile" when PI and STGDC are both included.

When the EBA is done using the specification in Levine and Renelt (1992), the partial correlation between BMP and both growth and the investment share are fragile. Thus, the difference between the findings in this paper and LR is a product of using different I-variables, not from using a different measure of the black market exchange rate.

12. See Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Levine (1991), Roubini and Sala-i-Martin (1991, 1992), King and Levine (1992a,b,c,d), Saint-Paul (1992), and DeGregorio and Guidotti (1992). But, also see Dornbusch and Reynoso (1989) for a different perspective.

13. Liquid liabilities equals M1 plus interest bearing liabilities of the banking system, plus demand and interest bearing liabilities of non-bank financial intermediaries.

14. See the extensive review by Orphanides and Solow (1990) and the papers by Fischer (1979), Stockman (1981), and DeGregorio (1991, 1992). Also, see Fischer (1992) for a study of the ties between macroeconomic factors and growth.

15. Adding the initial literacy rate, initial primary school enrollment,

the number of assassinations, or the number of wars to this control set of variables does not change this paper's results.

16. We only look at the average annual inflation rate. This rate may be strongly influenced by a few observations and therefore not adequately represent the inflation rate in any time period. We get similarly inconclusive results when we use the standard deviation of inflation instead of the average inflation rate.

17. Similarly, as discussed in Section II, there are so many endemic problems with cross-country analyses of growth that we should not push the econometrics beyond the low quality and limited interpretability of available data.

18. Italy's GDP per capita in 1990 was about 22.7 million Lira, and its average real per capita growth rate over the thirty years between 1960 and 1990 was about 3.5 percent per annum.

19. The coefficient indicates that countries in the HIPI40 group grow an average 0.02% slower per year. While statistically significant, this is economically minute.

20. Also see the paper by Easterly, Kremer, Summers, and Pritchett (1992) that examines other sensitivity analyses.

21. The results do not depend on removing the outliers.

22. Only FINANCE is robust when the extreme bounds analysis is performed.

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TABLE 1

Sensitivity Results for Fiscal Policy Indicators
Dependent Variable: Growth Rate of Real Per Capita GDP 1960-1989

	Beta	Standard Error	T-Statistic	Countries	R^2	Other Variables	Robust/Fragile (#)
Government Consumption Share (GOV)							
High	0.026	0.034	0.77	96	0.41	PI,STPI,BMP	
Base	0.022	0.034	0.67	99	0.37		Fragile:0
Low	0.004	0.034	0.13	97	0.42	PI,STPI,TRD	
Government Consumption Share, less education and defense 1970-85 (HSGVXDXE)							
High	-9.429	5.26	1.79	90	0.26	LLY,TRD,STPI	
Base	-15.665	4.98	3.15	92	0.20		Fragile:3
Low	-12.994	5.00	2.60	84	0.36	BMP,PI,STPI	
Government Fiscal Surplus (SURY)							
High	0.118	0.056	2.10	75	0.50	PI,STPI,LLY	
Base	0.086	0.052	1.65	79	0.39		Fragile: 0
Low	0.063	0.055	1.15	74	0.48	STPI,TRD,BMP	
Public Sector Fiscal Surplus (1970-88) (PSSUR)							
High	20.083	7.68	2.62	48	0.45	LLY,TRD,BMP	
Base	14.418	7.93	1.82	49	0.30		Fragile:0
Low	9.219	9.00	1.02	49	0.36	TRD,PI,STPI	

Notes:

The base beta is the estimated coefficient from the regression with the variable of interest (M-variable) and the always included variables (I-variables). The I-variables, are LYO, LSEC, and REVC. The high beta is the estimated coefficient from the regression with the extreme high bound (β_m + 2-standard deviations); the low beta is the coefficient from the regression with the extreme lower bound.

The "other variables" are the Z-variables included in the base regression that produce the extreme bounds. The underlined variables are the minimum additional variables that make the coefficient of interest insignificant or change sign.

The Robust/Fragile designation indicates whether the variable of interest is robust or fragile. If fragile, the column indicates how many additional variables need to be added before the variable is insignifcant or of the wrong sign. A zero indicates the coefficient is insignificant with only the I-variables included. If robust, the text provides information about further robustness tests.

TABLE 2

Sensitivity Results for Monetary and Trade Policy Indicators
Dependent Variable: Growth Rate of Real Per Capita GDP

	Beta	Standard Error	T-Statistic	Countries	R^2	Other Variables	Robust/Fragile (#)
Inflation (PI)							
High	-0.00003	0.00003	0.93	94	0.45	TRD,BMP,GOV	
Base	-0.00002	0.00003	0.57	102	0.36		Fragile:0
Low	-0.00003	0.00003	0.93	94	0.45	TRD,BMP,GOV	
Standard Deviation of Inflation (STPI)							
High	-0.000006	0.000006	0.97	88	0.56	BMP,TRD,GOV	
Base	-0.000002	0.000008	0.23	102	0.36		Fragile:0
Low	-0.000006	0.000006	0.97	88	0.56	BMP,TRD,GOV	
Imports plus Exports Share (TRD)							
High	0.013	0.005	2.53	97	0.42	PI,STPI,GOV	
Base	0.011	0.005	2.36	100	0.38		Fragile:1
Low	0.001	0.005	0.12	91	0.51	PI,STPI,LLY	
Black Market Premium (BMP)							
High	-0.0079	0.0035	2.27	96	0.41	PI,STPI,GOV	
Base	-0.0084	0.0027	3.07	98	0.41		Robust
Low	-0.0079	0.0035	2.27	96	0.41	PI,STPI,GOV	

Notes:
The base beta is the estimated coefficient from the regression with the variable of interest (M-variable) and the always included variables (I-variables). The I-variables, are LYO, LSEC, and REVC. The high beta is the estimated coefficient from the regression with the extreme high bound (β_m + 2-standard deviations); the low beta is the coefficient from the regression with the extreme lower bound.

The "other variables" are the Z-variables included in the base regression that produce the extreme bounds. The underlined variables are the minimum additional variables that make the coefficient of interest insignificant or change sign.

The Robust/Fragile designation indicates whether the variable of interest is robust or fragile. If fragile, the column indicates how many additional variables need to be added before the variable is insignifcant or of the wrong sign. A zero indicates the coefficient is insignificant with only the I-variables included. If robust, the text provides information about further robustness tests.

TABLE 3

Sensitivity Results for Financial Policy Indicators
Dependent Variable: Growth Rate of Real Per Capita GDP 1960-1989

	Beta	Standard Error	T-Statistic	Countries	R^2	Other Variables	Robust/Fragile (#)
Liquid Liabilities Share (LLY)							
High	0.029	0.007	4.31	89	0.56	PI,STPI,GOV	
Base	0.029	0.007	4.44	92	0.52		Robust
Low	0.025	0.007	3.82	88	0.56	PI,TRD,GOV	
Deposit Money Bank Domestic Credit Share (BANK)							
High	0.038	0.011	2.76	79	0.54	PI,STPI,TRD	
Base	0.038	0.012	3.19	83	0.48		Robust
Low	0.038	0.011	2.76	79	0.54	PI,STPI,TRD	
Claims on Private Sector to Total Domestic Credit (PRIVATE)							
High	0.031	0.011	2.96	82	0.47	PI,STPI,TRD	
Base	0.031	0.010	3.04	82	0.46		Robust
Low	0.025	0.010	2.40	79	0.54	STPI,TRD,BMP	

Notes:

The base beta is the estimated coefficient from the regression with the variable of interest (M-variable) and the always included variables (I-variables). The I-variables, are LYO, LSEC, and REVC. The high beta is the estimated coefficient from the regression with the extreme high bound (β_a + 2-standard deviations); the low beta is the coefficient from the regression with the extreme lower bound.

The "other variables" are the Z-variables included in the base regression that produce the extreme bounds. The underlined variables are the minimum additional variables that make the coefficient of interest insignificant or change sign.

The Robust/Fragile designation indicates whether the variable of interest is robust or fragile. If fragile, the column indicates how many additional variables need to be added before the variable is insignifcant or of the wrong sign. A zero indicates the coefficient is insignificant with only the I-variables included. If robust, the text provides information about further robustness tests.

TABLE 4

INFLATION AND GROWTH

Dependent Variable: Growth Rate of Real Per Capita GDP

regression#	1	2	3
observations	102	102	102
independent variables			
C	0.047**	0.051**	0.051**
	(0.005)	(0.005)	(0.005)
LYO	-0.007**	-0.007**	-0.007**
	(0.003)	(0.003)	(0.003)
LSEC	0.009**	0.009**	0.009**
	(0.002)	(0.002)	(0.002)
REVC	-0.023**	-0.023**	-0.023**
	(0.008)	(0.008)	(0.008)
HIPI40		.	-0.019**
			(0.007)
PI*HIPI40		.	0.00042
			(0.00026)
HIPI80		-0.009	.
		(0.013)	
PI*HIPI80		0.00037**	.
		(0.00015)	
PI	-0.00002	-0.00036**	-0.00038
	(0.00003)	(0.00014)	(0.00026)
F-TEST[1]		0.027	0.979
		(0.870)	(0.325)
R^2	0.36	0.40	0.40

(standard errors in parentheses)

* significant at the .10 level
** significant at the .05 level

LYO = log real per capita GDP, 1960
LSEC = log secondary school enrollment rate, 1960
REVC = number of revolutions and coups per year
HIPIXX = 1 for countries with PI>XX, 0 otherwise
PI = average annual inflation rate

1: F-test of hypothesis that the coefficients on PI*HIPIXX and PI sum to zero

TABLE 4, continued
INFLATION AND GROWTH
Dependent Variable: Growth Rate of Real Per Capita GDP

regression#	2A	3A	4	5	6
observations	100	100	98	98	96
independent variables					
C	0.051**	0.051**	0.042**	0.050**	0.041**
	(0.005)	(0.005)	(0.006)	(0.007)	(0.0072)
LYO	-0.008**	-0.007**	-0.007**	-0.009**	-0.008**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
LSEC	0.009**	0.009**	0.009**	0.010**	0.010**
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
REVC	-0.022**	-0.022**	-0.016**	-0.018**	-0.011**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
HIPI40	.	-0.015*	.	.	.
		(0.009)			
PI*HIPI40	.	0.00041	.	.	.
		(0.00026)			
HIPI80	-0.008	.	-0.001	-0.006	0.001
	(0.014)		(0.013)	(0.013)	(0.013)
PI*HIPI80	0.00031*	.	0.00021	0.00033**	0.00021
	(0.00017)		(0.00017)	(0.00016)	(0.00016)
PI	-0.00031*	-0.00038	-0.00022	-0.00033**	-0.00024
	(0.00016)	(0.00026)	(0.00016)	(0.00016)	(0.00016)
TRD	.	.	0.009*	.	0.011**
			(0.005)		(0.005)
GOV	.	.	.	0.023	0.010
				(0.034)	(0.034)
F-TEST[1]	0.017	0.351	0.008	0.190	0.686
	(0.895)	(0.555)	(0.927)	(0.664)	(0.410)
R^2	0.38	0.38	0.39	0.40	0.43

(standard errors in parentheses)

* significant at the .10 level
** significant at the .05 level

LYO = log real per capita GDP, 1960
LSEC = log secondary school enrollment rate, 1960
REVC = number of revolutions and coups per year
HIPIXX = 1 for countries with PI>XX, 0 otherwise
PI = average annual inflation rate
GOV = government consumption as share of GDP
TRD = exports + imports as share of GDP

Regression 2A(3A) = Regression 2(3) minus Uganda and Nicaragua
1: F-test of hypothesis that the coefficients on PI*HIPIXX and PI sum to zero

TABLE 5

INDEXES AND GROWTH

Dependent Variable: Growth Rate of Real Per Capita GDP

regression #	1	2	3	4
observations	68	85	72	54
independent variables:				
C	0.057**	0.048**	0.047**	0.053**
	(0.007)	(0.005)	(0.005)	(0.007)
LYO	-0.010**	-0.009**	-0.009**	-0.011**
	(0.004)	(0.003)	(0.003)	(0.004)
LSEC	0.011**	0.009**	0.007**	0.008**
	(0.002)	(0.002)	(0.002)	(0.002)
REVC	-0.014	-0.008	-0.006	0.009
	(0.009)	(0.008)	(0.007)	(0.010)
MACRO	0.004**	.	.	0.003*
	(0.002)			(0.002)
INTL	.	0.003**	.	0.002
		(0.001)		(0.001)
FIN	.	.	0.004**	0.004**
			(0.001)	(0.002)
R^2	0.38	0.39	0.46	0.52

(standard errors in parentheses)

* significant at the .10 level
** significant at the .05 level

LYO = log real per capita GDP, 1960
LSEC = log secondary school enrollment rate, 1960
REVC = number of revolutions and coups per year
MACRO = macroeconomic index
INTL = international index
FIN = financial index

TABLE 6

POLICY REGIMES AND GROWTH

FINANCIAL RANK	INTERNATIONAL RANK	MACROECONOMIC RANK	GROWTH	COUNTRIES
1	1	1	0.030	AUT, THA, FIN, DEU, CYP,CAN,NOR,NLD, TTO,FRA,PNG
1	1	0	0.027	PAN,JOR,IRL,PRT, BEL,NZL,JAM,MYS, MUS,BRB
1	0	1	0.036	KOR,USA,AUS
1	0	0	0.020	TUN,SYR,ZAF,GUY, GRC,KEN,TZA,MAR, PAK,ZMB
0	1	1	0.008	CMR,SEN,HND,HTI, HVO
0	1	0	0.018	GMB,MLI,TGO
0	0	1	0.011	COL,SLV,DOM,ETH, GTM,PHL,BGD,BDI, RWA,MDG
0	0	0	0.011	LKA,ZAR,TUR,SLE, MWI,NIC

Country List
119 Country Sample

1	AFG	Afghanistan	40	HTI	Haiti	80	PRY	Paraguay
2	DZA	Algeria	41	HND	Honduras	81	PER	Peru
3	AGO	Angola	42	HKG	Hong Kong	82	PHL	Philippine
4	ARG	Argentina	43	ISL	Iceland	83	PRT	Portugal
5	AUS	Australia	44	IND	India	84	RWA	Rwanda
6	AUT	Austria	45	IDN	Indonesia	85	SAU	Saudi Arab
7	BGD	Bangladesh	46	IRN	Iran	86	SEN	Senegal
8	BRB	Barbados	47	IRQ	Iraq	87	SLE	Sierra Leo
9	BEL	Belgium	48	IRL	Ireland	88	SGP	Singapore
10	BOL	Bolivia	49	ISR	Israel	89	SOM	Somalia
11	BWA	Botswana	50	ITA	Italy	90	ZAF	South Afri
12	BRA	Brazil	51	JAM	Jamaica	91	ESP	Spain
13	BDI	Burundi	52	JAP	Japan	92	LKA	Sri Lanka
14	CMR	Cameroon	53	JOR	Jordan	93	SDN	Sudan
15	CAN	Canada	54	KEN	Kenya	94	SWZ	Swaziland
16	CAF	Cent. Afr. Rep	55	KOR	Korea	95	SWE	Sweden
17	TCD	Chad	56	KWT	Kuwait	96	CHE	Switzerlan
18	CHL	Chile	57	LSO	Lesotho	97	SYR	Syria
19	COL	Colombia	58	LBR	Liberia	98	OAN	Taiwan
20	COG	Congo	59	LUX	Luxembourg	99	TZA	Tanzania
21	CRI	Costa Rica	60	MDG	Madagascar	100	THA	Thailand
22	CIV	Cote D'Ivoire	61	MWI	Malawi	101	TGO	Togo
23	CYP	Cyprus	62	MYS	Malaysia	102	TTO	Trin. and
24	DEN	Denmark	63	MLI	Mali	103	TUN	Tunisia
25	DOM	Dominican Rep.	64	MLT	Malta	104	TUR	Turkey
26	ECU	Ecuador	65	MRT	Mauritania	105	UGA	Uganda
27	EGY	Egypt	66	MUS	Mauritius	106	GBR	Great Brit
28	SLV	El Salvador	67	MEX	Mexico	107	USA	United Sta
29	ETH	Ethiopia	68	MAR	Morocco	108	URY	Uruguay
30	FJI	Fiji	69	MOZ	Mozambique	109	VEN	Venezuela
31	FIN	Finland	70	NLD	Netherland	110	YEM	Yemen
32	FRA	France	71	NZL	New Zealan	111	ZAR	Zaire
33	GAB	Gabon	72	NIC	Nicaragua	112	ZMB	Zambia
34	GMB	Gambia	73	NER	Niger	113	ZWE	Zimbabwe
35	DEU	Germany	74	NGA	Nigeria	114	BUR	Burma
36	GHA	Ghana	75	NOR	Norway	115	GUY	Guyana
37	GRC	Greece	76	OMN	Oman	116	BEN	Benin
38	GTM	Guatemala	77	PAK	Pakistan	117	HVO	Burkina Fa
39	GNB	Guinea-Bissau	78	PAN	Panama	118	NPL	Nepal
			79	PNG	Pap. New G	119	SUR	Suriname

Chart 1

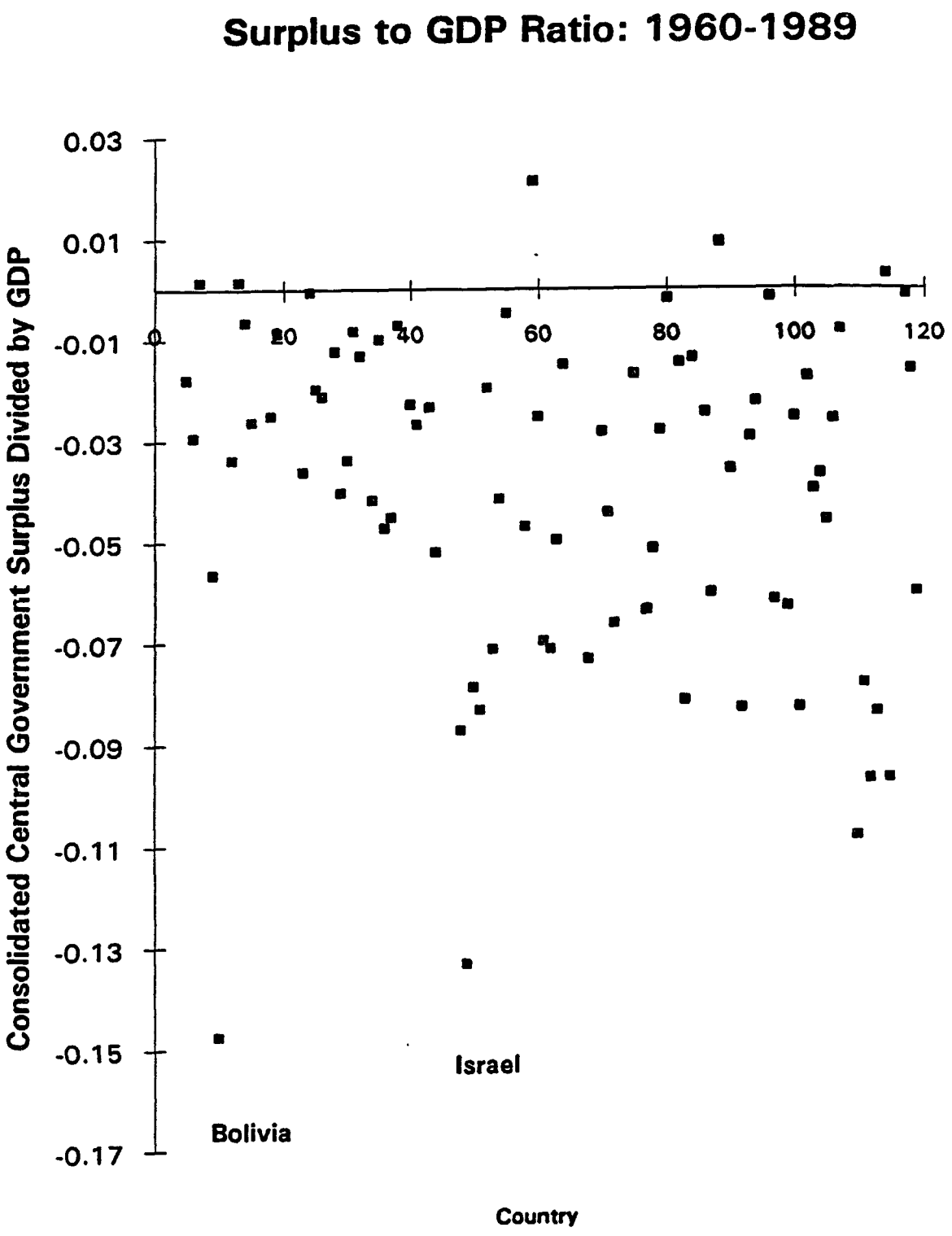

Surplus to GDP Ratio: 1960-1989
Consolidated Central Government Surplus Divided by GDP
0.03
0.01
-0.01
-0.03
-0.05
-0.07
-0.09
-0.11
-0.13
-0.15
-0.17
0
20
40
60
80
100
120
Israel
Bolivia
Country

Chart 2

Trade Divided by GDP: 1960-1989

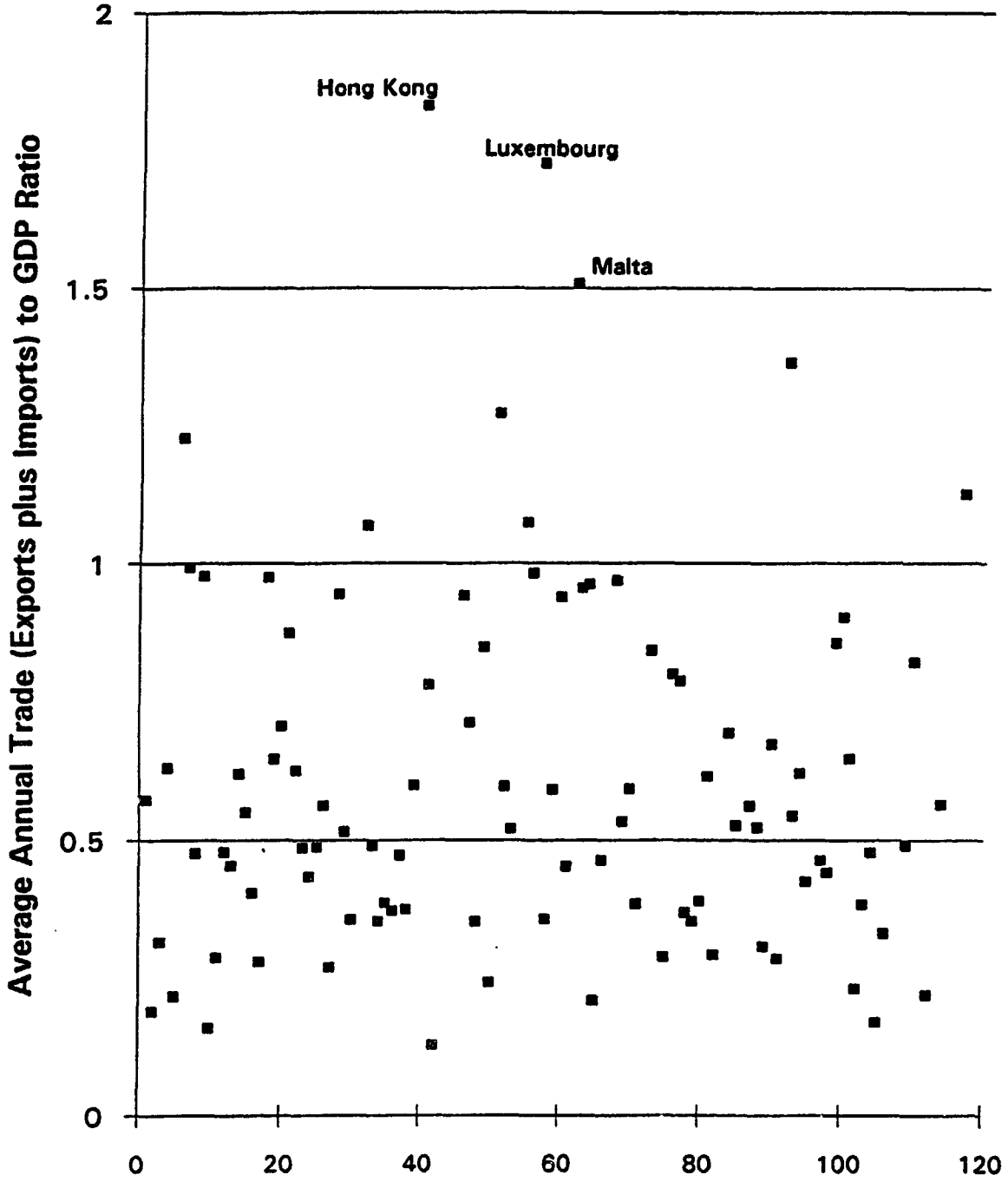


Chart 3

Black Market Premium: 1960-1989

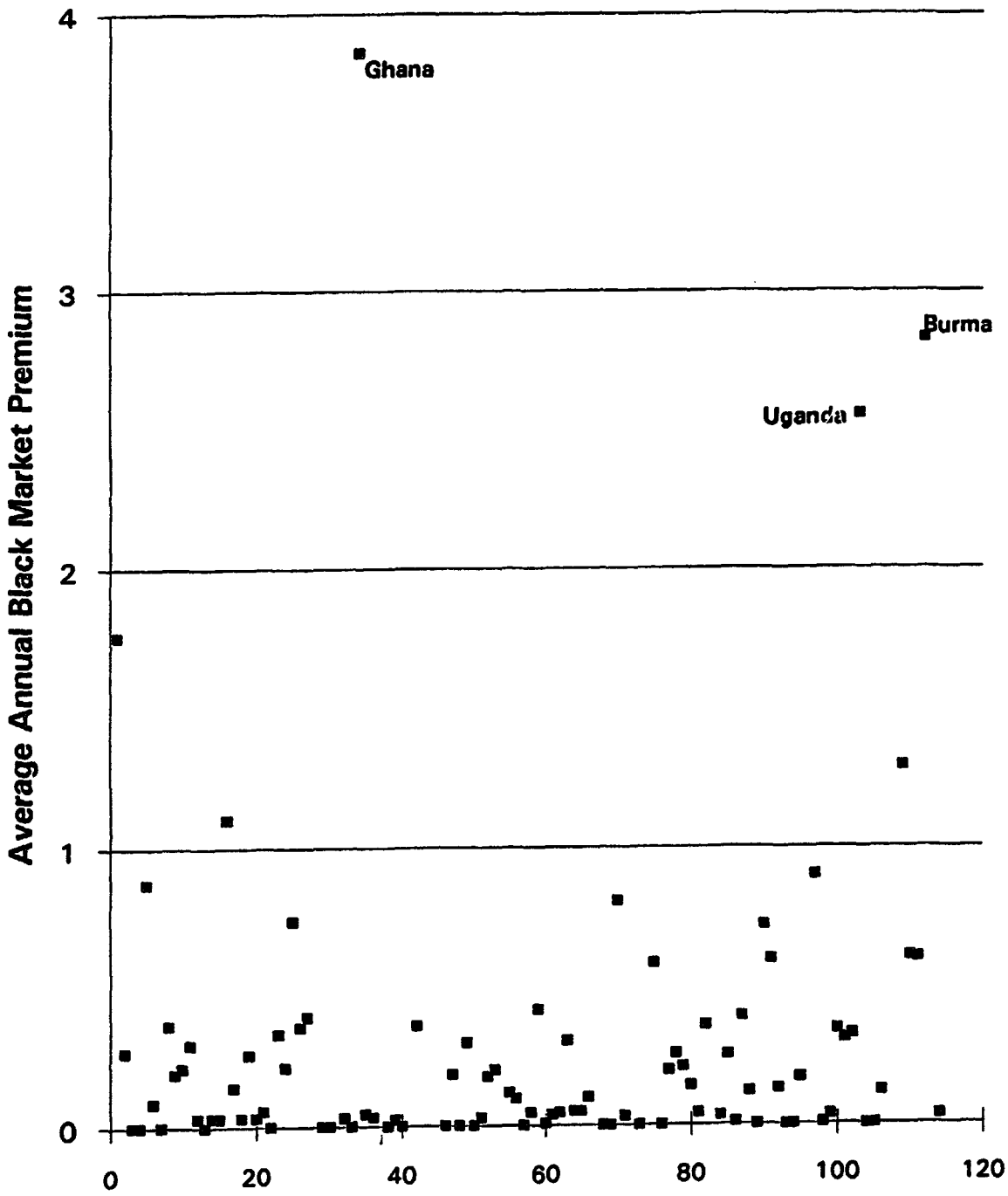


Chart 4

Liquid Liabilities Divided by GDP: 1960-1989

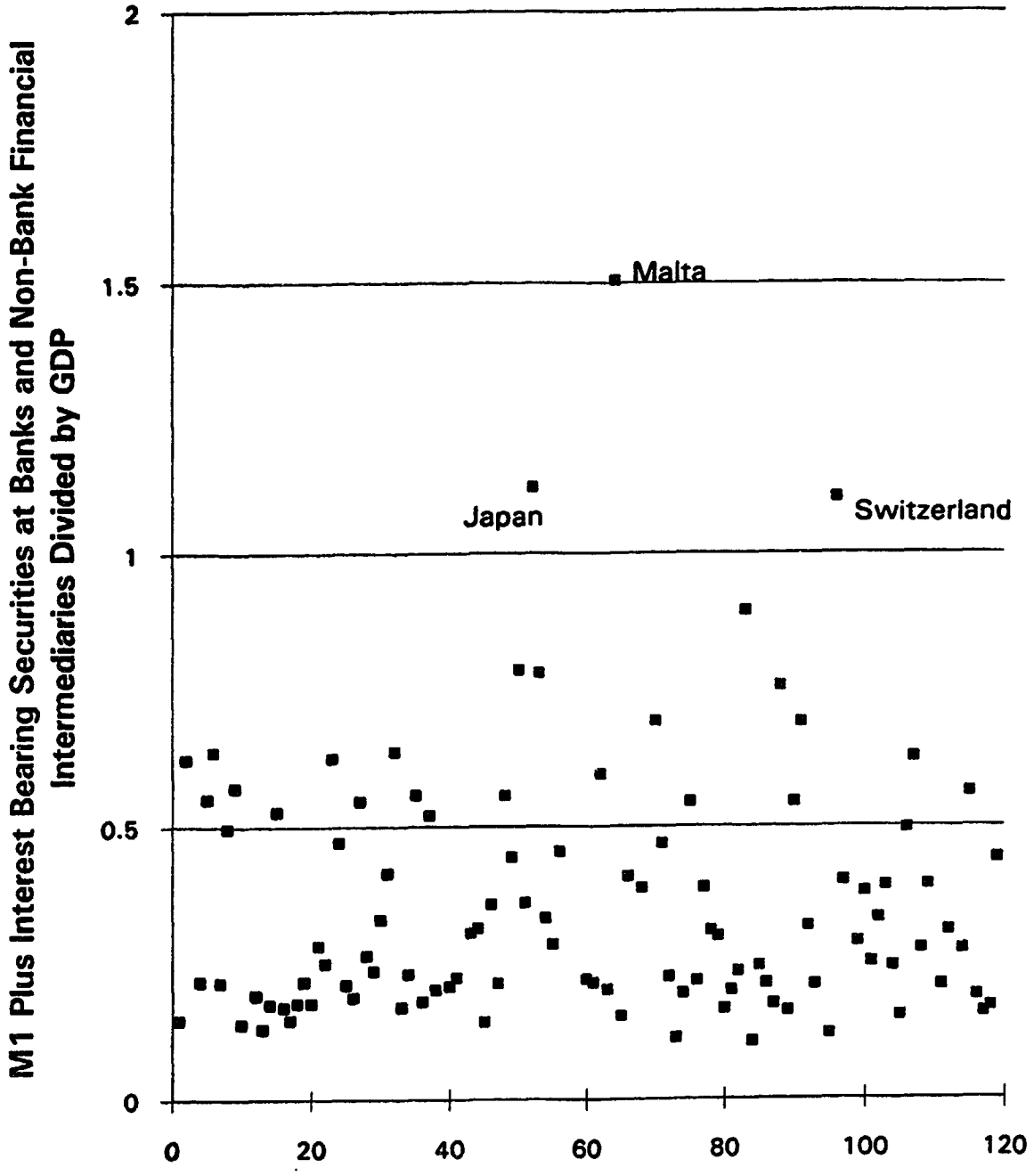
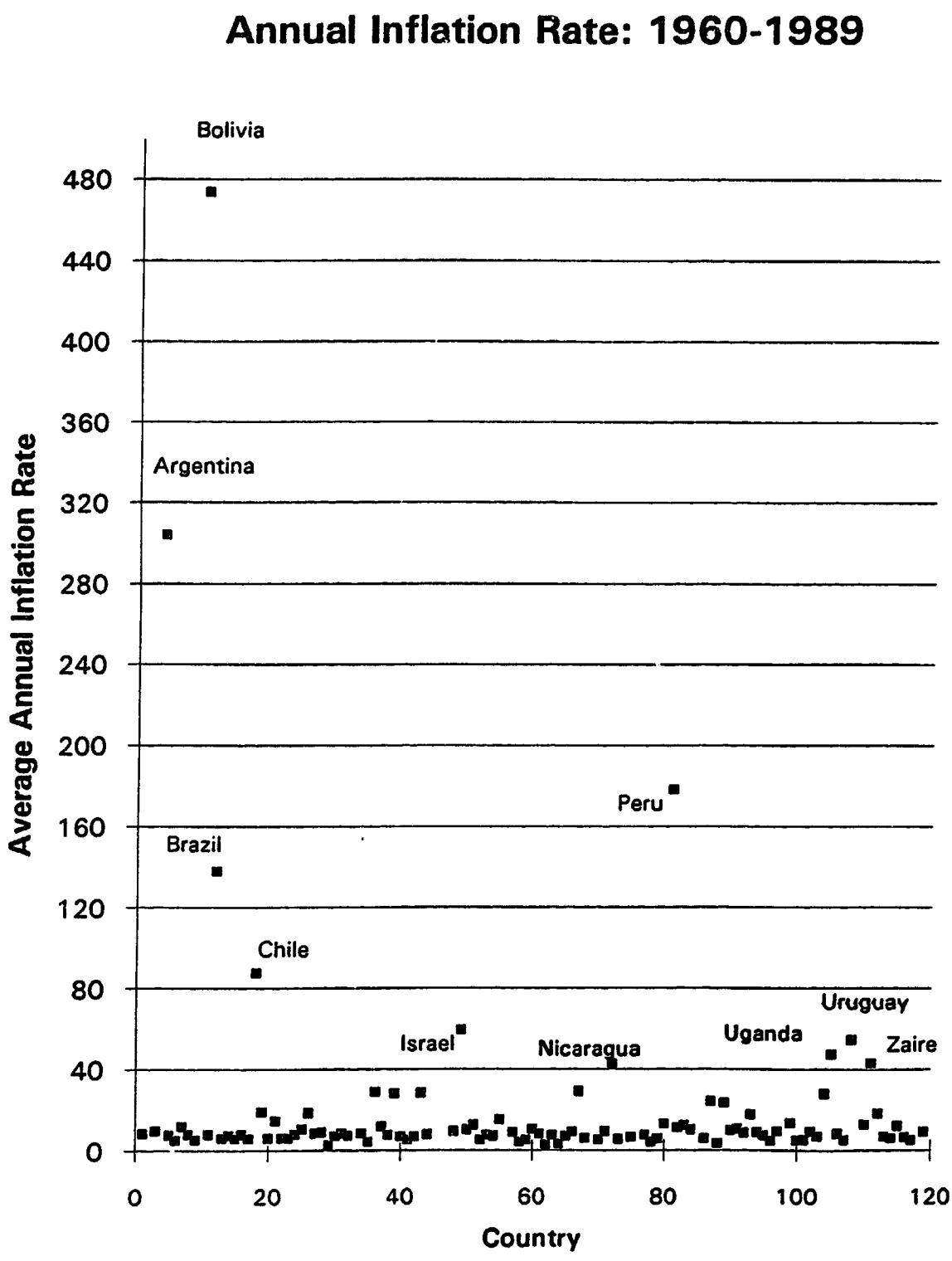


Chart 5


Annual Inflation Rate: 1960-1989
Average Annual Inflation Rate
480
440
400
360
320
280
240
200
160
120
80
40
0
Bolivia
Argentina
Peru
Brazil
Chile
Israel
Nicaragua
Uganda
Uruguay
Zaire
0
20
40
60
80
100
120
Country

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