MACROECONOMIC STABILITY AND GROWTH

STANLEY FISCHER

It is now widely accepted that a stable macroeconomic framework is necessary though not sufficient for sustainable economic growth. Three major World Bank studies of adjustment lending — balance of payments support loans made to help finance policy reforms in developing countries — affirm this basic conclusion, as does the World Development Report for 1991, The Challenge of Development.

This view is supported by much striking evidence. For instance, in Latin America, the recovery of economic growth in Chile and Mexico was preceded by the restoration of budget discipline and the reduction of inflation. By contrast, the current or very recent economic crises in Brazil and Argentina coincide with high inflation punctuated by stabilization attempts and continued macroeconomic instability. The fast growing countries of East Asia have generally maintained single or low double-digit inflation, have for the most part avoided balance of payments crises, and when they have had them — as for instance in Korea in 1980 — moved swiftly to deal with them. The lessons of the case study evidence amassed in the major World Bank research project headed by Little, Cooper, Corden and Rajapatirana (1992), summarized in Corden (1991), support the conventional view. The notion that macroeconomic stability is not sufficient for growth appears to be supported by evidence from Africa, where most of the countries of the franc zone — whose exchange rate has been rigidly fixed to the French franc for nearly fifty years and which have therefore maintained low inflation — have grown slowly since 1980, and from India, which grew steadily but slowly while pursuing conservative macroeconomic policies from 1947 to the end of the 1980s.

In this paper I first discuss the notion of a stable macroeconomic framework and then summarize theoretical considerations linking growth to macroeconomic policies. In Parts II and III I present evidence supporting the view that macroeconomic stability is conducive to growth. In Part IV I present some concluding remarks.

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1 The word "sustainable" is meant here in its literal and not environmental sense.
3 It draw extensively on results in my papers "Growth, Macroeconomics, and Development" (1992) and "Growth: the Role of Macroeconomic Factors" (1991).
I. **Definitions and Theoretical Considerations**

There is no single, simple, quantitative definition of good macroeconomic policies or a stable macroeconomic framework. Conceptually, the macroeconomic framework can be described as stable when inflation is low and predictable, real interest rates are appropriate, fiscal policy is stable and sustainable, the real exchange rate is competitive and predictable, and the balance of payments situation is perceived as viable.\(^4\)

Of the five criteria specified in this definition, only low and stable inflation is readily quantifiable. None of the specified variables is directly controllable by policy, and each should optimally vary in response to shocks. There is no simple way of determining the appropriate levels of the real interest or exchange rate in each period, or for that matter the inflation rate, from which to judge deviations that would indicate an unstable macroeconomic environment.

A country's macroeconomic indicators may be unstable either because policy is unstable or because the exogenous variables that affect the country are unstable. In either case, we expect growth to be adversely affected. If there were sufficient instrumental variables available, it would be possible to separate out those elements of instability of the policy variables that arise from responses to exogenous shocks, and then to test whether reactions to the two elements of instability differ.\(^5\)

I shall use the inflation rate as the best single indicator of the stability of the macroeconomic environment, and the budget deficit as the second basic indicator. There is no major industrialized economy in which inflation has exceeded 20 percent for any sustained period in the last 40 years. There is no economy in which the authorities do not have the avowed aim of eventually reducing inflation to a low level, and there is therefore no economy in which high inflation can be regarded as a stable situation. While there are economies in which inflation remains at moderate levels for prolonged periods (Dornbusch and Fischer, 1991), economic agents in a high inflation economy have to expect an attack -typically many attacks- on inflation at some point. Governments that have succeeded in creating a stable low inflation environment, such as those of Japan or Germany, can be expected to continue with their macroeconomic policies.

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4 This definition is based on World Bank (1990), p.4.

5 With regard to quantification of the other four variables: Measures of the fiscal deficit provide some information about fiscal policy; however it is difficult to characterize fiscal policy by a single variable (Mackenzie, 1989), and international fiscal data are poor. Estimates of sustainable deficits could in principle be calculated along the lines of Hamilton and Flavin (1986), but that level of detail is difficult to attain in a large cross-sectional study. In addition, the stochastic processes for deficits required by the Hamilton-Flavin approach may be especially difficult to estimate for developing countries, where both stationarity and data availability are problematic. The competitiveness of the real exchange rate could in principle be estimated by its implications for current and future levels of the current account, while the appropriateness of the real interest rate is difficult to specify.

6 Aizenman and Marion (1991) attempt to quantify the random element in policy by estimating autoregressive processes for policy variables and using the standard deviations of policy surprises as a measure of uncertainty. This is a promising approach, which however does not distinguish contemporaneous variability caused by responses to exogenous shocks from purely random variability.

7 The potential links between inflation and growth are discussed and developed in Fischer (1983) and by implication in Fischer and Modigliani (1978).
In essence, the argument is that the inflation rate serves as an indicator of the overall ability of the government to manage the economy. Since there are no good arguments for very high rates of inflation, a government that is producing high inflation is a government that has lost control. Economic growth is likely to be low in such an economy.

Along with the level of the inflation rate, the variability of inflation is an indicator of the stability of the macroeconomic environment and macroeconomic policies. It is well known that the inflation rate and the variance of the inflation rate across time for an individual country are highly correlated in the cross-section, with an $R^2$ that generally exceeds 0.9. Thus effects attributed to the level of the inflation rate may instead be attributable to uncertainty about inflation, but at the level of aggregation of this paper, those effects cannot be distinguished.

Countries may for a long time succeed in maintaining low and stable inflation through policies that are not ultimately sustainable. Such countries, for instance those in the franc zone, may face fiscal or balance of payments crises that could necessitate sharp changes in macroeconomic policy and that certainly increase macroeconomic uncertainty. The fiscal deficit is a good, though imperfect, indicator of such an unsustainable situation. I will also use changes in the real exchange rate, in the black market exchange premium, and changes in the terms of trade, as subsidiary or alternate indicators of the stability of the macroeconomic framework.

The emphasis on the stability of the macroeconomic framework suggests that the main reason macroeconomic factors matter for growth is through uncertainty. The literature has concentrated on two channels here. First, policy-induced macroeconomic uncertainty reduces the efficiency of the price mechanism, as in the classic Lucas (1973) contribution. This uncertainty, associated with high inflation or instability of the budget or current account, can be expected to reduce the level of productivity, and, in contexts where the reallocation of factors is part of the growth process, also the rate of increase of productivity. Second, temporary uncertainty about the macroeconomy tends to reduce the rate of investment, as potential investors wait for the resolution of the uncertainty before committing themselves (Pindyck, 1988). This channel suggests that investment would be lower at times when uncertainty is high, and its presence should therefore be more noticeable in the time series than cross-sectional data. Capital flight, which is likely to increase with domestic instability, provides another mechanism through which macroeconomic uncertainty reduces investment in the domestic economy.

The early growth theory literature on inflation and growth emphasized the positive impact of inflation on capital accumulation that occurs as a result of the portfolio shift away from money when the rate of return on money drops - the Mundell-Tobin effect. Subsequent contributions, noting various complementarities between real balances and capital -whether through the production function or because of a cash-in-advance constraint- predicted that higher inflation would reduce capital accumulation. Similarly, all the costs of inflation detailed in Fischer and Modigliani (1978) - including the impact of inflation on the taxation of capital- would imply a negative association between the level of income and inflation, and through the new growth theory mechanisms, between inflation and growth.

Solimano (1989) presents time series evidence supporting this relationship.

The mechanisms producing the Mundell and Tobin effects actually differ, though both imply that an increase in expected inflation increases capital accumulation.

For reference to the literature through 1983, see Fischer (1983).
Turning to the other macroeconomic indicators: The budget surplus should be positively associated with capital accumulation. There are again two reasons. The first is crowding out, which occurs in many models. The second is that, like the inflation rate, the deficit serves as an indicator of a government that is losing control of its actions.

Improvements in the terms of trade are likely to make investment more attractive at home. An increase in the black market exchange premium is an indicator of expectations of depreciation of the exchange rate and foreign exchange rationing. This suggests that capital accumulation and the black market premium are likely to be negatively related. One influence in the opposite direction arises from the fact that when foreign exchange access is controlled, there is frequently preferential treatment for the import of investment goods. Devaluation of the exchange rate is likely to make investment more attractive.

In the short run, neither the inflation rate nor the budget deficit are unaffected by the growth rate. A supply shock will both reduce the growth rate and raise the inflation rate, and given government spending a reduction in growth will increase the deficit. Two types of regressions are reported in this paper. In the cross-sectional regressions, the period average (usually 1961-87) growth rate or other dependent variable for each country is regressed on period average values of such right hand side variables as inflation and the budget deficit. In the panel regressions, similar regressions are run using both the time series variation within each country and the cross-sectional variation. The problem of reverse causation is more likely to arise in the panel regressions. In principle, the use of instrumental variables can deal with the endogeneity problem, but in practice appropriate instruments are difficult to find. The endogeneity problem is less severe in the cross-sectional regressions, where the length of period is more than 25 years. The government can certainly set the inflation rate and the deficit independently of the growth rate over such a long period.

II. Existing Empirical Evidence

The simple statistical evidence supports the basic proposition that macroeconomic stability is conducive to growth. Inflation in fast-growing Asia is well below the rates of price increase in slower-growing Africa and Latin America (Table 1), and across the three periods shown in Table 1, inflation in each area has moved inversely with growth. Levine and Renelt (1992) show that high growth countries are also lower inflation countries, have smaller governments, and lower black market exchange rate premia - the latter reflecting disequilibria in the official foreign exchange markets.

In the last few years a large volume of empirical work has been carried out, inspired by the new growth theory. This work consists largely of cross-country regressions, typically using the Summers-Heston (1988) ICP data. The results of these studies have been reviewed and their robustness examined in an extremely useful

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11 A similar table is presented in Fischer (1991). The inflation rate for Asia in that table (for which the first period is 1960-73) is shown as increasing from period to period, with an average of only 2 percent for 1960-73. Both tables are taken from the same source, and I am unable to account for the different patterns of Asian inflation, though they must arise from changes in country coverage and data revisions.

12 For examples, see Barro (1991) and the many studies listed in Levine and Renelt (1990).
paper by Levine and Renelt (1990), who list forty cross-sectional growth studies published since 1980\textsuperscript{13}.

<table>
<thead>
<tr>
<th>TABLE 1</th>
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<tbody>
<tr>
<td>INFLATION AND ECONOMIC GROWTH</td>
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<td>(% per annum)</td>
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<td></td>
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<tr>
<td>GDP growth</td>
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<td>GDP per cap. growth</td>
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<tr>
<td>Inflation</td>
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Each study regresses the growth rate over a given period against a variety of variables; well over 50 regressors have been used in these studies. Among the regressors are variables relating to trade and trade policy, and exchange rates; fiscal policy; political and social stability and rights; human capital and macroeconomic policy and outcomes. Early studies tended to focus on trade policy and investment; studies associated with the new growth theory typically include initial real income and some measure of human capital as well as investment.

For a sample of 101 countries, over the period 1960-89, Levine and Renelt present a basic regression

\[
GYP = -0.83 + 0.35 RGDP60 - 0.38 GN + 3.17 SEC + 17.5 INV
\]

\[ 
(-0.98) (2.50) (-1.73) (2.46) (6.53) \]

\[ \bar{R}^2 = 0.46 \]

\[ \text{t-statistics in parentheses} \]

where GYP is the growth rate of real per capita income (from the World Bank data base), RGDP60 is (Summers-Heston) real income in 1960, GN is the rate of population growth, SEC is the 1960 rate of secondary school enrollment, and INV is the share of investment in GDP. Applying Learner’s extreme bounds analysis to equation (1), the robust relationships are shown to be those between growth and initial income, and between growth and investment\textsuperscript{14}.

They then extend the analysis to include a variety of other variables. Their two

\textsuperscript{13} Their list is necessarily incomplete; in particular, it does not include the comparative cross-country analysis by Adelman and Morris (1988), which is based on work dating back to the 1960s. Several other earlier cross-country studies are listed by Chenery, (Chapter 2 in Chenery, Robinson and Syrquin (1986), (p.27)). Reynolds (1986, p. 101) also presents a cross-sectional growth regression, despite his general preference for time-series studies.

\textsuperscript{14} De Long and Summers (1991) present evidence that growth is linked primarily to the share of equipment investment in GNP.
broad findings are, first, that several measures of economic policy are related to long-run growth; and second, that the relationship between growth and almost every particular macroeconomic indicator other than the investment ratio is fragile. The strongest results are that investment in physical capital, and either the level or the rate of change of human capital, increase the rate of growth.

In Fischer (1991), I extend the basic equation (1) to include macroeconomic indicators. Regressing per capita real (Summers-Heston) growth over the period 1970-85\textsuperscript{15} against the standard new growth theory variables, plus indicators of macroeconomic performance, yields:

\[
GY = 1.38 - 0.52 \text{RGDP70} + 2.51 \text{PRIM70} + 11.16 \text{IV} - 4.75 \text{INF}
\]

\[
\left(\begin{array}{c}
(1.75) \\
(-5.90) \\
(2.69) \\
(3.91) \\
(-2.70)
\end{array}\right)
\]

\[
+ 0.17 \text{SUR} - 0.33 \text{DEBT80} - 2.02 \text{SSA} - 1.98 \text{LAC}
\]

\[
\left(\begin{array}{c}
(4.34) \\
(-0.79) \\
(-3.71) \\
(-3.76)
\end{array}\right)
\]

\[\bar{R}^2 = 0.60 \quad N = 73 \quad \text{t-statistics in parentheses}\]

where PRIM70 is the enrollment rate for primary school, INF is the average inflation rate over the period 1970-85, SUR is the ratio of the budget surplus to GNP over the period 1975-80\textsuperscript{16}; DEBT is the foreign debt to GNP ratio in 1980; and SSA and LAC are sub-Saharan Africa, and Latin America and the Caribbean dummies, respectively. The sample includes all countries for which data were available\textsuperscript{17}.

The rates of investment and inflation, and the budget surplus enter regression (2) significantly. The signs of all variables are as expected. When the continent dummies are excluded\textsuperscript{18}, the coefficient on inflation and the debt rise\textsuperscript{19}. Recalling that several of the mechanisms relating inflation to growth that were discussed in Section I operate by

\textsuperscript{15} The period was chosen in a tradeoff between the length of period and number of macroeconomic variables that could be included in the regression.

\textsuperscript{16} The period is chosen to increase the number of countries included in the sample. I have also run similar regressions for the period 1974-89, using Levine and Renelt's (1990b) data, provided by Ross Levine. No major differences in conclusions emerge using the Levine-Renelt data.

\textsuperscript{17} It can be argued that the developing countries are sufficiently and systematically different from the industrialized countries that the latter should be excluded from the regressions. While it is easy to agree with this view at the extremes, it is hard to know where to draw the line, and I therefore worked mostly with all countries for which there were data. For some regressions (not reported here), I excluded all countries that in 1970 had an income level above Italy's; if anything, this gave stronger results with respect to macroeconomic variables, particularly the debt.

\textsuperscript{18} Continent dummies enter most growth equations significantly. Lance Taylor has suggested that the negative coefficients for Africa and Latin America may reflect their particularly adverse terms of trade shocks in the 1980s.

\textsuperscript{19} There was relatively little experimentation in arriving at equation (2). In some versions, the variance of inflation was entered along with the rate of inflation; it was not significant and was excluded because it is highly correlated with the rate of inflation ($R = 0.94$). The SEC70 variable was initially included but was dropped since its exclusion made little difference and since PRIM70 was generally more significant. The budget surplus variable is available for the period 1975-85 for a smaller sample of (56) countries; the t-statistic on the budget surplus is smaller in that sample, but the coefficient is still significant at the 5% level. However in those regressions the significance level on the inflation rate drops below 5%, while that on the debt rises. The inclusion of the black market foreign exchange premium is discussed below.
affecting investment, it should be noted that the coefficients on both inflation and investment in equation (2) are statistically significant. This implies that inflation has effects other than those that operate through investment. For instance, inflation could affect the efficiency of operation of the given factor inputs. Regression (2) strengthens the argument that macroeconomic indicators are correlated with growth, at least over the period 1970-85.

As discussed in Section I, the macroeconomic indicators included in (2) cannot be regarded as truly exogenous. In this respect their status is no different than that of investment. Instruments are difficult to find; for instance, such candidates as measures of political instability not only cause but also are caused by inflation. Instrumental variable estimation of equation (2) using as instruments initial GDP and primary enrollment, the frequency of crises and riots, military spending, foreign aid, and the debt in 1980, resulted in a regression in which no coefficient was significantly different from zero. Instrumental variable regression using the above instruments plus the variance of inflation, the frequency of constitutional changes, and government consumption spending, produced results very similar to (2), except that primary education lost its statistical significance.

The instrumental variables regression, which does not include the continent dummies, is

\[
G_Y = 0.55 - 0.33 \text{RGDP70} + 2.32 \text{PRIM70} + 12.79 \text{INV} - 7.10 \text{INF} \\
(0.28) \quad (-4.33) \quad (1.31) \quad (3.51) \quad (-4.45) \\
+ 0.28 \text{SUR} - 0.03 \text{DEBT80} \\
(3.06) \quad (-0.04)
\]

\[\bar{R}^2 = 0.41 \quad N = 54 \quad \text{t-statistics (with White (1980) correction) in parentheses.}\]

Given both the similarity between equations (2) and (3), and the difficulties of choosing instruments, I will not pursue instrumental variables regressions in the remainder of this paper.

Relatively little of the cross-sectional variance in growth rates is accounted for by the macroeconomic variables alone. When only the inflation rate, debt, and the deficit are included, the (corrected) squared correlation coefficient is only 0.16. When the continent dummies are added, 32% of the variance is accounted for.

The external debt to GNP ratio serves in (2) as an indicator of the exchange rate overvaluations of the late 1970s. The average black market foreign exchange premium could serve as another such (partial) indicator. Examination of simple correlations between the black market premium and other variables suggests it might be strongly related to growth. The simple correlation between the average growth rate over the period 1970-85 and the average black market premium for the same period, for a group of forty countries for which the data are available, is -0.24. The simple correlation between the premium and investment is -0.36, and between the premium and the budget surplus -0.3420. However, the coefficient on the average black market premium is never

20 The premium is available for 67 countries for the period 1970-85, but there are only forty countries for which the variables in equation (2) plus the premium are all available. The weakness of the simple correlation between growth and the black market premium may be a result of the wide range of the premium, from zero to an average of 717% (for Nicaragua). The premium is high for African countries, excluding those in the CFA zone, and for Latin America.
significant in any regression that includes the other macroeconomic variables, and this applies also to various non-linear transformations of the premium. Its major impact seems to be to reduce the coefficient on the external debt, but because its inclusion also changes the sample size, not much can be deduced from any such effect.

The negative relationship between inflation and economic growth in equations (2) and (3) has been found also in other papers, for instance in Fischer (1983), de Gregorio (1991), and Gylfason (1991). Easterly and Rebelo (1992) find a consistent negative relationship between growth and budget deficits.

The evidence reviewed in this section supports the view that a stable macroeconomic framework is conducive of growth.

III. WHY DO MACROECONOMIC VARIABLES MATTER?

Suppose we accept the argument that inflation and other factors related to short-run macroeconomic management affect economic growth. Then the interesting question will be to investigate the channels through which macroeconomic factors affect growth. In terms of a standard production function framework we can write

$$Y_t = F(A_t, a( K_t), b( H_t))$$

where $A_t$ is an overall efficiency factor, including not only the level of technology, but also for example representing the quality of government management of the economy, or institutional factors; $K$ and $H$ are physical and human capital respectively; and $a( )$ and $b( )$ are efficiency factors. Except for some initial conditions, the regressions deal with averages of the variables over long periods, treating countries as the population from which the observations are drawn. Within this framework, there are two possible routes of influence for macroeconomic variables on growth. First, macroeconomic management may affect the rate of investment, and thus the rate of change of $K$. For example, large budget deficits may crowd out physical investment; or high and uncertain inflation may both reduce investment and induce capital flight. In addition, macroeconomic factors may affect the efficiency with which factors are used, i.e., by affecting $A( )$, $a( )$, and $b( )$ in Equation (4): for instance, by distorting price signals, inflation may reduce the rate of return on physical investment; or inflation may produce distortions that reduce the real wage.

New growth theory-based cross country investment regressions are presented in Barro (1989a, b) and Romer (1989), and their robustness examined in Levine and Renelt (1990b). These regressions generally show that some measure of initial human capital has a positive impact on investment, that measures of political instability have negative impacts, that investment is higher the lower the relative price of investment goods, and the more the price of investment goods diverges from the world level. In addition, government investment appears to be complementary with private investment. The robustness tests by Levine and Renelt (1990b) show that none of the relationships in the basic regression equation—which does not include the relative prices of investment goods—

Nicaragua aside, the highest premia, frequently exceeding 100%, are found in North and Sub-Saharan Africa.

Short-term macroeconomic management will also affect the number of employed, $H$, but is less likely to affect the rate of growth of population over long periods.
is robust: the cross-sectional results provide little guidance on the determinants of investment.

Table 2 presents estimates of a number of cross-sectional investment regressions, all for the average share of investment in GNP over the period 1970-1985. Equation (8) in Table 2 is both simple and has the highest explanatory power for cross-country variation in investment. There are no clear reasons that the initial level of per capita GDP and school enrollment enter the equation. The significant coefficient on the growth rate is consistent with the typical finding that accelerator type investment functions perform well (Clark, 1979). However, the direction of causation in this equation is difficult to establish\textsuperscript{22}.

\begin{table}
\centering
\caption{CROSS-COUNTRY INVESTMENT REGRESSIONS}
\begin{tabular}{lcccc}
\hline
 & (5) & (6) & Equation (7) & (8) & (9) \\
\hline
Constant & 0.097 & 0.077 & 0.087 & 0.236 & 0.214 \\
 & (4.40) & (3.17) & (2.96) & (13.70) & (9.70) \\
GY & 1.23 & & & & \\
 & (3.19) & & & & \\
RGDP70 & 0.012 & 0.009 & 0.008 & & \\
 & (4.48) & (2.98) & (2.32) & & \\
PRIM70 & 0.052 & 0.115 & 0.118 & & \\
 & (1.72) & (3.94) & (3.77) & & \\
INF & -0.174 & -0.148 & -0.133 & 0.075 & \\
 & (3.05) & (2.61) & (2.33) & (1.79) & \\
SUR7580 & -0.345 & -0.305 & -0.174 & -0.546 & \\
 & (2.02) & (1.69) & (0.78) & (2.45) & \\
DEBT80 & 0.013 & 0.018 & 0.010 & -0.008 & \\
 & (0.98) & (1.30) & (0.73) & (0.59) & \\
BLAV & & & & -0.018 & \\
 & & & & (3.95) & \\
PINV & & & & -0.043 & \\
 & & & & (2.63) & \\
SSA & -0.016 & -0.080 & & & \\
 & (0.90) & (4.65) & & & \\
LAC & -0.030 & -0.044 & & & \\
 & (1.67) & (2.14) & & & \\
\hline
$R^2$ & 0.46 & 0.44 & 0.45 & 0.21 & 0.21 \\
N & 73 & 73 & 73 & 73 & 40 \\
\end{tabular}
\end{table}

\textsuperscript{22}Dependent variable is INV, average share of investment in GNP over the period 1970-1985, in the Summers-Heston data. BLAV is the average black market premium (as a multiple of the official rate) over the period 1970-1985; PINV is the average price of investment goods in the country (relative to the United States) over the period.

Of course, the same can be said for the cross-country growth regressions that include investment as an explanatory variable.
When the macroeconomic variables are added and the growth rate of output removed, inflation and the budget surplus are significantly negatively related to investment. The negative relationship between inflation and the share of investment is robust. Equations (7) and (8) suggest important interactions between the initial level of outcome and primary enrollment, and the SSA continent dummy. Finally, in Equation (9), we see strongly statistically significant coefficients on the black market premium (BLAV) and the relative price of investment goods; the inclusion of these variables leaves the budget surplus as the other macroeconomic variable that is significant at the 5% level, but in the a priori wrong direction, if the surplus is interpreted as a measure of the quality of macroeconomic measurement, or if deficits are thought to crowd out investment.

The relationship between the investment share and the black market premium is reasonably robust, in the sense that the black market premium remains large and statistically significant in most permutations of investment equations that are based on the 40-country sample. The coefficients on the other macroeconomic variable are not stable. The coefficient on the debt is typically not significant, and it is frequently (though not significantly) positive, implying that countries that borrowed more in the 1970s generally invested more, ceteris paribus.

The black market premium can be interpreted both as a measure of expectations of depreciation of the currency (and therefore also of currency overvaluation), and as a crude index of distortions. Expectations of depreciation may affect investment through several channels: first, it is more attractive to hold foreign assets when depreciation is expected; second, economic uncertainty is higher under such conditions; but third, for those who can obtain foreign exchange at the official rate, foreign capital goods are cheap to import. While the first two factors suggest a negative relationship between the black market premium and investment, the third suggests the opposite. To the extent that the black market premium serves as a general index of distortions and therefore of an unsustainable situation, it is likely to be negatively correlated with investment.

The black market premium is both strongly negatively correlated with investment, and does not appear to affect the rate of growth significantly. The explanation would seem to be simple: that the black market premium affects the rate of investment directly and thereby the rate of growth indirectly. The black market premium can be interpreted as affecting the rate of investment.

Unfortunately, this argument does not stand up to further examination. A priori, it is difficult to see why an index of distortions would affect the rate of investment but not the rate of return on investment. More important, there is direct evidence that the black market premium is correlated with the efficiency of investment. Table 3 presents estimated rates of return on investment projects in developing countries, cross-categorized against measures of distortions and macroeconomic variables including the real interest rate, the black market premium, and the inflation rate.

Sweder van Wijnbergen has suggested that the negative coefficient on the budget surplus may reflect the role of government investment, which increases the overall rate of investment but decreases the budget surplus. The coefficient on the surplus is reduced when the dependent variable becomes private rather than aggregate investment, but it does not become positive. Solimano (1989) finds, using quarterly data from 1977: I to 1987:IV, that the black market premium is strongly negatively associated with investment in Chile. This assumes domestic interest rates have not adjusted, which is implied by the presence of a black market premium.

The data are from Kaufmann (1991); Kaufmann's preliminary regressions suggest that the black
The interpretation of the role of the black market premium must therefore be left as something of a mystery: it is negatively associated with the rate of investment; it is not clearly associated with the growth rate, except perhaps in extreme cases; but there is direct evidence that it appears to affect the rate of return on investment. Whether these results can be explained by the relationship between the black market premium and other measures of macroeconomic policy or microeconomic distortions remains to be seen.

**TABLE 3**

**RATES OF RETURN ON INVESTMENT PROJECTS**

<table>
<thead>
<tr>
<th></th>
<th>Public sector</th>
<th>Private sector</th>
</tr>
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<tbody>
<tr>
<td>Black market premium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High (&gt; 200%)</td>
<td>4.5</td>
<td>11.7</td>
</tr>
<tr>
<td>Medium (20-200%)</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>Low (&lt; 20%)</td>
<td>12.2</td>
<td>14.7</td>
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<tr>
<td>Real Interest rate</td>
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<td></td>
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<tr>
<td>Negative</td>
<td>8.7</td>
<td>10.9</td>
</tr>
<tr>
<td>Positive</td>
<td>12.6</td>
<td>16.0</td>
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<tr>
<td>Inflation rate</td>
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<td></td>
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<td>High (&gt; 100%)</td>
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<td>13.9</td>
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<tr>
<td>Medium (20-100%)</td>
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<tr>
<td>Low (&lt; 20%)</td>
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<td>13.5</td>
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<td>Trade price distortions</td>
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<tr>
<td>High</td>
<td>8.9</td>
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<td>Low</td>
<td>11.7</td>
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</tbody>
</table>

*From Kaufmann (1991): rates of return on public sector projects based on a sample of estimated ex post rates of return on 1400 World Bank projects; private sector projects are IFC financed, and their rate of return is the so-called reappraisal rate of return, which differs from the *ex post* rate of return; sample size is 150. All data are preliminary.

Although none of the regressions in Table 2 presents a satisfactory account of the determination of investment, this evidence as well as that in Levine and Renelt (1990b) again shows that macroeconomic variables - particularly the black market

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27 The qualifier is based on results reported in Chapter 2 of the 1991 *World Development Report*. In that study rates of total factor productivity growth for 68 countries are regressed against several variables, including the black market premium, which is interpreted as a measure of macroeconomic instability. The authors find that TFP growth is significantly lower for countries for which the lagged black market premium exceeded 500%, but that total factor productivity growth was otherwise unaffected by the premium.
premium and inflation- affect investment. But because the relationships between investment and macroeconomic indicators, except the black market premium and, to a lesser extent, inflation, are not robust, it is unlikely that further cross-sectional regressions of this type will pin down the transmission mechanism between macroeconomic variables and growth.

Time series evidence for individual countries may help do so. For the industrialized economies, investment equations generally show investment being affected by the cost of capital and by demand variables. The theoretical literature has emphasized the option value of waiting as a factor that makes investment especially sensitive to uncertainty; quantity of credit impacts have also been identified\(^{28}\).

The same variables that affect investment in industrialized countries should also affect investment in developing countries\(^{29}\). In addition, foreign exchange and credit rationing may be more prevalent in developing countries. Investment equations for developing countries have also paid considerable attention to possible complementarities between public and private sector investment\(^{30}\). Rama (1990) summarizes the results of separate investment regressions for 39 developing countries, 19 of them Latin American. Aggregate demand variables are almost always positively associated with investment, as are measures of the availability of credit; measures of uncertainty or instability are negatively associated with investment. Cost of capital variables usually enter investment equations with the right sign, but are typically not statistically significant. Public investment more often appears as a substitute for private investment than a complement in the studies he reports, though this result in not typical of the investment literature.

Cardoso (1990) presents regressions on panel data for six Latin American countries. Changes in the terms of trade, the growth rate of GDP, and the share of public investment in GDP are all significantly correlated with investment. Public and private investment are positively associated. Other variables that might be expected to affect investment, including a measure of economic instability, the stock of internal government debt, and exchange rate depreciation, do not enter investment equations significantly; only the debt to exports ratio makes a significant entry in one equation.

Solimano (1989), in a careful study of the determinants of Chilean investment, finds strong evidence that uncertainty or instability -of output, the real exchange rate, and the real interest rate-- reduce investment. His evidence also shows a complex relationship between the level of the real exchange rate and investment: an overvalued exchange rate tends to encourage investment, but the higher investment is nonsustainable\(^{31}\).

The time series studies of investment point to several macroeconomic-policy-related variables as affecting the rate of investment: increased stability of output, the exchange rate, and the cost of capital increase investment; so does the availability of credit; and in several studies, the external debt has a negative impact on investment\(^{32}\).

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28 On irreversible investment and the value of waiting, see Bernanke (1983) and Pindyck (1988); on finance and investment, see, for example, Fazzari, Hubbard, and Petersen (1988).
29 Serven and Solimano (1989) survey theories and evidence on investment, particularly with respect to the implications for developing countries.
30 This issue is also examined in Barro (1989a), who finds that private investment is higher, the higher is government investment.
31 The complexity of this relationship may account for the weak relationship between the exchange rate and investment found in Cardoso's study.
32 Schmidt-Hebbel and Mueller (1990) find the debt to GNP ratio has a significant impact on investment in Morocco; they treat the debt as an indicator of macroeconomic uncertainty.
The impact of public investment on the overall rate of investment has not been firmly tied down in investment studies. The black market premium reduces investment, as shown in Equation (10); and a reduction in the price of investment goods increases the quantity of investment. Thus the bulk of the evidence suggests an important role for macroeconomic policy in determining the rate of investment - even treating the role of income in investment equations with due circumspection.

The new growth theory has focused on the determinants of physical investment, even though the theory frequently relies on the accumulation of human capital to generate endogenous long-run growth. Schultz (1988, p. 569) examines de determinants of schooling for an 89 country sample. The income elasticity of primary school enrollment is 0.31, while that for secondary school is 0.43. The relative price of teachers has a strong negative impact on enrollments. Schultz's estimates show urbanization increasing primary school enrollment but reducing that for secondary school. The teacher-student ratio also increases with income, more so for primary than for secondary school. The positive association between income and school enrollment suggests a feedback effect between growth and its determinants - including macroeconomic policy- and schooling.

It would be interesting as well to examine the police-related determinants of the efficiency with which human capital operates, and therefore how much it contributes to output and growth. Schultz (1988, p. 575) provides estimates of these returns by continent and level of schooling, which generally show the highest returns to primary education, and higher returns in Latin America and Africa than elsewhere. Taken at face value, the latter findings are hard to reconcile with the typically negative coefficients on dummy variables for those regions. Part of the explanation may be that the estimated rates of return are based on data from before the 1980s. Both the puzzle of the rate of return results, and the relationship between the return to human capital and macroeconomic performance, must be subjects of further study.

IV. **Concluding Comments**

The primary aim of this paper is to establish that a country's macroeconomic policies matter for long-run growth. Provided the inflation rate, external debt, and the government deficit are accepted as macroeconomic policy indicators, both the cross-sectional regressions and the case studies presented in Fischer (1991) support that contention. The results are less clear on the mechanisms through which macroeconomic policy affects growth, but the case studies and much other evidence suggests they have a powerful impact on investment. The separate role of macroeconomic policy variables in the growth regressions implies the existence of other channels, which need further investigation.

It could be argued that the case studies show only that macroeconomic policy affects growth in the short run, and that the effects of such policies are transitory. It is difficult to deal with this contention over very long periods - for instance, the rapid growth of the post-World War II period can be seen as a catch-up from the absence of growth in the Great Depression, so that by 1973 the world was back where it would have been had growth proceeded smoothly since 1929. This is a unit root issue. But it would be a mistake to focus exclusively on the very long run: it was only in 1989 that Chilean per capita income recovered its 1970 level. That long period of unnecessarily
low income certainly had welfare consequences for many, even if by 2010 Chile is back were it would have been.

The simplicity of the macroeconomic policy lessons that can be drawn from country studies raises the question of why those lessons are so frequently not implemented. Here is the role for political economy, both in recognizing the particular circumstances of individual countries, and in seeking to develop more general theories. The theories may contribute understanding, even if they do not suggest how to change the policies.

This paper contends that macroeconomic policy matters for growth, but not that only macroeconomic policy matters. Reasonable macroeconomic stability is probably necessary for sustained growth, but beyond that the overall economic strategy pursued by the country -market and outward orientation, the size and role of government both in providing physical and social infrastructure, especially for human capital, and in limiting its role in other areas- is crucial.

The new growth theory and the associated empirical work have focused on these more structural factors. The empirical work characterizes high-growth countries: for instance, they invest a lot, they have higher school enrollment, they are more open. But it has not explored with any care the mechanisms that are central to endogenous growth theory -for instance, whether the process of human capital accumulation bears any similarity to the production functions for human capital typical in that literature. Nor has it yet succeeded in identifying the underlying determinants of investment, though the relative price effect emphasized by de Long and Summers (1990) must be an important part of the story.

Identifying the determinants of investment, and the other factors contributing to growth, will probably require a switch away from simple cross-sectional regressions to time series studies of individual countries, of the type discussed in Section 2.

Solow (1989) discusses the difficulties of integrating short-run macroeconomics with growth theory. There are indeed formidable problems in constructing a tractable theoretical model of this type. But any model that includes a production function and that accounts for the accumulation of factors of production and the efficiency of their use can be used to analyze long-run growth. Each of these elements has been modeled and estimated; they can be brought together to provide a coherent empirical account of growth.

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