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INVESTMENT, MACROECONOMIC STABILITY AND GROWTH: THE LATIN AMERICAN EXPERIENCE

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Abstract:

The purpose of this paper is to explore the role of factor accumulation, economic policies, and economic and political uncertainties on growth performance of Latin American countries in the last three decades. We extend the work of Corbo and Rojas (1992) in two directions suggested by recent work in this area. First, we extend the model by considering terms of trade effects and an additional measure of distortion, the black market premium. Second, we provide further evidence of the channels through which economic policies affect growth by endogenizing the investment rate. The main conclusions are that the terms of trade affect growth directly, and indirectly through its effect in the investment rate; the black market premium is more a measure of macroeconomic instability than of the degree of oppenness; and stability of economic policies can affect growth directly through the law of motion for growth and indirectly through investment rates.

1. Introduction

The decade of the 1980s has been called the lost development decade of Latin America. However, the tone has quickly changed and today there is much hope that many countries in Latin America are creating the conditions for sustainable growth. This new mood has been very much influenced by two factors. First, the poor growth performance of Latin America in the last twenty five years. Second, the favorable

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experience of Chile, a country that started a radical transformation in the mid-1970s and is now benefiting from almost a decade of growth at rates over 5% per annum (ECLAC, 1993). As a result, many other countries in Latin America have been in recent years embracing policies that give much more importance to restore macroeconomic balances and that give a more prominent role to markets in resource allocation and distribution.

In this paper we explore the role of factor accumulation, economic policies, and economic and political uncertainties on growth. We extend the work of Corbo and Rojas (1992) in two directions suggested by recent work in this area. First, we extend the model by considering terms of trade effects and an additional measure of distortion, the black market premium. Second, we provide further evidence of the channels through which economic policies affect growth by endogenizing the investment rate.

2. The Nexus Between Investments, Policies, and Growth

2.1. *Some Historical Developments*

In the last years there has been a reexamination of the theoretical and empirical work on growth. This work has been prompted by some unhappiness with the standard neoclassical model where growth capital accumulation does not affect the steady state growth rate. The work initiated by Romer (1986), Lucas (1988), and Barro (1989) provided the analytical underpinning for a mechanism through which economic policies and investment, in human and physical capital, could affect not only the level of output but also its rate of growth. The belief that economic policy and the investment rate are major determinants of economic growth has long been expressed in the writings of economists. Indeed, most development practitioners have, for a long time, emphasized the role of economic policies and the formation of human and physical capital in investment. Díaz-Alejandro (1976) used this type of analysis to interpret the poor long term growth record of Argentina. Similar lines of arguments have been used by Krueger (1978), Little (1982). For these authors there is not much that it is new in the "new growth" theories.

The idea underlying these models –economies of scale, externalities, and public goods– and the argument that the removal of distortions promote growth have been familiar for a long time. At a minimum, the new models provide a framework that may improve understanding of growth-promoting policies that have been suggested and implemented in the past (Easterly and Wetzel, 1989), possibly, they will also improve the quality of growth-promoting policies in the future.

This literature highlights a number of channels through which public policies can affect growth. Promoting human capital accumulation, for example by providing adequate nutritional levels and basic educational skill and investment in Research and Development, can foster growth (Romer, 1989, and Rebelo, 1992). Along these lines, Becker, Murphy, and Tamura (1990) show that economies may become stuck in a poverty trap: a situation where low income and low human capital levels create incentives for high population growth and low investment in human capital that perpetuate the state of poverty. Policies that stimulate investment in human capital can break the economy out of this stagnant situation.

The new model also stresses the importance of trade policy, fiscal policy, and financial policy, as determinants of long term growth. Again, much empirical work on

developments had already found these type of association (Feder, 1983, and Balassa, 1985). Recent empirical work has used these new theories to examine the cross-country evidence on trade policy and growth (Easterly and Wetzel, 1989; de Melo and Robinson, 1989; Nishimizu and Page, 1990; Dollar, 1990; and Levine and Renelt, 1992). The result of this empirical work indicates that after adjusting for factor accumulation, countries with more open economies have had higher rates of growth.

Governments are capable of policies that enhance growth and also of policies that hinder growth. In Easterly (1990) and Barro (1990), governments may have positive growth effects by providing essential public goods; they may have negative growth effects by wasting funds on worthless projects and bloated bureaucracies, or by imposing taxes and regulations that distort saving and investment decisions. It is thus necessary to conduct a detailed study of the composition of government expenditures and the structure of taxes to evaluate the effects of any country's fiscal stance on growth. These studies find a negative effect of higher government consumption on growth. However, the complexity of the relationship between fiscal policy and growth is borne out by recent empirical work in Levine and Renelt (1992). They find that broad macroeconomic indicators of fiscal policy are not robustly related to growth in a cross-section of countries.

The role of financial policy in growth has also been the focus of recent scrutiny. Gelb (1989) and Easterly and Wetzel (1989) present preliminary evidence suggesting that, after controlling for factor accumulation, financial deregulation from severely distorted initial positions has a positive effect.

2.2. *In Search of a Semi-structural Equation*

Growth Equation

The neoclassical framework has provided the starting point for a number of studies to investigate the different sources of growth. The typical methodology of these studies (Levine and Renelt, 1992; De Gregorio, 1992; Fischer, 1991; Barro, 1991) is to start with a neoclassical production function and then to add additional factors related to the stance of macroeconomic policies and the variability of inflation. These latter factors can affect growth through not only the utilization but also the efficiency of factors. The starting point is a growth equation of the form:

$$y_t = \beta_L l_t + \beta_K K_t + \mu \qquad (1)$$

where k is the rate of growth of capital, l is the growth rate of labor input and μ is a constant rate of productivity growth. With constant returns to scale and perfect competition the β's represent factor shares in output. Then, the first two terms on the right hand side of the last equation represent the contribution of labor and capital to growth while the last term represents the contribution of technical progress. The standard approach to growth accounting is to obtain input shares directly from the data. Solow (1956) used the observed factor shares and growth rates of capital and labor to decompose the contributions of both factors to output growth. The part of growth that cannot be explained by input growth, represents the growth in total factor productivity which is assumed to come from exogenous technical change.

Since capital stock data is generally not available, adding the assumption of a constant capital output ratio, one can write the rate of growth of the capital stock in

terms of the investment rate. Then, the equation usually estimated by many empirical studies both for time-series data for a single country as for cross-sectional country studies is:

$$y_t = a_0 + a_1 i_t + a_2 i_t \qquad (2)$$

where i is the investment rate, and given the assumption that capital-output ratios and technology are the same in all countries, a1 and a2 should represent the marginal product of capital and labor share respectively.

Basically, most cross-sectional studies begin with this basic model and then include other regressors. Levine and Renelt (1991) present a list of forty one cross-sectional growth studies published since 1980. Each study regresses the output growth rate over a given period against a set of variables that includes variables relating to trade policy, fiscal policy, exchange rate policy, political and social stability, human capital, and macroeconomic policy and outcomes.

For a sample of 101 countries, Levine and Renelt (1992) analyze the effects of including new variables besides the standard ones of initial GDP per-capita, investment rate, rate of population growth, and the rate of secondary school enrollment. The main finding of Levine and Renelt is that several measures of economic policy are related to long-run growth and that, except for the investment ratio, the relationship between growth and every particular macroeconomic indicator is fragile.

On the other hand, Fischer (1991), using a cross-sectional regression for average growth in a sample of 73 countries and a pooled cross-sectional time-series regression for annual growth in the same sample of countries, finds a significant relation between macroeconomic-policy related variables and growth, supporting the view that the quality of macroeconomic management matters for growth. In this paper we use the same type of models.

In our empirical work we use a model of the type provided by equation (2). The estimated basic regression is

$$GY_{i,t} = b_0 + b_1 INV_{i,t} + b_2 INV_{i,t-1} + b_3 \left(\frac{RGDP60_i}{RGDP60^{US}} \right) + b_4 GOV_{i,t} + b_5 HUMKAP_{i,t} \quad (3)$$

where GY is the growth rate of real per capita income for the country i (from Summers and Heston data base, 1991, in 1985 international prices); INV is the share of total investment to GDP in 1985 international prices; GOV is the share of government consumption to GDP in 1985 international prices; RGDP60 is the real per capita income in 1960 of country i and $RGDP60^{US}$ is the real per capita income of US, then the ratio represents the initial productivity gap at the start of the sample period *vis-à-vis* the United States; and HUMKAP is a measure of initial human capital represented by the 1960 rate of primary or secondary school enrollment from Barro and Wolf data base (1989).

The basic specification is extended to include the rate of growth of terms of trade, indicators of macroeconomic and political instability, and degree of openness of the economy. As indicators of macroeconomic stability, we include the trade deficit to GDP ratio, and the inflation rate (both from the World Bank data base); while the GDP share of total trade (total imports plus total exports over GDP,from the World Bank data base) and the black market or parallel market premium rate (from World Currency

Yearbook) were include as indicators of openness. As an indicator of political instability we used the number of assassinations per million population per year (1960-85, from Barro and Wolf data base).

Investment Equation

Much work has been done in recent years on investment equations. Basically, this work has been concentrated to introduce explicitly the role of uncertainty on investment (see Serven and Solimano, 1992; Pindyck and Solimano, 1993). This work singles out output growth, cost of funding and the uncertainty associated to macroeconomic policies as the main factors determining investment rates. In addition, new growth theory-based cross country investment regressions show that some measure of initial human capital has a positive impact on investment, that measures of political instability have negative impacts, that real government expenditures to GDP has a negative effect, that investment is higher the lower the relative price of investment goods, and consistent with the convergence implication of the neoclassical growth model that the initial real GDP has a negative impact on investment (see Barro, 1991; Romer, 1989).

Fischer (1992) extended this analysis through including macroeconomic stability variables in the investment regression, finding that inflation rate and budget surplus are significantly negatively related to investment. On the other hand, he found a significant negative coefficient on the black market premium, however, its inclusion caused that the budget surplus enter investment equation with the wrong sign.

Cardoso (1990) presents regressions on panel data for six Latin American countries. She found that changes in terms of trade, that the growth rate of GDP, and that the share of public investment in GDP were all significantly correlated with investment; while variables like a measure of economic stability, stock of internal government debt, and exchange rate depreciation do not have significant effects on investment. Solimano (1989), and Serven and Solimano (1992b) find strong evidence that uncertainty or instability –of output, the real exchange rate, the inflation rate, and the real interest rate– reduce investment.

Finally, Pindyck and Solimano (1993) find that the volatility of the marginal profitability of capital –a summary measure of uncertainty– affects investment, but the size of the effect is moderate, and is greatest for developing countries. They also find that this volatility has little correlation with the typical measures of political instability used in recent studies of growth, as well as several indicators of economic instability. Only the inflation rate is highly correlated with this volatility and significant explanatory variable in the investment regression.

Following this literature we estimate an investment equation of the form:

$$INV_{i,t} = c_0 + c_1 GY_{i,t} + c_2 \left(\frac{RGDP60_i}{RGDP60^{US}} \right) + c_3 GOV_{i,t} + c_4 HUMKAP_{i,t} + c_5 TTRADE_{i,t} \quad (4)$$

$$+ c_6 INFL_{i,t} + c_7 BLACK_{i,t} + c_8 FINV_{i,t} + c_9 ASSASS_i$$

where INV is the share of total investment to GDP in 1985 international prices from Summers and Heston data base; TTRADE is the level of terms of trade index, INFL represents the inflation rate or the variability of the inflation rate, BLACK is the black

market premium rate, FINV is the share of direct foreign investment to GDP from the World Bank Data Base[1], and ASSASS is a measure of political instability represented by the number of assassinations per million population per year.

3. The Empirical Results

3.1. *Overview of the Data*

The data required to generate the trade openness, the inflation rate variable and the direct foreign investment variable are taken from the World Bank Data Base, the black market premium data is taken from World Currency Yearbook, the terms of trade data is taken from ECLAC statistics, and all the other time series data are taken from Summers and Heston (1991). The last two authors have compiled internationally comparable annual figures on output and its composition, prices, and exchange rates for 134 market economies from 1950 to 1988. The data for the time invariant variables is taken from the data base of Barro and Wolf (1989) .

Given the characteristics of the data, we can choose its organization, ranging from averaging each country's experience into one data point and estimating a single cross-sectional equation to pooling cross-sectional and time-series data and estimating a panel equation.

The single cross-sectional equation has been the alternative most used in the empirical growth literature. However, averaging over the entire sample period eliminates the information contained in the sample about the effect of changing conditions of growth in individual countries and allows only cross-country variation to inform the estimates. Therefore, trying to obtain as much as possible from the data, a panel estimation using sub-periods averages was considered for the period between 1960 and 1988. However, and since we are interested in secular growth patterns, some amount of averaging was required to net out irregular fluctuations in the annual data. For this purpose, the data was pooled using five-years averages and one four-year average. The periods are: 1960-64; 1965-69; 1970-74; 1975-79; 1980-84; and 1985-88.

3.2. *Econometric Results*

In this section we present different specification estimates of growth and investment equations. As we use time invariant variables in our panel data, we can not allow for fixed-effects in our estimates. Therefore, our estimates are obtained using random-effects.

At difference of our 1992 paper, in this opportunity we consider only the Latin American sample of twenty countries. With 6 periods of data, we obtained 120 total observations for analysis.

Previous Results

In our 1992 paper, using a panel data set from 1960 to 1988, we assessed the effect on long term growth of economic policies, factor accumulation, and the initial relative gap productivity *vis-à-vis* US. The main findings were the following:

(a) Using only the total investment to GDP ratio one explains only 37% of the variation in the per capita growth rate of Latin America. However, this is the single most important variable accounting for growth. But still there is a 63% of the variation in per capita growth to be accounted for.

(b) When we add to our model the initial level of per capita GDP, the current government expenditures to GDP ratio, human capital variables, and two measures of macroeconomic instability (the inflation rate, and the trade deficit to GDP ratio) we find that the explanatory power of the model increases to 43% of the variation in the rate of per capita GDP growth. On top of the investment rate, the most significant variables were the two indicators of macroeconomic stability (i. e. the inflation rate and the trade deficit to GDP ratio), and the proxy for human capital. However, current government expenditures to GDP and the indicator of openness were not significant.

(c) We also find convergence of per capita GDP growth in the region. That is, holding everything else constant, the countries with the lowest level of per capita income growth at a highest rate than countries with a higher level of per capita income. The single most important variable accounting for a negative coefficient in the initial level of income per capita is the trade deficit to GDP ratio. The latter is one of the measures that we use as a proxy for the stability of macroeconomic policies.

(d) Adding to the sample of 20 Latin American countries, a sample of 69 countries outside Latin America that we called Rest of the World (ROW), we find substantial evidence that the laws of motion for growth were different for the two groups of countries. From this evidence we concluded that the data is generated at least by two regimes. Additionally, we find evidence that the different regimes can not be explained by an omitted variable problem. Both in the case that African countries are considered or not in the rest of the world (ROW) sample, the statistics were significant, rejecting pooling the two groups of countries into a single sample in favor of the separate regressions for Latin American and ROW countries. Thus, the evidence of multiple regimes seems robust with the addition of these variables, indicating that the difference of growth performance between the Latin American countries and the ROW countries could be explained not only by differences on policy implementation across regions but also by different specification equations.

(e) Finally, we carried out a decomposition analysis of the difference in the explained rate of per-capita income growth in both groups of countries. From this decomposition analysis, we find that in all periods but the last one (1985-88), the difference in the coefficients of the two equations is the most important factor accounting for the higher rate of growth of the ROW countries.

New Estimates on Growth and Investment Regressions

We extend our previous estimates in two directions. First, including new determinants of the growth equation by considering terms of trade effects and an additional measures of distortion, the black market premium rate. Second, we provide further evidence of the channels through which economic policies affect growth by endogenizing the investment rate.

As was recognized in our previous paper, Latin America experienced important terms of trade losses in the 1980's, our hypothesis at the time was that this temporal effects should disappear through the averaging process utilized. The empirical work reported here shows that this assumption is not supported by the data. The work on investment rate shows that both political and macroeconomic stability have an important positive effect on investment.

The main results are presented in Table 1 and 2. To avoid the possibility of endogeneity, all the regressions were estimated by instrumental variable technique. Additionally, all the standard errors were computed using White's (1980) heteroskedasticity-robust procedure. Table 1 shows the results for the regressions of GDP per-capita growth, and Table 2 shows the results for the regressions of investment rate.

GDP per-capita Growth Determinants

In general, the most robust determinants of growth are the investment rate, the initial relative productivity gap *vis-à-vis* USA, the government expenditures to GDP ratio, the primary school rate, the growth rate in terms of trade, and the two measures of macroeconomic stability (the inflation rate and the trade deficit to GDP ratio). In most of the regression, the coefficients of these variables appeared to be statistically significant regardless of the inclusion of other variables. The black premium rate also appeared to be negatively correlated with growth, but these result was more sensitive to the specification. The overall fit of the regressions is quite good, and the regressions explain up to 55 percent of the variability of the five-year average rates of growth.

The first regression on Table 1 shows the importance of the terms of trade effect to explain the rate of per-capita GDP growth in Latin American Countries. Compared with the regression results of our previous paper (1992), the addition of the terms of trade variable increases the explanatory power of the regression from 0.43 to 0.52. In all the specifications presented in Table 1, the coefficient of the terms of trade variable was positive and highly significant, indicating that improvement in terms of trade will induce faster growth. A possible explanation for this result lies on the fact that many of the Latin American countries in our sample depend quite heavily on the export earnings and their import capacity to buy the intermediate inputs and capital goods. Therefore, an improvement in the terms of trade increase capacity utilization and it shows up in a higher rate of growth. A similar argument was advanced by Díaz-Alejandro (1976, p. 238).

The significance of the terms of trade variable questions the maintain hypothesis used in our previous paper that secular changes in the terms of trade did not affect long term growth. Even though, we recognized that Latin American countries experienced important terms of trade losses in eighties, our hypothesis at that time was that this temporal effects should disappear through the averaging process utilized. Also, our results reported here are different than those reported by De Gregorio (1992) where he found that terms of trade changes did not have a significant effect on growth in Latin American countries. The main difference between our and De Gregorio's work is that we work with change in terms of trade and he works with the level.

All the regressions on Table 1 show evidence of convergence of per-capita GDP growth. That is, holding everything else constant, the countries with the lower level of per-capita income growth at a higher rate than countries with a higher level of per-capita income[2].

The human capital variable (proxied by the primary school rate) shows a positive and significant effect on growth in all the regressions, confirming the results of our 1992 paper[3]. On the other hand, government spending on GDP has a negative and significant effect on growth in all the regression of Table 1. Comparing with the results found in our previous work, the inclusion of the terms of trade variable allow to leave the government expenditure as another variable that is significant at the 1% level.

TABLE 1

POOLED REGRESSIONS FOR GROWTH RATE IN GDP PER-CAPITA
FIVE-YEARS AVERAGED DATA FOR LATIN AMERICAN COUNTRIES: 1960-88. INSTRUMENTAL VARIABLE ESTIMATION

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.019	-0.016	-0.012	-0.018	-0.01	-0.011	-0.026	-0.02
	(0.643)	(-0.436)	(-0.374)	(-0.497)	(-0.447)	(-0.274)	(-0.848)	(-0.638)
Investment ratio in t	0.291	0.34	0.319	0.346	0.281	0.333	0.325	0.316
	(1.517)	(1.967)	(1.798)	(1.976)	(1.360)	(1.959)	(1.772)	(1.761)
Investment ratio in t-1	-0.258	-0.307	-0.294	-0.311	-0.276	-0.309	-0.289	-0.291
	(-1.611)	(-2.073)	(-1.926)	(-2.076)	(-1.579)	(-2.106)	(-1.835)	(-1.862)
Productivity gap *vis-à-vis* USA	-0.056	-0.079	-0.083	-0.078	-0.083	-0.08	-0.081	-0.081
	(-2.997)	(-3.805)	(-3.821)	(-3.686)	(-3.824)	(-3.757)	(-3.689)	(-3.663)
Government spending (x10E-2)	-0.119	-0.073	-0.078	-0.074	-0.101	-0.073	-0.083	-0.084
	(-4.457)	(-2.350)	(-2.406)	(-2.345)	(-1.930)	(-2.374)	(-2.542)	(-2.575)
Primary school rate	0.044	0.041	0.046	0.041	0.047	0.04	0.044	0.043
	(2.901)	(3.178)	(3.306)	(3.072)	(2.822)	(2.903)	(3.312)	(3.089)
Growth rate in terms of trade	0.208	0.188	0.185	0.19	0.201	0.179	0.186	0.177
	(4.565)	(4.172)	(4.274)	(4.204)	(4.709)	(3.797)	(4.090)	(3.721)
Inflation rate		-9.96E-04	-4.45E-03		-7.03E-04	-1.02E-03		
		(-2.575)	(-1.487)		(-1.773)	(-2.723)		
Trade deficit		-0.185	-0.209	-0.172	-0.180	-0.192	-0.189	-0.197
		(-2.022)	(-2.202)	(-1.863)	(-1.705)	(-2.091)	(-1.960)	(-2.036)
Black premium rate			4.10E-04	-9.27E-05				
			(1.233)	(-2.925)				
Trade ratio					0.008			
					(0.549)			
Assassinations						-0.002		-0.002
						(-1.278)		(-1.176)
FOR HIGH INFLATION COUNTRIES								
Dummy for Investment ratio in t							-0.066	-0.068
							(-2.505)	(-2.584)
Dummy for Investment ratio in t-1							0.062	0.062
							(2.159)	(2.171)
Sample Size	100	100	100	100	100	100	100	100
Corrected R-squared	0.518	0.539	0.537	0.536	0.53	0.538	0.553	0.552

Note: t-statistics in parenthesis. The regressions also include time-period dummies for periods 1965-69; 1970-74; 1975-79; and 1980-84.

TABLE 2

POOLED REGRESSIONS FOR INVESTMENT RATIOS
FIVE-YEARS AVERAGED DATA FOR LATIN AMERICAN COUNTRIES: 1960-88

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	9.601 (3.984)	9.394 (4.246)	7.899 (3.050	8.908 (3.904)	9.033 (3.992)	9.11 (4.061)	8.402 (3.414)	9.896 (4.458)	8.927 (3.528)
Growth rate in GDP per-capita	28.339 (2.846)	38.527 (4.354)	37.474 (4.120)	37.395 (4.276)	37.662 (4.291)	37.911 (4.304)	35.835 (4.157)	34.983 (3.996)	35.159 (3.858)
Productivity gap *vis-à-vis* USA	-9.326 (-1.178)	-13.609 (-2.083)	-12.485 (-1.937)	-13.442 (-2.041)	-13.487 (-2.052)	-13.531 (-2.066)	-13.067 (-1.945)	-14.096 (-2.281)	-13.203 (-2.164)
Government spending	-0.368 (-3.360)	0.361 (-3.507)	-0.362 (-3.502)	-0.349 (-3.345)	-0.349 (-3.336)	-0.351 (-3.351)	-0.358 (-3.350)	-0.377 (-3.549)	-0.39 (-3.707)
Secondary school rate	37.679 (2.260)	40.176 (2.809)	41.448 (2.776)	39.747 (2.741)	39.749 (2.749)	39.836 (2.768)	40.108 (2.665)	39.609 (2.887)	41.162 (2.908)
Terms of trade index		0.016 (3.921)	0.014 (3.633)	0.0153 (3.865)	0.015 (3.889)	0.015 (3.909)	0.014 (3.644)	0.014 (3.890)	0.013 (3.573)
Dummy for high inflation			-1.358 (-1.825)						-1.301 (-1.817)
Inflation rate				-0.115 (-1.549)			-0.879 (-1.954)	-0.111 (-1.676	
Variance of inflation					-0.058 (-1.543)				
Black premium rate						-0.009 (-1.504)	0.084 (1.772)		
Assassinations								-3.487 (-6.302)	-3.456 (-6.508)
Sample Size	120	120	120	120	120	120	120	120	120
Corrected R-squared	0.272	0.305	0.315	0.304	0.303	0.301	0.308	0.356	0.364

Note: t-statistics in parenthesis. The regressions also include time-period dummies for periods 1960-64; 1965-69; 1970-74; 1975-79; and 1980-84.

Regression 2 assesses the effect on long term growth of macroeconomic instability. A stable macroeconomic framework can be described as one where inflation is low and predictable, real interest rate are positive but not too high, fiscal policy is stable and sustainable, the real exchange rate is competitive and predictable, and the balance of payments situation is perceived as viable (Corbo and Fischer, 1992). We consider two measures of macroeconomic instability: the inflation rate[4] and the trade deficit to GDP ratio. Both variables have negative and significant coefficients.

In general, the main reason why 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. 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. As we control for the investment rate, a higher trade deficit is a measure of macroeconomic instability as it is associated with a lower domestic saving rate. Second, temporary uncertainty about the macroeconomic situation tends to reduce the rate of investment, as potential investors wait for the resolution of the uncertainty before committing themselves. This second channel suggests that investment would be lower at times when uncertainty is high. In other words, countries with high inflation rates are expected to present not only low level of investment rates but also small efficiency of their investment rates (See Serven and Solimano, 1992a, 1992b). This last point is assessed in regressions 7 and 8 through including interaction effects on investment rate variables in countries with average inflation rates in the period 1960-88 over 30 percent per year. In both regressions, the coefficients are significant with the expected signs that together with the direct effect of the investment rates on growth, indicated that the Latin American countries with lower average levels of inflation have showed faster growth[5].

There are many reasons why the increase in the degree of openness should be associated with higher growth (Dornbusch, 1992). In particular, the new growth theories suggest a link between openness and the long-run rate of growth of output rather than a rise in the level of output. Grossman and Helpman (1992) and Romer (1986) suggest that this can occur through the favorable impact of openness on technological change. For example openness to trade increases growth rate because it provides access to a variety of imported inputs which embody new technology. On the other hand, Krugman (1988) sustains that greater openness expands the size of market facing domestic exporters thereby raising returns to innovation and thus enhancing the country's specialization in research-intensive production. However, the new growth theories also show that growth can be lowered by increased foreign competition or it can be increased by import protection if protection promotes investment in the research-intensive sectors of the relevant country. Thus, the direction of the openness-growth relationship is an open question for empirical research rather than a theoretical given.

Regressions 3, 4 and 5 assess the effect on long term growth of trade openness. Two measures of openness were considers: the GDP share of total trade (total imports plus total exports over GDP) and the black market or parallel market premium. The first one tries to use a proximate effect of openness as a proxy for openness itself. While the black market premium is directly related to changes in trade restrictions or in openness basically because the premium reflects the excess demand for tradable and for foreign assets that is not satisfied by the official foreign exchange market. Thus, the

greater the controls on the use of official foreign exchange, the larger is the premium on the black or parallel market exchange rate. The estimates of the regression 5 show that the coefficient of the share of total trade in GDP is positive but not significant. However, in the case of the black market premium rate, its coefficient in regression 4 is significant and negative, indicating that those Latin American countries with more foreign exchange restrictions have presented slower output growth.

However, the significant effect of the black market premium rate on growth depends on the presence of the inflation rate in the regression. When both variables are included in the specification (regression 3), both variables are not significant and the sign of the black market premium is positive, indicating that this variable could also represent some degree of macroeconomic instability more than the degree of openness of the economy. This caveat to use the black market premium as a proxy for openness arises from the fact that the demand for foreign exchange assets is also a function of the degree of political and macroeconomic instability. Thus, when the premium changes because the portfolio excess demand for foreign assets is affected by political or economic "news" or internal civil disturbances it does undermine the usefulness of the premium as a measure of openness. Then, the premium may change due to speculation, even when there is no change in the degree of restrictiveness of the trade regime.

Finally, the roles of political variables on growth were investigated. Regressions 6 and 8 add as growth determinant the index of assassinations taken from Barro and Wolf (1989). The estimates indicate that the coefficient of this variable is negative but not significant. A possible explanation of this result can be found in the fact that the role of political variables is confined to its possible negative effect on investment. This point will be addressed in the next section.

Investment Rate Determinants

The second channel through which economic policies could affect growth is by their effect on investment rates. Following the specification of equation (4), Table 2 presents estimates of a number of pooled investment regressions. In all these regressions the dependent variable is the share of investment in GDP for each of the periods also used for the growth equations. Regression 1 presents the results of the simplest model. In this model the investment rate is explained in terms of an accelerator model augmented by a human capital variable, the share of government spending in GDP and the productivity gap *vis-à-vis* the US. In this equation the coefficient of the relative productivity gap *vis-à-vis* USA, and all the other coefficients are significant and with the expected signs. In particular, the significant coefficient on the growth rate in GDP per-capita is consistent with the usual finding that accelerator type investment function perform well.

Similar to the results obtained on growth, both the human capital and the government expenditure on GDP present significant effects on investment rate in all the regression of Table 2. Both effects on investment not only present the expected signs but also are significant at the 1% level. Human capital enters in the investment equation through its complementarity with physical capital in the production process. The share of government expenditures in GDP affect investment rates through crowding out effects.

In regression 2, we add the terms of trade variable. In the investment equation the terms of trade variable enters in levels. An improvement in the terms of trade, increases saving and contributes to an expansion of credit or a decrease in interest rates resulting

in an increase in the investment rate. The terms of trade variable has a highly statistically significant coefficient; the inclusion of this variable not only indicates that improvements in the terms of trade are likely to make investment more attractive at home but also leaves the relative productivity gap as another variable that is significant at the 1% level. The importance of the terms of trade variable in the investment specification is directly reflected in the increment on the explanatory power for the investment rate by more than 3 percentage points.

Regressions 3, 4 and 5 assess the effect on the investment rate of macroeconomic instability reflected by three inflation measures: the inflation rate; the variance of the inflation rate; and a dummy variable for high inflation countries[7]. Both the inflation rate and the variance of the inflation rate have similar negative effects on the investment rate, however, the negative relationship between inflation rate (or variance of the inflation rate) and the share of the investment is significant only at the 10% level. For observations with average inflation for a period of over 50 percent per year, the estimate of the dummy variable in regression 3 shows a more significant negative relationship with investment rate than the obtained with the other two measures of inflation. High inflation rates are associated with macroeconomic instability and then this uncertainty about the macroeconomic tends to reduce the rate of investment, because potential investors wait for the resolution of the uncertainty before committing themselves. Thus investment would be lower at times when uncertainty is high, or countries with high inflation rates are expected to present low levels of investment rates. The results show in regression 3, 4, and 5 tend to sustain the hypothesis that the effect of the uncertainty, reflected by high inflation rates, on the investment rates is stronger in countries that have experimented higher inflation episodes. In particular over 50 (or 30) percent per year.

As another measure of economic uncertainty, regressions 6 and 7 add the black market premium rate. This variable can be interpreted both as a measure of expectation of depreciation of the currency, and as a crude index of distortions. According to Fisher (1992), the first interpretation 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 official rate, foreign capital goods are cheap to import. Thus, while the first two channels suggest a negative relationship between the black market premium and investment rate, the third suggests the opposite. On the other hand, the second interpretation is that the black premium serves as a general index of distortions and therefore of an unsustainable situation, then it is likely to be negatively correlated with investment.

In regression 6 the black market premium rate is the only measure of uncertainty or macroeconomic instability included. In this case its coefficient is negative and significant only at the 10% level. The coefficients of the other variables in the regression are significant and stable respect to the estimates obtained from regression 2 to 5. When other measure of macroeconomic instability, the inflation rate, is added together with the black market premium, both the inflation rate and the black premium rate are statistically significant, however, only the inflation rate presents the expected negative relationship with investment. This fact can be explained by the high collinearity between both variables because high inflation countries are also countries that show high levels of black market premium, reflecting the level of uncertainty and instability of the economy.

Finally, regressions 8 and 9 include an additional variable to control for political instability. The coefficient of this variables was negative and strongly significant, helping to improve the explanatory power of the regression by around six percentage points. As Barro (1991) sustains, this negative relationship between investment and political instability (proxied by figures on number of coups, index of political rights, and political assassination) could involve the adverse effects of political instability on property rights and the linkage between property rights and private investment. However, the correlation could also reflect a political response to bad economic outcomes. From Tables 1 and 2, we observe that the political instability variable is both strongly negative correlated with investment, and does not appear to affect the rate of growth on GDP per-capita significantly. The explanation would seem to be simple: that the political instability affects the rate of investment directly and thereby the rate of growth indirectly. The political instability (proxied in Tables 1 and 2 by an index of political assassination) can be interpreted as affecting the rate of investment.

4. Conclusions

The new empirical work reported in this paper confirms some of our earlier results and also provides some new clues on the role of policy on growth. We briefly summarize our main findings:

First, policies can affect growth directly through the law of motion for growth and indirectly through investment rates.

Second, terms of trade affect growth directly and indirectly. A change in terms of trade has a direct effect on growth by allowing a higher degree of capacity utilization. An increase in terms of trade also has a positive effect on investment rates, and through this channel it indirectly affects growth. These effects are significant in their respective equations.

Third, human capital variables have a positive effect on growth both through the growth equation and through a higher rate of investment. This result shows that public policy has an important role in promoting growth by enhancing the human capital base. The latter could be done through the direct provision of human capital for low-income groups or through creating an enabling environment that reduce distortions to the accumulation of human capital.

Fourth, controlling for other factors, the share of government spending in GDP has a negative effect on growth and on investment rates. In general government spending can enhance growth or hinder growth. Government spending may promote growth by providing essential public goods. However, it could create negative growth effects by wasting resources on programs with a low rate of return. Our results show than on average government spending has a strong negative effect on growth.

Fifth, we find that the black market premium is more a measure of macroeconomic instability than of the degree of openness. Even though its coefficient in the growth equation is significant and negative–indicating that those Latin American countries with more foreign exchange restrictions have slower output growth– this effect depends on the presence of the inflation rate in the regression. When both variables are included in the estimation, both variables are not statistically significant. However, when we leave out the inflation rate the coefficient of the black premium is negative and statistically significant. From this finding we conclude that the black premium variable is an indicator more of macroeconomic instability than of trade openness.

Sixth, political instability has a highly negative effect on investment rates, while macroeconomic instability has a direct negative effect on growth. The negative effect of political instability on investment is consistent with the view that investment is much affected by uncertainty. This result confirms recent theoretical work on the role of uncertainty and the credibility of policies on investment (Serven and Solimano, 1992a and 1992b; Rodrik, 1991; and Dornbusch, 1990).

Notes

1 Since this variable was not highly significant, it was not included in our investment regression reported in the next section. However, this variable is maintained in equation (4) because it allows us to identify the growth equation.

2 Since the logarithm of productivity gap has a more straightforward interpretation than the level of productivity gap, we run a regression replacing the level by its logarithm, however, the overall fit of the regression and the significance of the rest of the coefficients was marginally lower in this case.

3 We also consider the secondary school rate as an additional measure of human capital, however, it was dropped since its inclusion made little difference and since the primary school rate was generally more significant.

4 The variance of inflation rate was also considered, finding a negative and significant effect on growth. Since the general results do not change respect with the inflation rate is considered, we do not report the results in Table 1.

5 F-tests were carry out to test the null hypothesis that the investment rates and interaction effects coefficients were significant no different from zero. The levels of significance of the F-test for regression 7 and 8 were 0.13E-5 and 0.15E-5 respectively, rejecting strongly the null hypothesis.

6 We report only the result for the variable number of assassinations per million population per year (1960-1985). Others variables were also considered and were found not to have a significant effect on growth. These variables were: index of civil liberties, index of political rights, and number of coups.

7 Average inflation rates of 50 and 30 percent per year in each five-year period were used as cutoff points. In both case the coefficient of the dummy was significant, however, in the case of 50 percent cutoff point, the coefficient was more significant and the explanatory power of the regression was higher. In Table 2, we report only the results where the dummy takes value of one when the country has an average inflation rate over 50 percent per year.

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