CAN LATIN AMERICA PROSPER BY REDUCING ITS GOVERNMENT'S SIZE?

Radhames Lizardo and André V. Mollick

This article examines the effect of government consumption on economic growth in 23 Latin American countries over the years 1974-2003. During the last two decades, Latin America has displayed sluggish economic growth. Despite significant improvements in economic management, the region is still plagued with poverty and inequality, which may have led to the elections of anti-market candidates recently. Employing the Armey Curve, we show that the typical Latin American government is spending beyond the optimal point. Panel data analysis suggests these results are very robust to growth controls: increases in government consumption lead to unambiguous decreases in economic growth.

Introduction

An important policy goal of governments is to improve the economic well-being of their citizens. However, as can be seen in Figure 1, Latin America's share in world output (GDP) dropped significantly during the 1980s. This decade has been called the "lost decade" for Latin America, with per capita real income actually shrinking from 1980 to1989.

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Insert Figure 1 here

While the Latin America region has suffered from lack of economic growth, other regions of the world have experienced economic growth, especially during the last 20 years. Figure 2 depicts the growth of East Asia's share of world economic output and contrasts it to that of Latin America's. From 1970 to 2005, Latin America's share of world output grew from 6.09% to 6.35% (an increase of 4.3%) while East Asia's share, for the same period, went from 16.26% to 22.46% (an increase of 38.05%). The comparative exercise suggests that even after the implementation of more free-market economic policies during the late-1980s and 1990s, Latin America economic growth has been sub-optimal. It could be argued that this is one of the reasons several countries of the region have recently veered towards less capitalist economic systems. See Gruben and Alm (2007) for a discussion of several indexes of economic freedom and business measures as well as comparison of recent developments.

Insert Figure 2 here

One of the fastest growing economies in the world, China, is eating away an important source of Latin America economic growth with an upward shift in the exports of manufactured goods, especially in textile and other tradable goods. China has already surpassed Latin America and the Caribbean in global exports. Figure 3 documents the growing importance of exports in Chinese GDP relative to Latin America's export/GDP share. While both Latin America and China had about 1.9% export/GDP share in 1970; the figures were 6.66% (Latin America) and 7.39% (China) in 1985; 15.15% (Latin America) and 17.11% (China) in 2000; and, more recently, 18.02% (Latin America) and 28.48% (China) in 2004. For evidence on China having an impact on trade (exports and

imports) and FDI in the region, see Jenkins et al. (2008). Such a trend is expected to continue unless effective economic reforms are put in place.

Insert Figure 3 here

Along with sluggish economic growth, the Latin America region suffers from a severe inequality of income distribution both within and between countries. Figure 4 displays significant variation in annual real gross domestic product per capita among these countries, ranging from $480 for Haiti to over $18,000 for the Bahamas in 2006.

Insert Figure 4 here

Economists and other social scientists have tried to figure out the causes of such standard of living disparity and lack of economic growth. Factors such as corruption, debt crisis, political instability, low investment in human capital, and emigration, have been suggested as potential triggers of low levels of economic prosperity in Latin America. See, for example, De Gregorio (1992), Hein (1992), Mauro (1995), Alesina et al. (1996), Hakim (1999), Habid and Zurawicki (2002), and Adams (2003). Others have attributed the suboptimal economic growth to other factors, including: exchange rate volatility in Hausmann et. al. (2006) and Kaminsky and Reinhart (1998); bad monetary policy in Wallich (1985); insufficient Foreign Direct Investment in Goldberg and Kolstad (1995); inequality in Birdsall and Londoso (1997); lack of economic freedom in Islam (1996), Farr and Wolfenbarger (1998), Fraga (2004), and Miles et al. (2005); and lack of democracy in Barro (1996) and Leblang (1997).

Figure 5 presents the average real gross domestic product per capita (RGDP) of the G-7 (group of seven industrialized nation of the world) and of the 23 Latin American countries included in this study for the year 2003. One concludes the more than 3 to 1 gap

in income between the two sets of countries. Figure 6 presents the average government consumption as a share of real gross domestic product (GC) for both blocks of countries for 2003. Latin America has, on average, a much higher level of Government Consumption (more than 23% GDP share) than the average depicted by prosperous nations (slightly more than 15% GDP share). These figures suggest that Latin America has, on average, a much higher level of government consumption than the most prosperous nations of the world. This feature comes with and a significant lower level of prosperity. The next section attempts to verify this finding under formal econometric analysis.

Insert Figures 5 and 6 here

Our findings corroborate the conclusion of other studies concerning the negative relationship between economic growth and government consumption, and also the positive relationship between economic growth and investment put forward by Barro (1991). The Armey curve analysis suggests that the optimal consumption by the average Latin America government should be around 13.7% of the annual real GDP, against the actual average spending of about 22.71% of the annual real GDP. While confirming the premise that the typical Latin America government wastes to much resources in ineffective bureaucracy, panel data reinforces the message from the Armey curve: an increase of 1% in GC leads to a reduction of economic growth varying from -0.22% to -0.28% across specifications.

Hypothesis and Theoretical Issues

We conjecture in this study that the atypical proportion of real gross domestic product consumed by the typical government in Latin America is a significant impediment to economic growth. When the government controls a substantial part of its economy, space for private investment is limited, which has a negative spillover effect on productivity. In addition, non-productive public expending (government waste) is an impediment to economic growth. Our hypothesis can be represented by the following formula:

(1) $GE_t = PE_t + UE_t$

where: GE_t represents total government expenditure in period t; PE_t is the amount of productive government expenditure, such as effective investment in human capital, infrastructure, and law and order; and UE_t represents the amount of unproductive government expenditure, such as excess bureaucracy, giveaways, useless government programs, and outright misappropriations of public funds. The ideal situation is when $UE_t = 0$; however, this is not realistic. We expect GE_t to be higher than the optimal level, PE_t. According to this view, conditions of $UE_t > 0$ contribute to economic stagnation.

Our research design has the objectives of: (1) detecting and measuring the negative effect, if any, that the size of the government consumption has on the level of economic prosperity. We assess whether or not the size of government expenditures contributes to the levels of income per capita, which is proxied by real gross domestic product per capita; and (2) determining the optimal share of government consumption in the context of Latin America. The optimal share should be close to PE_t in (1).

Economic theory suggests a general inverse relationship between the growth rate of real per capita gross domestic product and the share of government consumption, as documented by Barro (1991). It has been shown, however, that a country with insufficient or no government (in which the share of government consumption in gross domestic product is close to zero), suffers from graver economic conditions than those countries where the government consumes a significant share of gross domestic product. See Vedder and Gallaway (1998). Therefore, we estimate the optimal level of the share of Latin American government consumption and contrast that with the observed ratio.

Data and Descriptive Statistics

Due to data constraints, our analysis considers twenty three of the countries that form the Latin American region. These countries are: Mexico, Guatemala, Nicaragua, El Salvador, Honduras, Costa Rica, Panama, Venezuela, Brazil, Bolivia, Peru, Paraguay, Uruguay, Chile, Argentina, Bahamas, Barbados, Belize, Jamaica, Suriname, Santa Lucia, Trinidad & Tobago, and Saint Vincent, for the period 1974 to 2003. The excluded countries are, in most cases, small islands, except for Cuba which is a relatively large island in the Caribbean but for which data are also unavailable. The observations of annual growth in the Real Gross Domestic Product per Capita (GY), Real Gross Domestic Product per Capita (RGDPC), Openness (OPEN), Inflation (INF), and Government consumption as a share of GDP (GC) come from the Penn World Table Version 6.2 (Heston et al. 2006). Fertility (FER) comes from the World Bank's Data & Statistics (http://web.worldbank.org)

Basic descriptive statistics are presented in Table 1. Prosperity (GY), defined as

the annual rate of growth of real gross domestic product per capita, as well as investment share of GDP (INV), inflation (INF), government consumption as a share of GDP (GC) and openness (OPEN) are presented in percentages. Real gross domestic product per capita (RGDPC) are presented in US dollars. The country with the highest/lowest averaged observation is also indicated. Haiti, which is not included in the analysis for lack of key data, is the poorest country in the region. Table 1 depicts significant dispersion in inflation and real gross domestic product per capita among these countries suggesting the presence of economic uncertainty and instability in the region. However, the rate of economic growth reflects little variation, implying weak or no growth throughout the region, varying on average from -1.86% over the years in Nicaragua to 3.62% in St. Vincent. It also confirms the argument that lack of economic growth has been a pervasive problem for the whole zone. Countries with economic growth above the mean were very few and, in most cases, with insignificant distance.

Insert Table 1 here

Figure 7 depicts the relationship between the cross-sectional averages of economic prosperity (GY) and government consumption (GC). The scatter plot reflects a negative relationship between these two variables. As the government share increases in Latin America we tend to see lower average rates of economic growth. This is the first indication of a negative relationship between GY and GC.

Insert Figure 7 here

Econometric Models

The Armey Curve

Our first approach in analyzing the relationship between economic growth (GY) and government share of real gross domestic product (GC) in the context of Latin America and the Caribbean is through a cross-sectional study of the 23 countries listed above using the Armey Curve methodology. As in Vedder and Gallaway (1998), the Armey Curve is estimated using the ordinary least squares method (hypothesized signs for the regression coefficients are provided below the equation) as follows:

$$(2)\ GY_i = \beta_0 + \underset{+}{\beta_1} GC_i + \underset{-}{\beta_2} GC_i^2 + \varepsilon_i$$

where: GY represents economic growth and GC represents government consumption as a percentage of annual real gross domestic product. The positive expected sign on the linear term GC is designed to show the favorable effects of government spending on gross domestic product, while the negative expected sign for the squared term is designed to reflect the unfavorable effects associated with increased government size beyond its optimal level on gross domestic product. The downward-sloping portion of the Armey Curve is produced by the squared term which increases in value faster than the linear term.

As can be seen in Figure 8, the unfavorable effect of continued growth in government size would eventually offset the favorable effect, *ceteris paribus*. The creator of the Armey Curve, former U.S. Representative Dick Armey, argues that the non-existence of government causes a state of anarchy and low levels of wealth creation. The absence of rule of law and protection of property rights and the lack of collective infrastructure lead to poor productivity and consequently low levels of wealth creation, as argued by Torstensson (1994). Similarly, when all input and output decisions are in the hands of the authorities, wealth creation is also very low or even negative. However,

where there is a mix of private and government initiative regarding the allocation of resources, output will tend to grow. As a state of law and order is being installed, collective infrastructure such as roads, bridges and means of communication, education, and welfare are being built, all contribute to increased productivity. This evolution is projected as the part of the curve between Points A and B. Growth-enhancing features of government spending gradually diminish. Further inefficient expansion of government spending beyond the Armey-optimal point B no longer leads to output expansion. At that point, the marginal productivity of public expending equals the marginal productivity of private spending, and the benefits from increased government spending become zero. The optimal point (Point B) can be found by taking the first derivative of equation (2), setting it to zero, and solving for the critical point.

Insert Figure 8 here

Panel Data Analysis

Equation (1) is based on cross-sectional aggregated data. When cross-sectional data are aggregated, statistical power may be negatively affected due to the loss of variance. In addition, economic growth must be affected by more than just government spending. In order to minimize the effect of aggregating cross-sectional data and the "omitted variables problem", we expanded our analysis by combining cross-sectional data with time series in a panel data context. The relationship between economic growth and government consumption is assessed using equation (3). To take into account the characteristics of each country, we let the intercept vary for each one but still assume that the slope coefficients are constant across countries See Gujarati (2003) for details. We use the fixed effects model in our panel data analysis in the following format (expected

signs are provided below the equation):

$$(3)\ GY_{it} = \alpha_i + \underset{-}{\beta_1} GC_{it} + \underset{+}{\beta_2} INV_{it} + \underset{+}{\beta_3} OPEN_{it} + \underset{-}{\beta_4} INF_{it} + \underset{-}{\beta_5} FER_{it} + \underset{-}{\beta_6} ESIZE_{it} + \varepsilon_i$$

Equation (3) is a reduced form model of Barro (1991). The coefficient for the squared term of GC could also appear at the right hand side (RHS) but their effect is never statistically significant as shown below. The model underlying (3) incorporates independent variables found in the traditional growth literature. Important variables such as human capital are not included due to lack of data for many of the countries of Latin America. However, we believe that the included control variables such as investment (INV), inflation (INF), openness (OPEN), fertility rate (FER), and economy size (ESIZE) effectively serve as control variables and provide an adequate parsimonious model. Economy size is here measured by the country's gross domestic product relative to the gross domestic product of the United States.

We expect β_1 to be negative and significant. A negative sign would be an indication that the government is spending beyond the optimal level. Traditional economic theory posits that investment encourages economic growth. As a result, we expect β_2 to be positive. Economic theory also suggests that openness allows trade to flourish, which should positively impact economic growth. Inflation has been shown to negatively impact economic growth by Barro (1991) and De Gregorio (1992); β_4 is thus expected to be negative. Barro (1991) also shows that fertility and initial level of wealth are negatively associated with economic growth. Therefore, we expect β_5 and β_6 to be negative.

Empirical Results

The Armey Curve

Table 2 shows the estimation of equation (2). Government Consumption (GC) and the square of GC have the expected signs and are statistically significant ($p<0.01$). The result seems to confirm the hypothesis that economic growth moves negatively with government consumption that goes beyond the optimal point. It also lends support to the argument that certain levels of government participation are healthy for economic growth. The optimal point (Point B of Figure 8) is computed by taking the first derivative of the OLS estimation presented in the table above, setting it equal to zero and solving for the critical point as follows:

(4) $$\frac{\partial GY}{\partial GC} = 41.49 - 3.02GC = 0$$

Insert Table 2 here

By solving equation (4), we can determine that the function is maximized at GC ≈ 13.7. Since the average government consumption in Latin America (see Table 1) is 22.71 percent of real gross domestic product, we can infer that the average Latin America government is spending beyond the optimal point. The increase of GC beyond optimal levels results in lower economic growth. In the average cross-section framework of Table 2, if one eliminates the squared term of GC one has a negative and direct effect between GC and GY of -1.623, as shown in column (2). This suggests that an increase in GC leads to a more than proportional negative effect on GY. Panel data analysis will further enlighten this relationship: even though the systematic effect of GC on GY is smaller compared to that presented in Table 2, the relationship is clearly negative.

Panel Data Analysis

Table 2 tends to support the argument that Government Consumption is an important predictor of economic growth in the context of Latin America. One possible reason is that a significant amount of government consumption is in giveaways and outright misappropriations. However, aggregating data might weaken statistical power and the model should include other variables which are well-established predictors of economic growth.

As a result, we add time series to the cross-sectional data and estimated equation (3) six times, adding one variable per estimation to check the consistency of β_1, the focus of this study. The results are presented in Table 3. White-robust heteroscedasticity consistent standard errors are given in parenthesis. As expected, government consumption (β_1) is negative and significant at the 1% level throughout. The coefficient for the squared term of GC was never statistically significant at the 10% level or less and was thus omitted in the estimation. In the panel data context, the square of GC has no impact on economic growth and GY responds to GC only and negatively. Its magnitude and direction are consistent across specifications. As control variables are added, β_1 remains stable. The result is clear: an increase of 1% in GC leads to a reduction of economic growth varying from -0.22% to -0.28% depending on the specification. Investment (β_2) also contributes to explain the variance of the dependent variable. As can be seen, there is a positive relationship between the two, in line with economic theory and the evidence in Barro (1991). The coefficient β_2 is very stable, with both magnitude and direction consistent throughout model specifications. The implication is that besides

keeping an adequate size of government policy makers should strive to increase investment in order to encourage economic growth.

Insert Table 3 here

Interestingly, openness (β_3) is negative and statistically significant only in one out of four specifications. This is contrary to one would expect. While the negative coefficient is found only for column (6) and at 10% level only, another implication is that more comprehensive measures of openness to control for financial flows should be more appropriate than a perspective based on traded goods only as performed in Table 3. Inflation (β_4) depicts the correct sign (negative) and is statistically significant throughout, although small. Fertility (β_5), a driver of population growth, is found to vary in statistic significance in this data set. However, the size of the economy, measured by the gross domestic product relative to that of United States, is statistically significant and with the expected sign. If the country's GDP is high compared to the U.S., country growth tends to be smaller, which is consistent with the convergence hypothesis of the growth literature in Barro (1991).

The last column reproduces the estimation of (3) for the series that have been consistently statistically significant in the estimations. One confirms the negative effect of government consumption ($\beta_1 = -0.247$), the positive effect of the investment ratio ($\beta_2 = 0.210$), and the negative effect of country size relative to the U.S. ($\beta_6 = -0.143$). As before, the parsimonious model in column (7) does not suffer from serial correlation problems (DW = 1.75).

The result of this analysis has important implications for policy makers. First, the evidence supports the notion that promoting efficiency in governmental activities is good

for the region. Second, the promotion of effective government works best when it is accompanied by improvements in private investment.

Conclusions

As Latin American policy makers ponder how to keep the region competitive and their economies growing, one area that should be carefully considered is the size of their respective governments. This study tests the hypothesis that government expenditures in excess of the optimal point, as determined by the Armey Curve, tend to shrink economic growth. When resources are wasted in sustaining an ineffective bureaucratic governmental system, opportunities to grow the economy are forfeited. When government overspends, it is because the government has overtaxed its citizens, which dries up the pool of private investment. As asserted in this study, investment seems to be a positive and significant predictor of economic growth.

Our findings corroborate the conclusion of other studies concerning the negative relationship between economic growth and government consumption, and also the positive relationship between economic growth and investment, such as Barro (1991). What is the optimal size of the governments of Latin American countries? Since this is a question that must be answered for each country, we leave this for future study. However, we estimated that the optimal consumption by the average Latin America government should be around 13.7% of the annual real gross domestic product; yet the actual average spending is about 22.71% of the annual real GDP. The findings from panel data analysis reinforce the message from the Armey curve: an increase of 1% in GC leads to a reduction of economic growth varying from -0.22% to -0.28% across specifications.

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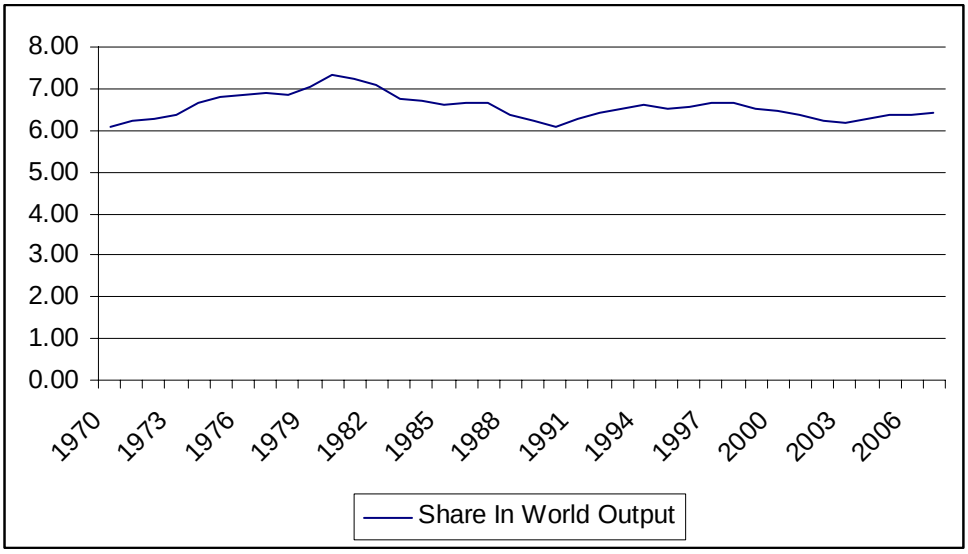
FIGURE 1

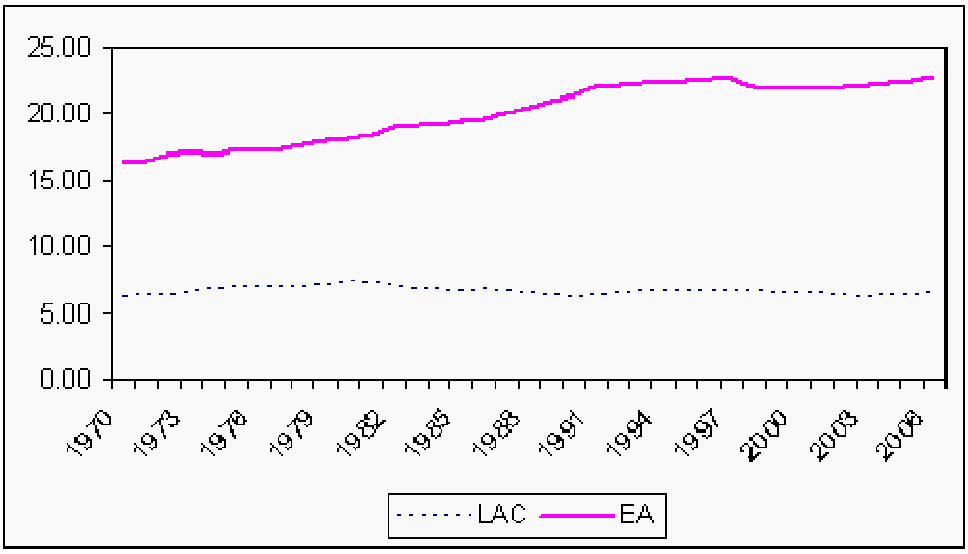
LATIN AMERICA'S SHARE IN WORLD OUTPUT



Sources: GDP Table in the ERS International Macroeconomic Data Set (www.ers.usda.gov)

FIGURE 2

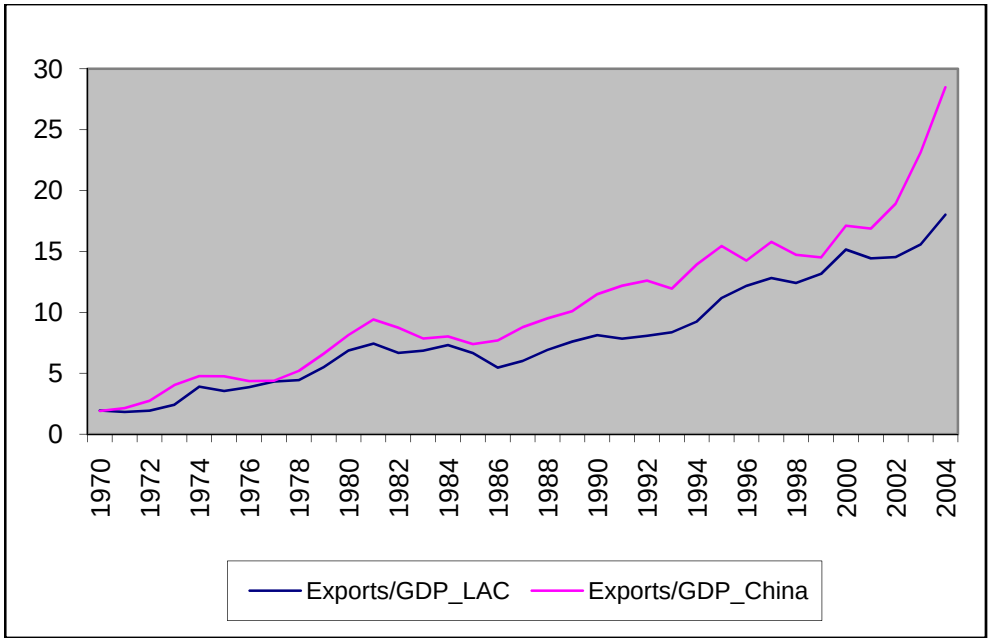
LATIN AMERICA AND EAST ASIA'S SHARE IN WORLD OUTPUT



Sources: GDP Table in the ERS International Macroeconomic Data Set (www.ers.usda.gov)

FIGURE 3

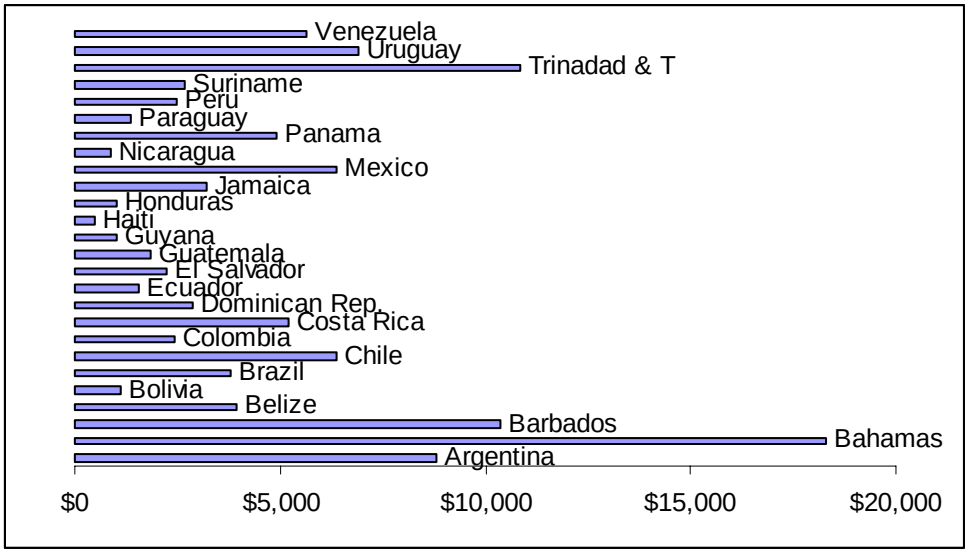
EXPORT/GDP SHARES IN %



Sources: International Monetary Fund IFS (www.imfstatistics.org/imf)

FIGURE 4

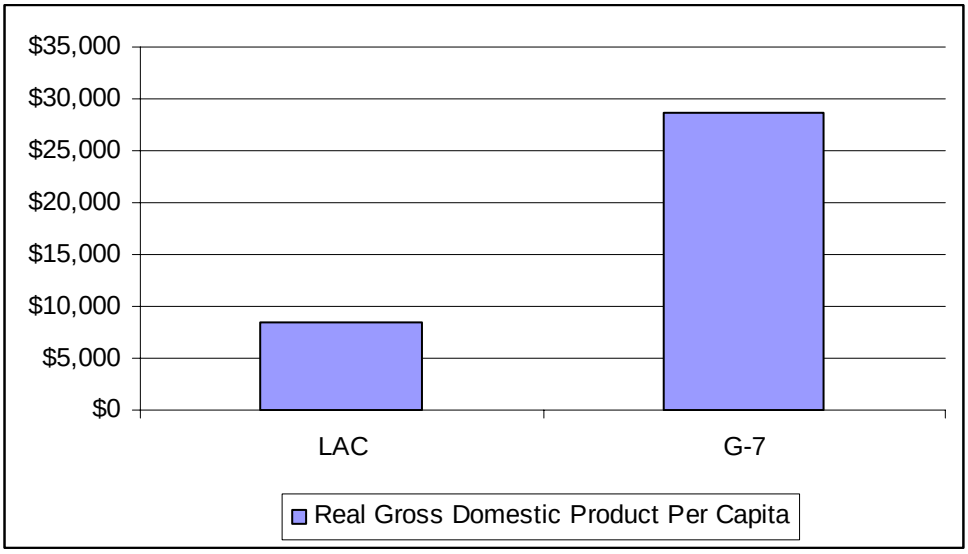
2006 ANNUAL REAL GROSS DOMESTIC PRODUCT PER CAPITA



Sources: GDP Table in the ERS International Macroeconomic Data Set (www.ers.usda.gov)

FIGURE 5

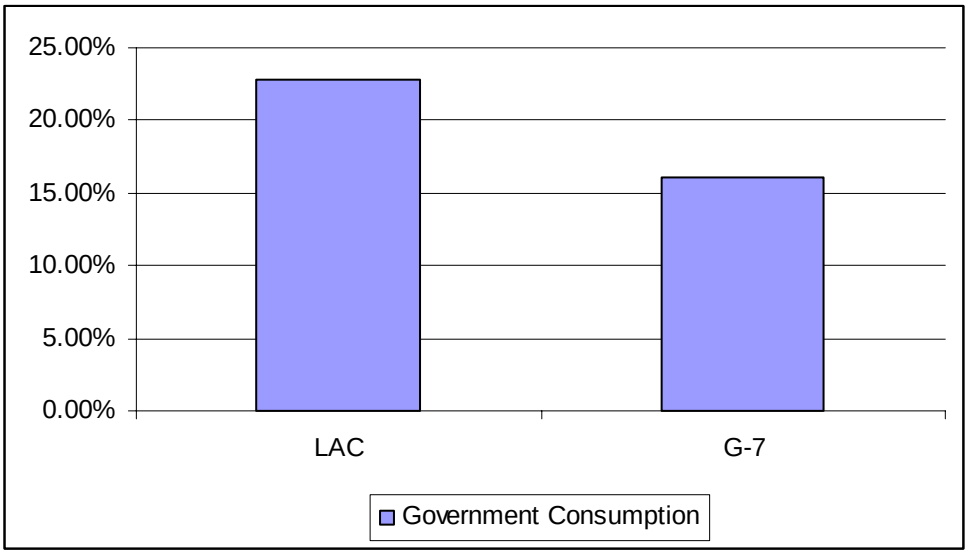
REAL GROSS DOMESTIC PRODUCT PER CAPITA IN U.S. DOLLARS



Sources: Based on the dataset as explained in the text. G-7: average of United States, Canada, United Kingdom, Japan, Germany, France, and Italy for the year 2003. LAC: average of the 23 countries explained in the text also for the year 2003.

FIGURE 6

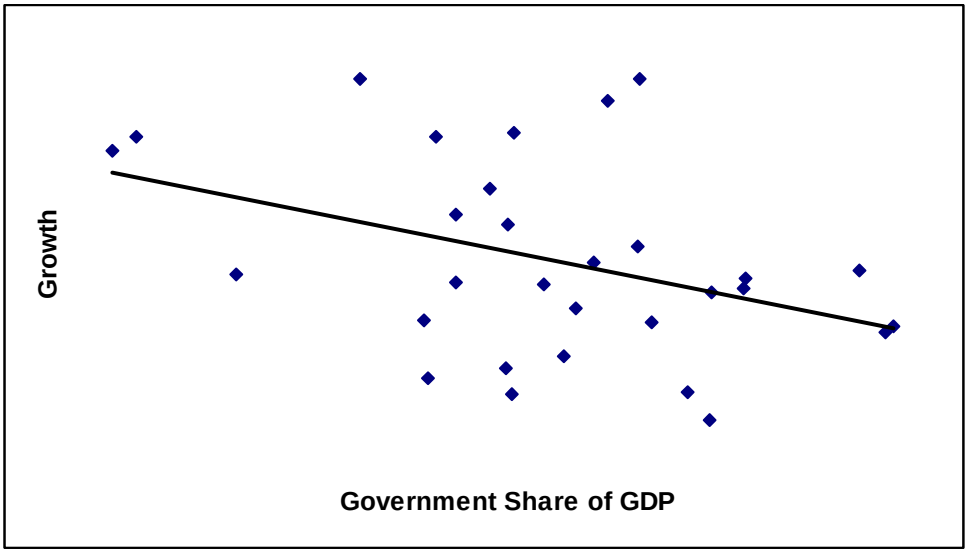
GOVERNMENT CONSUMPTION AS A SHARE OF REAL GROSS DOMESTIC PRODUCT



Sources: Based on the dataset as explained in the text. G-7: average of United States, Canada, United Kingdom, Japan, Germany, France, and Italy for the year 2003. LAC: average of the 23 countries explained in the text also for the year 2003.

FIGURE 7

ECONOMIC PROSPERITY (GY) AND GOVERNMENT CONSUMPTION (GC)



Sources: Authors' calculations based on dataset explained in the text.

FIGURE 8

GROWTH RATE UNDER GROWING PUBLIC SPENDING

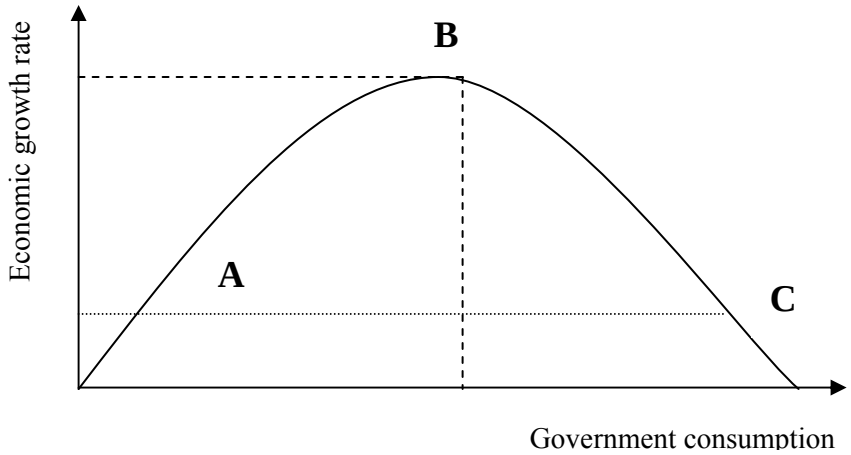


TABLE 1

DESCRIPTIVE STATISTICS OF KEY VARIABLES

Variable	Mean	Median	St. Dev.	Highest	Lowest
Prosperity (GY)	1.14	1.17	6.0	St. Vincent (3.62)	Nicaragua (-1.86)
Investment Share (INV)	14.37	13.87	5.8	Brazil (19.51)	Barbados (5.24)
Inflation (INF)	73.35	11.11	548.3	Bolivia (492.4)	Panama (2.5)
Openness (OPEN)	74.78	63.19	42.0	Panama (156.6)	Brazil (17.7)
Real GDP/Capita (RGDP)	5,254	4,276	3550.6	Bahamas (13,601)	Honduras (1,714)
Government Consumption (GC)	22.71	19.70	11.1	Nicaragua (33.85)	Barbados (11.7)

Notes: Data are of annual frequency from 1974 to 2003. Countries included in the analysis are: Mexico, Guatemala, Nicaragua, El Salvador, Honduras, Costa Rica, Panama, Venezuela, Brazil, Bolivia, Peru, Paraguay, Uruguay, Chile, Argentina, Bahamas, Barbados, Belize, Jamaica, Suriname, Santa Lucia, Trinidad & Tobago, and Saint Vincent.

TABLE 2

ESTIMATION OF EQUATION (2)

DEPENDENT VARIABLE: ECONOMIC GROWTH (GY)

	(1)	(2)
β_0	-282.801**	24.392***
	(110.295)	(8.734)
β_1	41.487**	-1.623**
	(15.435)	(0.615)
β_2	-1.505***	
	(0.538)	
Adj. R^2	0.281	0.175
N	30	30
DW	1.662	1.660
F-STAT	6.653	7.142

Notes: The method of estimation is Ordinary Least Squares (OLS). *** denotes statistic significance at the 1% level; ** at the 5% level; and * at the 1% level. White-cross section standard errors are reported in parenthesis.

TABLE 3

ESTIMATION OF EQUATION (3)

DEPENDENT VARIABLE: ECONOMIC GROWTH (GY)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
β_1	-0.249***	-0.219***	-0.242***	-0.240***	-0.230***	-0.276***	-0.247***
	(0.070)	(0.073)	(0.067)	(0.067)	(0.065)	(0.068)	(0.076)
β_2		0.149*	0.178**	0.172*	0.213**	0.276***	0.210***
		(0.084)	(0.090)	(0.090)	(0.090)	(0.093)	(0.088)
β_3			-0.032	-0.032	-0.036	-0.048*	
			(0.028)	(0.028)	(0.027)	(0.027)	
β_4				-0.0006*	-0.0006*	-0.0006*	
				(0.0004)	(0.0003)	(0.0004)	
β_5					-1.070***	-0.581	
					(0.394)	(0.412)	
β_6						-0.162***	-0.143***
						(0.055)	(0.053)
Adj. R^2	0.044	0.052	0.058	0.060	0.067	0.084	0.068
DW	1.706	1.734	1.730	1.739	1.752	1.764	1.750
F-STAT	2.315	2.588	2.708	2.678	2.837	3.240	2.996
N	23.00	23.00	23.00	23.00	23.00	23.00	23.00
T	30.00	30.00	30.00	30.00	30.00	30.00	30.00
N.T	690.00	690.00	690.00	689.00	689.00	689.00	690.00

Notes: The method of estimation is Feasible Generalized Least Squares (FGLS) with fixed effects. A constant term was included but is not reported. The squared term on government consumption was always not statistically significant throughout specifications. *** denotes statistic significance at the 1% level; ** at the 5% level; and * at the 1% level. White-cross section standard errors are reported in parenthesis.