



# **Determinants of Government and External Debt: Evidence from the Young Democracies of South America**

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**ERSA working paper 341**

**March 2013**

Economic Research Southern Africa (ERSA) is a research programme funded by the National Treasury of South Africa.

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# Determinants of Government and External Debt: Evidence from the Young Democracies of South America

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January 31, 2013

## Abstract

We investigate in this paper what are the main determinants of government and external debt in South America. Our sample purposely includes all nine South American countries that re-democratised in the last thirty years or so, and the data cover the period 1970-2007. The results, based on principal component and dynamic panel (time-series) data analyses (we use the Pooled OLS, Fixed Effects, Fixed Effects with Instrumental Variables, DIF-GMM and SYS-GMM estimators), suggest that economic growth has had the ability of significantly reduce debt in the region. Other important candidates suggested by the literature, such as inflation, inequality and constraints on the executive (variables that some would deem important within the rather turbulent South American context), do not present the expected nor clear-cut estimates on government and external debt. Essentially, the results suggest firstly that the (neoclassical) tax-smoothing model holds in South America, or that the continent is, after all, countercyclical, and secondly they highlight the importance of such case studies in order to avoid unwarranted generalisations about the continent's recent history. All in all, in times of a renewed spell of populism in the region and of a severe debt crisis in Europe, these conclusions are suggestive of the importance of an economic environment geared towards generating economic activity and prosperity in, at least, keeping debt under control.

Keywords: Government and External Debt, Democracy, South America.

JEL Classification: H60, N16, O11, O54.

## I. Introduction and Summary

South America has been known, at least in the last forty years or so, for political transitions from (mostly right-wing) dictatorships to more democratic regimes, macroeconomic instability (some countries experienced debt crisis and also severe episodes of high rates of inflation), delayed stabilisation processes (in the spirit of Alesina and Drazen (1991)) and (on a more positive note) no come back to less democratic regimes. Moreover, the region has been known for a certain, relatively above the average, degree of economic inequality.

Against this rather eventful background, and also with the current debt crisis affecting some European countries and all its possible economic implications in mind, we investigate what are the main determinants of government and external debt in the South American continent. It is worth mentioning at this early stage the importance of both debt variables and how interconnected they actually are with each other (*e.g.*, Chihi and Normandin (2012) establish positive comovements between both variables in a sample of developing countries from the 1960s onwards), and also their relation with the debt rescheduling and default crisis seen in South America, particularly in the 1980s, which coincide with some of the most severe political and economic shocks that the region has suffered in recent times<sup>1</sup>.

To conduct the analysis we use data from all nine South American countries which re-democratised at some point in the 1970s, 1980s and 1990s, and given data availability, we cover the period between 1970 and 2007. The significance of using this sample of young South American democracies is that, given the above-mentioned nature of the continent, it allows us to test different predictions proposed by the literature so that we can further our knowledge of the region. For the empirical analysis we make use of principal component and dynamic panel (time-series) data analyses. More specifically, we use the Pooled OLS, Fixed Effects, Fixed Effects with Instrumental Variables, First Difference and SYSTEM Generalised Method of Moments, estimators which tackle different empirical issues in the data.

In terms of results, firstly we find some robust evidence that economic growth is able to significantly, and smoothly, reduce debt in the region. Secondly, we do not find conclusive evidence that the high rates of inflation seen at the time in the region have had any effect in increasing debt, which would occur via higher nominal interest rates (particularly during periods of high rates of

inflation).

Thirdly, there is no evidence that constraints on the executive, or the better checks and balances which were implemented during the institutional reforms that some of those countries put in place in the 1990s and early 2000s, have had any effect in restraining spending and therefore debt. Fourthly, we are not able to report conclusive evidence that inequality, which is believed to be prevalent in some of the countries in the region, has played any role in increasing debt, which in the vein of Meltzer and Richard (1991), would take place via some sort of redistribution, particularly during and shortly after the democratic transition.

All in all, economic growth is—amongst of the most popular candidates suggested by the literature—the variable to have had a robust effect in reducing government and external debt in the region, which is suggestive of the importance of fast and consistent economic activity in keeping debt under control, or even in reducing it to lower levels. To put it another way, in times of a renewed wave of populism taking place in some parts of South America, and also with the debt crisis in Europe in mind, an environment which incentivises economic activity is perhaps a better option than the current contempt for property rights taking place in countries like Argentina and Bolivia, and the overall economic uncertainty and instability being experienced in the Giips countries.

The subject has always attracted the attention of the profession, and there are always new candidates (in addition to the tax-smoothing model) being proposed to explain government and external debt alike. Initially, Barro (1979) argues, theoretically and empirically, that temporary increases in income play a countercyclical role on debt in the US, and also that there is an expected positive effect of inflation on debt. In the South American context both variables are of particular interest in the sense that the region has experienced some growth collapses (during the so-called ‘lost decade’) and also some episodes of very high inflation in the past, factors which would have an effect of increasing overall debt.

On a slightly different vein, Berg and Sachs (1988) introduce the role of inequality to study the probability of debt rescheduling in a sample of middle-income countries, and they report that high inequality is a good predictor of rescheduling episodes. This is also interesting because some countries in South America are perceived to be rather unequal and one would expect inequality to play a positive role (via redistribution taking place during those political transitions) on debt in

the region.

Political factors enter the literature towards the end of the 1980s. Firstly, Roubini and Sachs (1989) using a sample of OECD countries are able to report that those countries are countercyclical. However, in Roubini and Sachs (1989) they report that the same OECD countries are only weakly countercyclical when politically fragmented, or when the political coalitions in power happen to be too polarised to find an agreement in terms of debt creation and rescheduling. This is also related to the South American case since our sample includes young democracies with, at the initial stages of democratisation, rather fragmented coalitions in power. Hence, one would expect a certain degree of procyclicality in the region during those periods of political transition.

Moreover, Alesina and Tabellini (1990) provide a theoretical framework which formalises the role of democracy, or alternating government coalitions, on debt. In this case the incumbent, or outgoing in some cases, coalition would bequest the new competing coalition coming into power with high debt to be repaid in the near future, which would financially constraint the new regime in its initial stages. This is also of interest to South America with young democracies and different coalitions coming into power combined with rather loose budget rules, factors which would have the effect of increasing debt levels. In similar vein, Edwards and Tabellini (1991), and Roubini (1991) empirically suggest that the tax-smoothing model does not hold in developing countries because of the political instability and inequality seen in those societies.

In addition, specifically related to Latin America, Gavin and Perotti (1997) make use of a sample of thirteen countries (some of which overlap with our own sample), covering the period between 1968 and 1995, and simple OLS estimation to suggest that the tax-smoothing model does not hold in the region. Their explanation for this result is first that they might be picking up the wrong causality, and second the voracity effect. With the latter in mind, Alesina *et al.* (1999) propose the idea of debt ceilings as a solution for the perennial debt problems seen in Latin America in the 1980s and early 1990s. It is worth mentioning that some of those countries indeed implemented fiscal responsibility laws (and central bank independence), however only towards the end of the 1990s and beginning of 2000s.

Furthermore, Easterly (2001) empirically suggests that the growth slowdowns of the 1980s and 1990s are to blame for the debt crisis that some developing countries (South America included with its ‘lost decade’) faced at the time, which is some evidence for the tax-smoothing model. On

the other hand, Woo (2003) formally reintroduces the role of inequality in the debate. He makes use of a large panel data set and finds out that inequality, and also finance, are related to larger public deficits (via redistribution and easier access to finance). Woo (2005 and 2008) extend on his previous analysis and suggests that polarisation, or inequality, within the coalition in power might generate a fight for the common resources pool, which leads to higher deficits and consequently output collapse. As mentioned before, one would argue that inequality is an important factor within the South American context, a region known for being relatively unequal, which re-democratises and is faced with demand for redistribution. In this case it is expected that a successful attempt at redistribution tends to increase government debt.

Finally, Alesina, Tabellini and Campante (2008), also using panel data, suggest that fiscal procyclicality in developing countries takes place because the electorate attempts to "starve the Leviathan", or to make sure to extract, during booms, from the government all resources possible, before the coalition in power wastes those resources in more frivolous activities. The "starve the Leviathan" story, or the voracity effect, can also be related to those South American young democracies in the sense that those societies, as mentioned above, took some time to implement better checks and balances on their executives (and fiscal responsibility laws) after their democratic transitions, factors which would constrain the way those governments managed their *fiscus*.

Essentially, the literature suggests that the tax-smoothing model does not always apply, particularly in developing countries, and that inequality, political instability and institutional quality might play a role in how governments behave when spending and generating debt<sup>2</sup>.

Given the above, the value added of this paper to the literature is that we make use of a sample of South American countries (all sharing some developing countries characteristics, but with their own idiosyncrasies), which went through structural political and economic changes (not to mention severe shocks) in the last thirty years or so. This is interesting in itself because with that sample we can not only test for different predictions proposed by the literature, but also disaggregate and comparatively further our knowledge on what plays a mitigating effect on debt in the region, and consequently avoid unwarranted generalisations.

Furthermore, we construct a proxy for government and external debt based on principal component analysis that captures what is common to different variables for debt and that offers more explanatory power to the analysis. Lastly, we use different dynamic panel (time-series) data esti-

mators, which tackle different empirical issues, to make sure that our results are robust. Therefore, we are able to provide some interesting evidence to specifically understand the recent history of South America, instead of treating the region either as an outlier to be removed from the sample, or as a dummy variable<sup>3</sup>.

The remainder of this paper is as follows: in the next sections we describe the data set, the empirical methodology used, and then we present and discuss, in light of the previous literature, the main results obtained. We then conclude and offer some future research avenues that can be pursued from here.

## II. Empirical Analysis

### A. *A Look at the Data*

The data set covers the period between 1970 and 2007, and nine South American countries which transitioned from political dictatorship to full democracy at some point in the late 1970s (Ecuador), 1980s (Argentina, Bolivia, Brazil, Chile, Peru and Uruguay), and early 1990s (Guyana and Paraguay). In addition, most of these countries experienced hyperinflationary bursts during the period (the only exception is Paraguay), and growth collapses.

The variables used to measure government and external debt are the share of general public debt to GDP (*DEBT*), from the Historical Public Debt Database compiled by Abbas, Belhocine, ElGanainy, and Horton, (2010) and provided by the IMF; and the share of external debt to GDP (*XDEBT*), from the World Development Indicators which is provided by the World Bank. With this information we make use of principal component analysis and extract via spectral decomposition from this standardised data matrix the unobserved common factors of these two, and rather popular in the literature, variables for debt. We therefore end up with a proxy for debt, *GOVERN*, which contributes to reduce model uncertainty and that presents more explanatory power. In this case, the first principal component—which roughly corresponds to the mean of the series—accounts for 85% of the variation in the two above-mentioned variables. This is important because in this case we end up with a proxy that contains most of the information coming from different candidates for debt.

Information on economic growth (*GROWTH*) come from the Penn World Table, and in this

case it is expected that economies which grow consistently faster tend to present lower debt. The other explanatory variables used are relatively standard in the literature and they are as follows: a measure for trade openness relative to GDP (*OPEN*), which is provided by the Penn World Table, and it is expected that more open economies tend to display smaller debt (via higher exports taxes and imports tariffs). Moreover, we use the share of the liquid liabilities to GDP (*M2*), which comes from the World Development Indicators and that are provided by the World Bank as well. In this case it is predicted that in economies with better developed financial sectors governments can acquire finance more easily and therefore increase public debt. The inflation rates (*INFLAT*), and its usual log transformation [ $\log(1 + INFLAT/100)$ ], also come from the World Development Indicators, and it is expected that higher inflation, via higher nominal interest rates, leads to higher government debt.

Furthermore, the population (*POP*) and urbanisation (*URBAN*) series are from the World Development Indicators; constraints on the executive (*XCONST*) come from the Polity IV data set; government shares to GDP (*GOV*) are from the Penn World Table; and the Gini coefficients for income inequality (*INEQ*) come from the UNU-WIDER data base. What is expected from these variables is that rapid population change and urbanisation in developing countries lead to higher spending in infrastructure, more constrained executives (or better checks and balances usually implemented after re-democratisation) tend to be more restrained in how they generate public debt, higher government participation in the GDP must be somehow funded and it tends to lead to higher debt, and higher inequality leads to some sort of redistribution (usually via the provision of particular public goods or via transfers), which leads to higher government debt overall.

To briefly illustrate the behaviour of the variables used to understand the behaviour of government and external debt over time in the region—government debt to GDP (*DEBT*), external debt to GDP (*XDEBT*) and the proxy for government and external debt itself (*GOVERN*)—in Figure One we plot in clockwise fashion all these averaged series against time. This initial eye-ball evidence shows that these country averages increased moderately during the late 1970s, and rather dramatically in the early 1980s, which roughly coincide with the implementation of more democratic regimes in the region (alternatively it can also coincide with the end of those political dictatorships). Moreover, this dramatic increase in government and external debt in the early 1980s coincides with the hyperinflationary episodes that most of those countries experienced at



the time. On the other hand, most debt series present a reasonably consistent reduction from the 1990s onwards, which suggest that some time after democratisation, and with the macroeconomic stabilisation and institutional reforms taking place in most of those countries, the size of debt has actually decreased.

In addition, to illustrate the general macroeconomic conditions in the continent, we plot the economic growth averages over time, and it can be seen that growth rates displayed even negative figures in the 1980s (the so-called ‘lost decade’), which coincide with the sharp increase in public and external debt seen in the first panels. However, those averages have been displaying a more encouraging positive trend from the 1990s onwards, which broadly coincide with the macroeconomic stabilisation taking place in the 1990s, and also specifically with the reduction in debt that the region has experienced recently.

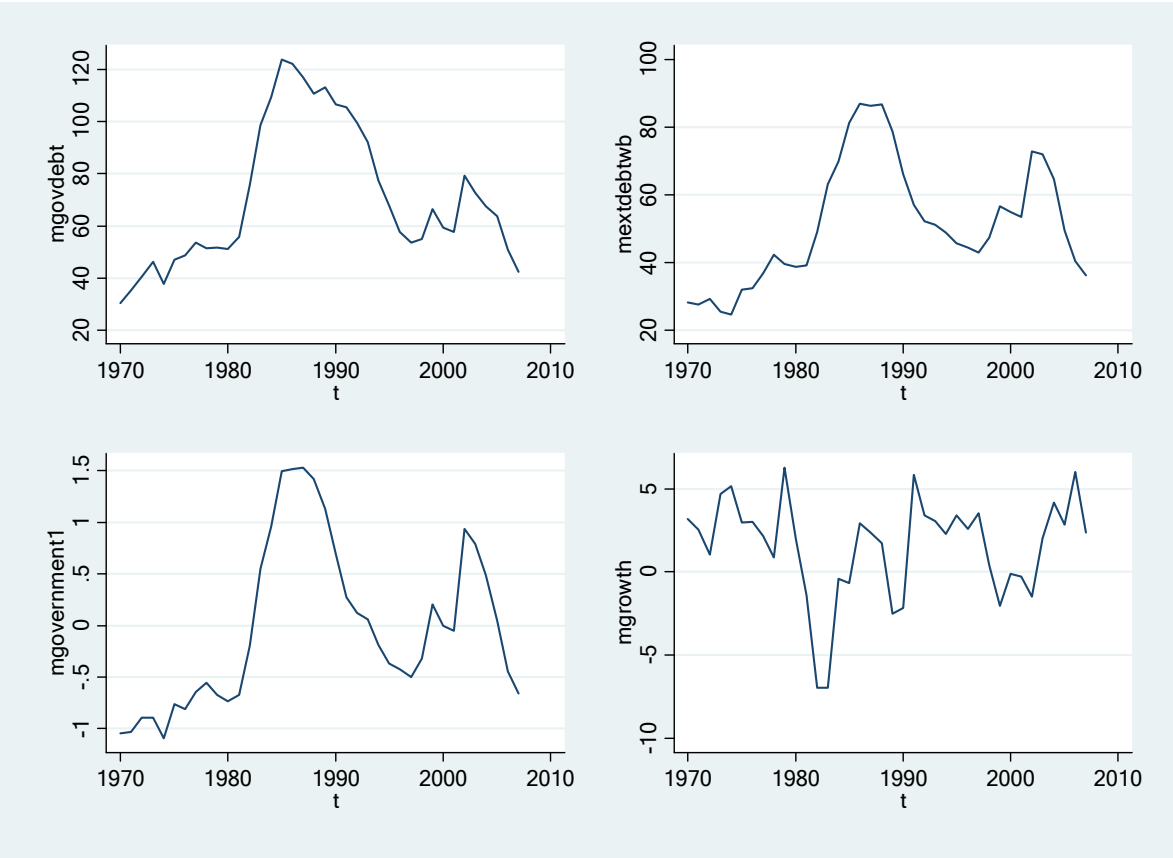


Figure 1: Government debt, external debt, government and economic growth, South America, 1970-2007. Sources: IMF, World Bank and PWT files.

Moreover, we provide the correlation matrix in Table One. Initially what can be seen from this descriptive evidence is that all variables for debt are positively and significantly correlated with each other, as it should be since—according to the principal component analysis—they have so much in common. More specifically to our purposes here though, the statistical correlations amongst our variables and proxy for government and external debt with economic growth are all negative and statistically significant at the 5% level.

Other variables of interest in the literature, particularly within the South American context, are inflation, constraints on the executive and inequality. Inflation presents positive correlations with government and external debt, however not always statistically significant. Constraints on the executive present positive and significant correlations with all debt variables, however we would expect that more constrained executives would, actually, spend less. Finally, inequality, presents the predicted positive correlations, however not always significant.

Basically, these preliminary correlations (without implying any causation at this stage) suggest that government and external debt decrease with faster economic activity, or to put it another way, the tax-smoothing model seem to be at work in the region. On the other hand, the other explanatory variables do not present us with clear-cut statistical correlations at this point.

Table One: The Correlation Matrix: South America, 1970-2007.

	DEBT	XDEBT	GOVER	GROW	OPEN	M2	INFLAT	URBAN	CONST	GOV	POP	INEQ
DEBT	1											
XDEBT	0.67*	1										
GOVER	0.85*	0.87*	1									
GROW	-0.14*	-0.27*	-0.23*	1								
OPEN	0.36*	0.23*	0.05	0.00	1							
M2	0.36*	0.02	-0.02	-0.00	0.55*	1						
INFLAT	0.04	0.09	0.18*	-0.27*	-0.43*	-0.41*	1					
URBAN	-0.40*	0.03	0.00	0.02	-0.62*	-0.23*	0.20*	1				
CONST	0.11*	0.34*	0.25*	-0.05	0.17*	0.22*	0.06	0.27*	1			
GOV	0.00	-0.14*	-0.00	-0.14*	-0.18*	-0.10*	0.19*	-0.07	-0.19*	1		
POP	-0.31*	-0.07	-0.00	0.02	-0.77*	-0.34*	0.28*	0.64*	0.08	0.09	1	
INEQ	0.22*	0.12	0.15	0.12	0.06	0.24*	-0.12	-0.34*	0.03	-0.19*	0.37*	1

Sources: IMF, World Bank, PWT, Polity IV and UNU-WIDER files. \* represents significance at the 5% level.

Furthermore, taking into consideration that the correlations amongst the variables for debt and growth are the only ones which present the expected signs and are statistically significant, in Figure Two we provide in clockwise fashion the OLS regression lines amongst all variables for government and external debt against economic growth. Basically, there is a negative relationship between debt and faster economic activity, which suggests firstly a negative economic relationship between debt and growth, and secondly that the neoclassical prediction of tax smoothing might well apply to the region.

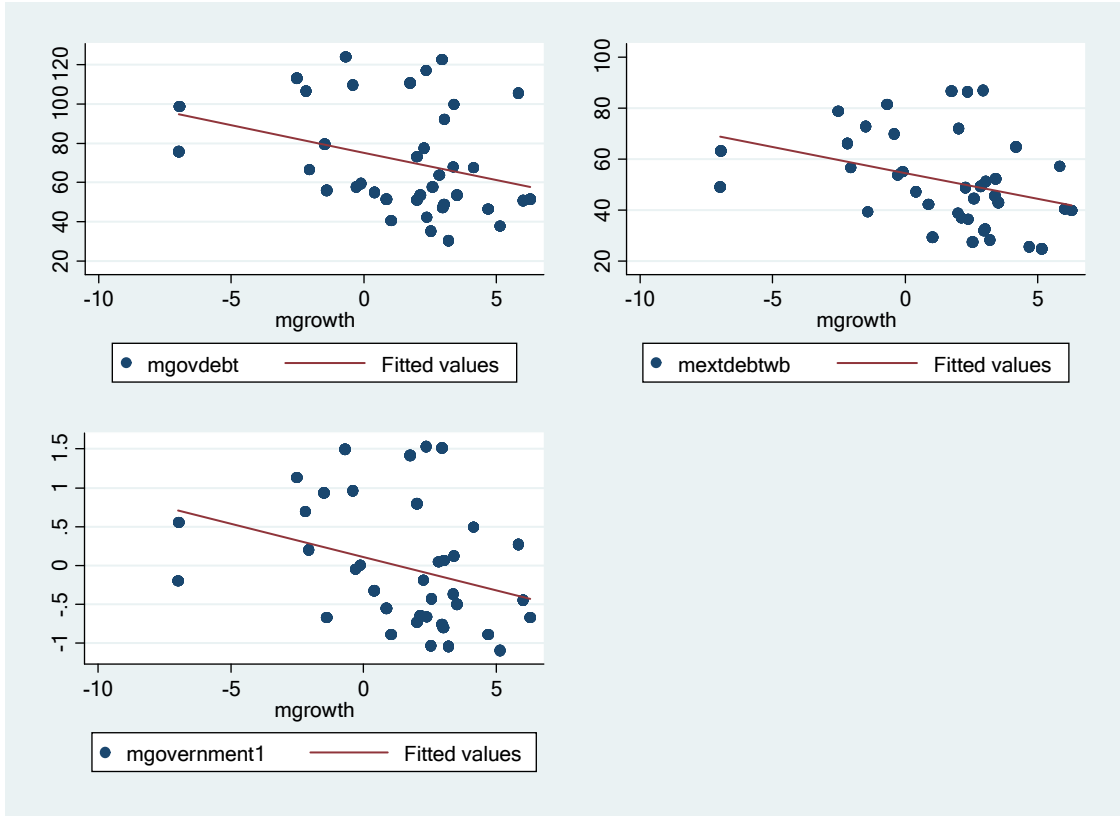


Figure 2: OLS regression lines, government debt, external debt, government and economic growth, South America, 1970-2007. Sources: IMF, World Bank and PWT files.

In essence, the above preliminary evidence, with all its caveats, suggests that in one way or another the size of government and external debt, and growth have been moving in opposite directions, or alternatively that debt has decreased with faster economic activity. To put it another way, this initial descriptive evidence is rather suggestive of the prediction provided by the neoclassical model of tax smoothing, or that those economies seem to be countercyclical after all. On the other hand, we cannot, at this stage, draw any conclusion on how the other explanatory variables affect government and external debt in the continent.

### ***B. Empirical Strategy***

In terms of empirical strategy, since we have a panel of nine South American countries ( $N = 9$ ) covering the period between 1970 and 2007 ( $T = 38$ ), we make use of dynamic panel (time-series) data analysis. Initially, since most variables are either ratios (*e.g.*, the debt variables, openness and

finance), or bounded within closed intervals (*e.g.*, inequality and constraints on the executive), and consequently stationary by default, we do not pursue the issue of cointegration in panels here. In addition, Bohn (1998) suggests that debt to GDP ratios tend to be mean-reverting because of the positive relationship between primary surpluses and debt which tends to satisfy the government intertemporal budget constraint<sup>4</sup>.

Firstly, we use the baseline Pooled OLS (POLS) estimator which assumes homogeneity of intercepts and slopes (admittedly a rather heroic assumption in such a diverse region), and which gives equal weight to the within ( $y_{it} - \bar{y}_i$ ) and between ( $\bar{y}_i - \bar{y}$ ) variances in the data. Secondly, we make use of the one-way Fixed Effects (FE) estimator with robust standard errors for the correlation of residuals over time, which assumes heterogeneity of intercepts (a reasonable assumption in such a diverse panel of countries), and which makes use only of the within ( $\bar{y}_i - \bar{y}$ ) variation in the data, which purges the correlation between the unobserved heterogeneity and the regressors. Essentially, the FE estimator under  $T \rightarrow \infty$ , not only reduces statistical endogeneity (via the demeaning), but also minimises the Nickell bias present in short  $T$  dynamic panels and provides consistent estimates of the expected values (Smith and Fuertes (2008)).

Thirdly, although we attempt to use—given data availability—the most common explanatory variables in the literature, one would argue that omitted variables, measurement error, and even some sort of economic endogeneity might be present. Therefore, we initially make use of the Fixed Effects with Instrumental Variables (FE-IV) estimator which provides asymptotically consistent and efficient estimates when  $T \rightarrow \infty$  (Arellano (2003)), and under the assumption  $E(x_{it-1}v_{it}) = 0$ , we use the first lag of economic growth, inflation and government share to GDP as our identifying instruments for contemporaneous *GROWTH* (the growth literature suggests that government debt are detrimental to economic growth, Barro (1991)), *INFLAT* (some would argue that higher debt are behind higher inflation, Fischer (2005)) and for *GOV* (it can be argued that the government share to GDP and debt are intrinsically related).

Furthermore, controlling for the number of instruments—and for what we instrument—to avoid overfitting (Judson and Owen (1999), Bond (2002) and Roodman (2009)), we carefully make use firstly of the "restricted" Generalised Method of Moments (GMM) estimator proposed by Arellano and Bond (1991) First-Difference GMM (DIF-GMM) which is based on the idea proposed by Anderson and Hsiao (1981) of using lags in levels ( $y_{it-2}, \dots, y_{i1}$ ) as instruments for the first-

differenced model. Moreover, we take into account the fact that persistent series might lead to weak instruments (and to a non-negligible small sample bias) and make use of the GMM estimator that combines the usual moment conditions for the DIF-GMM model above, with those extra conditions for the model in levels ( $\Delta y_{it-1}$ ), SYSTEM (SYS), or the SYS-GMM estimator proposed by Arellano and Bover (1995), and Blundell and Bond (1998).

In essence, within the GMM framework, we instrument for the lagged dependent variable with levels dated  $t - 3$  and earlier, a standard assumption, and then again for *GROWTH*, *INFLAT* and *GOV*. We therefore carefully use these two "restricted" GMM estimators, collapsing the lag range with robust standard errors and the small-sample correction provided by Windmeijer (2005) to avoid "too good to be true" standard errors.

All in all, the above-mentioned dynamic panel (time-series) estimators take into account not only the fact that those countries in the sample share particular characteristics, but also the fact that such a panel is, no doubt, heterogenous (some of the countries in the sample are more developed than others, or more or less unequal than others). Moreover, some of these estimators take into consideration the possibility of omitted variables and measurement error biases, and endogeneity and persistence issues, which are always advantageous given the nature of our sample and the predictions being tested here. The estimated differenced GMM dynamic equation is as follows,

$$\begin{aligned}
 (1) \quad \Delta GOVERN_{it} &= \alpha \Delta GROWTH_{it} + \beta \Delta OPEN_{it} + \gamma \Delta M2_{it} + \delta \Delta INFLAT_{it} \\
 &+ \epsilon \Delta URBAN_{it} + \varepsilon \Delta XCONST_{it} + \zeta \Delta GOV_{it} + \eta \Delta POP_{it} \\
 &+ \theta \Delta INEQ_{it} + \vartheta \Delta GOVERN_{t-1} + \Delta v_{it},
 \end{aligned}$$

where *GOVERN* is the proxy for government debt which comprises the unobserved common factors between government debt to GDP and external debt to GDP, *GROWTH* are the GDP growth rates, *OPEN* is a measure for trade openness, *M2* are the liquid liabilities to GDP, *INFLAT* are the inflation rates, *URBAN* is the share of urban population, *XCONST* accounts for constraints on the executive, *GOV* for the share of government to GDP, *POP* for population and *INEQ* are the Gini coefficients for income inequality.

### C. Results and Discussion

In Table Two we regress the variable *DEBT* against all our explanatory variables so that we can test for the different predictions suggested by the literature. Essentially, all *GROWTH* estimates are negative, and mostly statistically significant, which initially highlights the importance of economic activity in reducing government debt in the region. For instance, for every percent increase in *GROWTH*, government debt would decrease by 0.7% per year in the dynamic FE-IV specification, which is a respectable and plausible effect.

The variable *OPEN* presents the predicted negative signs, with most estimates being statistically significant, and *M2* presents mostly the expected positive estimates, with most of them being significant as well. On the other hand, *INFLAT* has mostly (unexpected) negative estimates, and they are significant in almost all specifications. A plausible economic explanation for these negative estimates is probably because some of those countries implemented nominal interest rate ceilings (financial repression) in the 1980s, and others had full indexation in place as a mechanism of protection against high inflation, factors which could have had an effect on the way inflation affects government debt.

The variables *URBAN*, *XCONST*, *GOV* and *POP* do not present clear-cut estimates and their significance levels are not always ideal, and *INEQ* presents the expected positive estimates, however these estimates are not always statistically significant either.

The *t* and *F* tests in the first-stage regressions are all significant, which minimises the issue of weak instruments in the FE-IV analysis (available on request). Finally, the Arellano and Bond *m2* test for second-order serial correlation suggests that we can not reject the null hypothesis and the Sargan test does not indicate that the DIF-GMM and SYS-GMM instrument sets are invalid (in this case the instruments are not correlated with the residuals in the first-differenced equation).

Table Two: Dynamic POLS, FE and GMM Estimates, South America, 1970-2007.

DEBT	Dynamic Models				
	POLS	FE	FE-IV	DIF-GMM	SYS-GMM
GROWTH	-.029 (-7.91)	-.029 (-6.42)	-.070 (-2.81)	-.009 (-1.43)	-.023 (-5.44)
OPEN	-.146 (-2.44)	-.345 (-4.01)	-.446 (-2.63)	-1.43 (-1.96)	-.144 (-1.59)
M2	.103 (2.28)	.137 (1.79)	.029 (0.29)	.298 (3.00)	.125 (1.94)
INFLAT	-.069 (-1.86)	-.079 (-3.08)	-.249 (-2.39)	.176 (2.14)	-.071 (-1.75)
URBAN	.150 (1.48)	-.288 (-0.41)	-.606 (-0.35)	-9.00 (-2.00)	.139 (2.28)
XCONST	.033 (1.14)	.040 (2.24)	.122 (1.88)	-.106 (-1.76)	.001 (0.06)
GOV	.162 (1.53)	.209 (2.02)	.353 (1.26)	1.28 (1.55)	.195 (0.90)
POP	-.039 (-1.44)	.321 (0.96)	.428 (0.61)	-.624 (-0.17)	-.018 (-0.38)
INEQ	.184 (0.98)	.567 (1.57)	.762 (1.96)	.789 (2.50)	-.020 (-0.12)
DEBT <sub>1</sub>	.942 (30.12)	.951 (29.48)	1.03 (14.81)	.608 (7.46)	.949 (20.74)
F test	122.85	932.19	40.80		
m2 (p)				0.56	0.69
Sargan				1.00	1.00

T-ratios in parentheses. Number of observations:  $NT = 342$ . *DEBT* is the government debt to GDP, *GROWTH* are the GDP growth rates, *OPEN* is a measure for trade openness, *M2* are the liquid liabilities to GDP, *INFLAT* are the inflation rates, *URBAN* is the share of urban population, *XCONST* the constraints on the executive, *GOV* the government share to GDP, *POP* the population and *INEQ* are the Gini coefficients for income inequality. POLS is the Pooled OLS, FE is the Fixed Effects, FE-IV is the Fixed Effects with Instrumental Variables, and the DIF-GMM and SYS-GMM are the First Difference and System Generalised Method of Moments estimators.

In Table Three we regress *XDEBT* against all explanatory variables. Again, the *GROWTH* estimates are all negative and mostly statistically significant, with DIF-GMM being the only exception in terms of statistical significance. This suggests once more the role of sustained economic activity in reducing external debt and the relevance of the tax-smoothing model in the region. For instance, for every percent increase in *GROWTH*, external debt would decrease by 0.5% per year in the dynamic FE-IV specification, which is a plausible effect.

The variable *OPEN* presents mostly the predicted negative signs, however the estimates are



not entirely statistically significant this time, and *INFLAT* keeps its negative (unexpected) sign with most of the estimates being, in fact, significant. On the other hand, *M2* does not present us with entirely convincing estimates in this instance, possibly because external debt does not depend too much on domestic financial depth to be funded.

The other explanatory variables (*URBAN*, *XCONST* and *POP*) do not present clear estimates in terms of signs, with some of them actually flipping signs, nor in terms of statistical significance. Furthermore, *INEQ* keeps its expected positive signs, however those estimates are not always significant.

In addition, the  $t$  and  $F$  tests in the first-stage regressions are statistically significant in the FE-IV analysis (available on request), which minimises the issue of weak instruments. Lastly, the Arellano and Bond, and Sargan tests do not suggest that the DIF-GMM and SYS-GMM instrument sets are in anyway invalid.

Table Three: Dynamic POLS, FE and GMM Estimates, South America, 1970-2007.

XDEBT	Dynamic Models				
	POLS	FE	FE-IV	DIF-GMM	SYS-GMM
GROWTH	-.024 (-7.46)	-.022 (-9.84)	-.051 (-2.80)	-.006 (-1.50)	-.022 (-4.62)
OPEN	-.046 (-0.85)	.001 (0.02)	-.098 (-0.74)	-.526 (-1.58)	-.034 (-0.49)
M2	-.016 (-0.37)	-.049 (-1.00)	-.147 (-1.73)	-.113 (-1.74)	-.057 (-1.52)
INFLAT	-.072 (-2.32)	-.064 (-5.22)	-.194 (-2.34)	-.041 (-1.23)	-.030 (-1.32)
URBAN	.160 (1.44)	-2.42 (-2.02)	-2.43 (-2.09)	-1.05 (-0.81)	.204 (1.20)
XCONST	-.005 (-0.21)	-.041 (-2.55)	.017 (0.32)	-.263 (-3.62)	-.065 (-1.13)
GOV	.126 (1.33)	.440 (3.06)	.337 (1.54)	1.06 (2.68)	.092 (0.92)
POP	-.038 (-1.52)	1.32 (2.14)	1.23 (2.36)	-4.66 (-3.09)	-.056 (-2.22)
INEQ	.243 (1.32)	.386 (1.08)	.467 (1.51)	.711 (2.12)	.242 (1.26)
XDEBT <sub>1</sub>	.896 (27.33)	.862 (16.59)	.917 (16.22)	.443 (4.57)	.856 (11.09)
F test	99.95	3517.29	40.87		
m2 (p)				0.42	0.26
Sargan				1.00	1.00

T-ratios in parentheses. Number of observations:  $NT = 342$ . *XDEBT* is the external debt to GDP, *GROWTH* are the GDP growth rates, *OPEN* is a measure for trade openness, *M2* are the liquid liabilities to GDP, *INFLAT* are the inflation rates, *URBAN* is the share of urban population, *XCONST* the constraints on the executive, *GOV* the government share to GDP, *POP* the population and *INEQ* are the Gini coefficients for income inequality. POLS is the Pooled OLS, FE is the Fixed Effects, FE-IV is the Fixed Effects with Instrumental Variables, and the DIF-GMM and SYS-GMM are the First Difference and System Generalised Method of Moments estimators.

In Table Four we regress our proxy *GOVERN*, which captures the common factors between government and external debt, against our explanatory variables. As we would expect by now, *GROWTH* follows the same pattern as before, with all estimates being negative, and except for the DIF-GMM one, all other estimates are statistically significant. In essence, these results somehow support the neoclassical tax-smoothing prediction in the continent and help to bring the, somehow overlooked, role of countercyclical factors back to the discussion of public and external debt in general.

The variables *OPEN* and *INFLAT* present similar estimates as before, with both variables presenting negative signs against debt, however those estimates are not always entirely significant. The liquid liabilities as well as *URBAN*, *XCONST*, *GOV* and *POP* do not present clear-cut estimates from which we can draw a more definitive picture in terms of their roles on debt. In similar vein, *INEQ* presents the predicted positive estimates, however given the lack of statistical significance, we cannot draw a solid picture of its role on debt in general.

Furthermore, the  $t$  and  $F$  tests in the first-stage regressions of the FE-IV analysis suggest that we do not have weak instruments (available on request). Lastly, about the validity of the instrument set, the Arellano and Bond, and Sargan tests do not detect any evidence of invalidity or proliferation of instruments within the DIF-GMM and SYS-GMM framework<sup>5</sup>.

Table Four: Dynamic POLS, FE and GMM Estimates, South America, 1970-2007.

GOVERN	Dynamic Models				
	POLS	FE	FE-IV	DIF-GMM	SYS-GMM
GROWTH	-.076 (-7.38)	-.074 (-5.48)	-.174 (-2.65)	-.027 (-1.59)	-.069 (-6.27)
OPEN	-.196 (-1.15)	-.448 (-2.58)	-.625 (-1.37)	-5.34 (-2.34)	-.098 (-0.60)
M2	.051 (0.37)	.082 (0.48)	-.204 (-0.72)	.567 (2.48)	.046 (0.42)
INFLAT	-.151 (-1.44)	-.140 (-2.29)	-.490 (-1.73)	.237 (1.49)	-.066 (-0.85)
URBAN	.557 (1.60)	-1.08 (-0.39)	-1.09 (-0.24)	-8.49 (-0.75)	.671 (1.74)
XCONST	.031 (0.39)	-.006 (-0.10)	.216 (1.17)	-7.35 (-3.88)	-.099 (-0.89)
GOV	.214 (0.73)	.312 (0.79)	.630 (0.86)	1.85 (0.89)	-.052 (-0.14)
POP	-.088 (-1.15)	1.24 (1.09)	1.30 (0.69)	-9.24 (-1.11)	-.068 (-0.67)
INEQ	.563 (1.01)	.752 (0.73)	1.12 (1.09)	2.20 (1.61)	.273 (0.40)
GOVERN <sub>1</sub>	.917 (24.29)	.895 (24.91)	.987 (12.06)	.466 (5.31)	.888 (18.97)
F test	68.80	5.03	26.15		
m2 (p)				0.94	0.64
Sargan				1.00	1.00

T-ratios in parentheses. Number of observations:  $NT = 342$ . *GOVERN* is the proxy which captures the common factors of government debt and external debt to GDP, *GROWTH* are the GDP growth rates, *OPEN* is a measure for trade openness, *M2* are the liquid liabilities to GDP, *INFLAT* are the inflation rates, *URBAN* is the share of urban population, *XCONST* the constraints on the executive, *GOV* the government share to GDP, *POP* the population and *INEQ* are the Gini coefficients for income inequality. POLS is the Pooled OLS, FE is the Fixed Effects, FE-IV is the Fixed Effects with Instrumental Variables, and the DIF-GMM and SYS-GMM are the First Difference and System Generalised Method of Moments estimators.

All in all, economic growth is the only explanatory variable which actually follows the predicted hypothesis, presenting negative and mostly statistically significant estimates against government and external debt in the region. Essentially, these estimates indicate to the importance of faster economic activity and prosperity on debt reduction, which, in light of a renewed spell of populism in South America and the severe debt crisis that Europe is experiencing at the moment, is of particular importance. Above all, the tax-smoothing (neoclassical) model is still valid in the region in the

sense that debt increased rather dramatically during the political and economic transitions that the region went through in the 1980s (the *war* period), however the economic recovery that followed (the *peace* period) has played an important role in reducing debt in those young democracies of South America (Barro (1979) and Easterly (2001)).

It is worth mentioning that these results contrast with Gavin and Perotti (1997) in the sense that they are not able to provide evidence for the neoclassical model in the region. This is probably because we benefit not only from better dynamic panel estimation techniques made available from the late 1990s onwards, but also from more data which capture the economic recovery affecting the region precisely after 1995. Alternatively, it can be said that we are not able to find any evidence of procyclicality, or for the voracity effect or "starve the Leviathan" predictions in the region (Alesina, Tabellini and Campante (2008)).

Moreover, inflation is an important variable which presents (unexpected) negative estimates, and it must be said that these estimates are not in line with the neoclassical prediction (Barro (1979)). These unexpected estimates are probably because some of those countries engaged in severe interest rate controls (financial repression), which would artificially reduce the effect of higher nominal interest rates on debt, while others had completely indexed economies during their episodes of hyperinflation. It is plausible that overall both effects are cancelling each other out. Alternatively, it can be said that if interest rate ceilings and inflation were consciously used as instruments to reduce debt, these (unexpected) results regarding the role of inflation on debt would be more in line with the recent work by Reinhart and Sbrancia (2011) on financial repression and debt liquidation<sup>6</sup>. All in all, this is an important issue which deserves more attention.

Furthermore, our variable *XCONST*, a proxy which accounts for re-democratisation and also for checks and balances on the executive, is not playing a definitive role in reducing debt in the region, although the DIF-GMM estimates are negative and statistically significant. These not entirely clear results somewhat contrast with the prediction in Alesina *et al.* (1999) of the importance of institutional reforms in reducing debt. However, the reason for these rather unclear estimates is perhaps because fiscal responsibility laws, and central bank independence, were only implemented in some countries towards the end of the 1990s (Santiso (2006)), and it is plausible to assume that because of this the data are still not picking those institutional changes up, which tend to restrain the way governments behave and spend. Alternatively, it can be suggested that in some

countries macroeconomic stabilisation was achieved before these institutional reforms were actually implemented (*e.g.*, Brazil) and in others the reforms were implemented before re-democratisation (*e.g.*, Chile), factors which would possibly play down the importance of constraints on the executive, or institutional quality, on debt.

An old determinant of redistribution, which would lead to bigger government and external debt alike, inequality, does not play its predicted role in the region either, which also contrasts with Berg and Sachs (1988) and Woo (2003). This is perhaps because, although South America is known for being relatively unequal, in fact not all those countries are actually that unequal (Argentina, Chile and Uruguay, to mention a few, do not present high Gini coefficients of their own, and Brazil has presented decreasing inequality since the stabilisation of the 1990s—see Bittencourt (2011) for a recent analysis of the Brazilian case).

Alternatively, some would argue that new democratic coalitions coming into power, even when supposedly from the left, will try to disguise themselves and avoid engaging in leftist redistribution (Acemoglu, Egorov and Sonin (2011)), which might be a mitigating factor of the effect of inequality on debt. In this vein, it could also be argued instead that since those outgoing dictatorships presented a right-wing flavour, the first democratic coalitions coming into power would be of a more left-wing nature and with particular redistributive tendencies. However, this is an unwarranted generalisation, *e.g.*, Alfonsín and Sarney (the first Argentinean and Brazilian civilian Presidents) were not representatives of any left-wing coalition (Alfonsín's coalition was not related to the more leftist Peronist party, and Sarney's coalition excluded the main Brazilian leftist parties). Nevertheless, both coalitions engaged in redistributive policies. All in all, the link between debt and inequality, at least in South America, does not seem to be entirely clear, and therefore deserves more attention as well<sup>7</sup> <sup>8</sup>.

In a nutshell, we have tested for different hypothesis on what determines government and external debt in the young democracies of South America, a sample which offers us with enough variation, not to mention interesting structural changes, so that we can further our knowledge about the continent's recent history. More importantly, we have been able to learn firstly that the region is countercyclical; secondly that inflation, in conjunction with interest ceilings, is probably being used as an instrument for debt liquidation (a subject that certainly deserves more attention); thirdly that the effect of the institutional reforms implemented (mostly) after re-democratisation

are still not being picked up by the analysis conducted here; and finally that inequality (for all sorts of reasons) is not really affecting the size of government and external debt in the region. All the same, with those results we not only deepen what we know about the region, but also avoid unwarranted generalisations about the continent<sup>9</sup>.

#### *D. Final Observations*

In this paper we have investigated the determinants of government and external debt in the young democracies of South America. The results, based on a sample of South American countries that have gone through particular political (democratisation) and economic (growth collapses, hyperinflationary episodes and macroeconomic stabilisation) structural changes in the last thirty years or so, and on principal component and dynamic panel (time-series) data analyses, indicate that faster and consistent economic activity is the only variable that robustly has been able to reduce government and external debt in the region.

The importance of this study is that with panel (time-series) data and analysis we have been able to specifically study the South American case, with all its idiosyncrasies, without having to incur in generalisations which are not always warranted (in particular about the roles of growth, inflation, constraints on the executive and inequality on debt), nor to treat the region either as a dummy or as an outlier to be removed from the sample. With that we have been able to comparatively further our understanding of the recent history of the continent in terms of government and external debt during an eventful period of its history, which might also be of use to understand the importance that an environment conducive to faster economic growth can play on the current debt crisis that some European countries are experiencing at the moment.

Future research can be extended to further disaggregations and comparisons. For instance, some transition economies from eastern Europe have also been through important political and economic structural changes in the last twenty years or so, and understanding the determinants of government and external debt will certainly be informative for the region. Moreover, needless to say that understanding the current debt crisis in Europe is of paramount importance, and the analysis conducted here can be extended to that particular group of countries as well. In addition, an interesting counterfactual would be to study the behaviour of debt in low-inflation countries to see if the results obtained here hold, or whether inflation keeps its not so clear-cut role on debt.

On a more methodological note, spatial dependence, given the nature of these regions, is perhaps an issue which can be explored in future research<sup>10</sup>.

Essentially, perhaps the main lessons from the above analysis is firstly the importance of avoiding particular generalisations, and secondly the need for a return to the basics in terms of understanding government and external debt, and the role and relevance of economic activity and prosperity in keeping debt under control. The latter is interesting in itself, since the lesson, or the main policy implication, coming from the analysis is about promoting an environment conducive to economic activity, which somehow contrasts with some of the interventions and policies being recently implemented in countries like Argentina and Bolivia, and Europe to tackle the crisis, which are more along the lines of not generating faster economic activity.

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## Notes

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<sup>1</sup>See, for instance, Sachs (1985).

<sup>2</sup>A parallel literature dealing with political budget cycles is also of some interest for the South American case, however we do not deal explicitly with those issues in this paper. In any case, see Rogoff and Sibert (1988), Rogoff (1990), Gonzalez (2002), Akhmedov and Zhuravskaya (2004), Brender and Drazen (2005), Shi and Svensson (2006), and Brender and Drazen (2007) for more on this literature.

<sup>3</sup>For instance, Woo (2003) uses in some of his regressions dummies for Latin America and Africa.

<sup>4</sup>Also, Phillips and Moon (1999) suggest that, because of the averaging taking place in panel estimation—which reduces the noise—spurious regressions are less of a problem within this setting.

<sup>5</sup>In addition, we follow the canonical Solow growth model and run regressions with investment as the identifying instrument for growth, and the FE-IV and GMM estimates are quantitatively and qualitatively similar to the ones reported above. Available on request.

<sup>6</sup>Another related possibility is suggested by Bohn (1998) in which interest rates on government bonds are kept lower than economic growth rates and, in the absence of negative shocks, that can generate sustainable deficits even in the long run.

<sup>7</sup>We have also estimated alternative regressions with lagged inequality on the RHS, to account for the fact that inequality is a slow-moving variable. The results are in line with the ones reported above. In addition, we include an interaction term between inequality and a variable accounting specifically for democratisation (the variable Polity from Polity IV), and the inequality estimates keep their positive signs and also their lack of significance. The interaction term is not significant either. Available on request.

<sup>8</sup>Another interesting issue to investigate is whether progressive taxation as such increased during the transition in an attempt at redistribution. If that was the case, then inequality would not play any role in increasing debt.

<sup>9</sup>We have also run regressions using the Kiviet's correction (Kiviet (1995)). All estimates follow the trend reported above. Available on request.

<sup>10</sup>We have also tentatively used Pesaran's (2006) Common Correlated Effects (CCE) estimator, which accounts for spatial dependence, and the estimates are in line with the ones reported above. For instance, the *GROWTH* estimate on *DEBT* is -.023 (-4.23). Available on request.