

Economic Growth and Government Debt: Evidence from the Young Democracies of South America

Manoel Bittencourt*

University of Pretoria

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Abstract

We investigate in this paper what are the main determinants of government and external debt in South America. Our sample purposely includes nine South American countries that re-democratised in the last thirty years or so, and the data cover the period between 1970 and 2007. The results, based on principal component and dynamic panel data analyses (we use the Pooled OLS, Fixed Effects, Fixed Effects with Instrumental Variables, DIF-GMM and SYS-GMM estimators), suggest that economic growth, predictably via the automatic stabilisers, 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 or clear-cut estimates on debt. Essentially, the former suggests that the (neoclassical) tax-smoothing model holds in South America, which—in times of a severe debt crisis in Europe—is very suggestive of the importance of public policies designed towards generating fast economic activity and prosperity in keeping debt, at least, under control.

Keywords: Growth, debt, South America.

JEL Classification: H60, N16, O11, O54.

I. Introduction and Summary

South America has been known, at least in the last thirty 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 southern European countries and all its possible economic implications in mind, we investigate what are the main determinants of government and external debt in the region. It is worth mentioning at this early stage the importance of both debt variables and how interconnected they actually are with each other, and also their relation with the debt rescheduling and default crisis 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.

To conduct the analysis we use data from nine South American countries which redemocratised at some point in the 1970s, 1980s and 1990s, and given data availability, we cover the period between 1970 and 2007. For the empirical analysis we make use of principal component and dynamic panel 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, via the automatic stabilisers, 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. Thirdly, there is no evidence that constraints on the executive, or better checks and balances which were implemented during the institutional reforms that some of those countries put in place in the 1990s, have had any effect in restraining spending and therefore debt. Fourthly, we are not able to report evidence that inequality, which is believed to be prevalent in some of the countries in the region has had any impact on debt, which in the vein of Meltzer and Richard (1991), would take place via some sort

of redistribution.

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 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 in some parts of South America, and also with the debt crisis in Europe in mind, policies which incentivise economic activity are certainly a better option than the current disrespect for properties rights taking place in Argentina and Bolivia, and the economic asphyxiation being implemented in the Giips countries (policies or interventions which are not known for generating economic growth).

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, so that our understanding of what generates debt is constantly being furthered. Barro (1979) argues, theoretically and empirically, that temporary increases in income play a countercyclical role on debt, and also that there is an expected positive effect of inflation on debt. In the South American case 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 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 higher debt. This is also interesting for our purposes here because some countries in South America are perceived to be rather unequal and one would expect inequality to play a positive role (via redistribution) on debt in the region.

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 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, 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 (Latin 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 re-introduces the role of inequality in the debate. He makes use of panel data and finds 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 this is an important factor within the South American context, a region known for being relatively unequal, which redemocratises and is faced with demand for redistribution. In this case it is expected that an attempt at redistribution tends to increase government debt.

Finally, Alesina, Tabellini and Campante (2008), also using panel data, suggest that fiscal pro-cyclicality 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 after their democratic transitions.

Essentially, the literature suggests that the tax-smoothing model does not always apply, particularly in developing countries, and that inequality and political instability might play a role in how governments behave when spending and generating debt¹. 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 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 is believed to offer more explanatory power. Finally, we use different dynamic panel data estimators, which tackle different empirical issues, to make sure that our results are robust. It is therefore believed that 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.

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 public debt to GDP (*DEBT*), from the recently released 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 can 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 is believed to present 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 faster tend to present lower debt, via the automatic stabilisers. The control 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. In this case it is predicted that in economies with better developed financial sectors governments can acquire finance more easily and therefore run higher public debt. The inflation rates (*INFLAT*), 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 control variables is that rapid population change and urbanisation in developing countries lead to higher spending in infrastructure, more constrained executives 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 lead 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 debt itself (*GOVERN*)—in Figure One we plot in clockwise fashion all these averaged series against time. This initial eyeball evidence shows that these country averages increased 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 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, we plot the economic growth averages in the region, 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. 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.

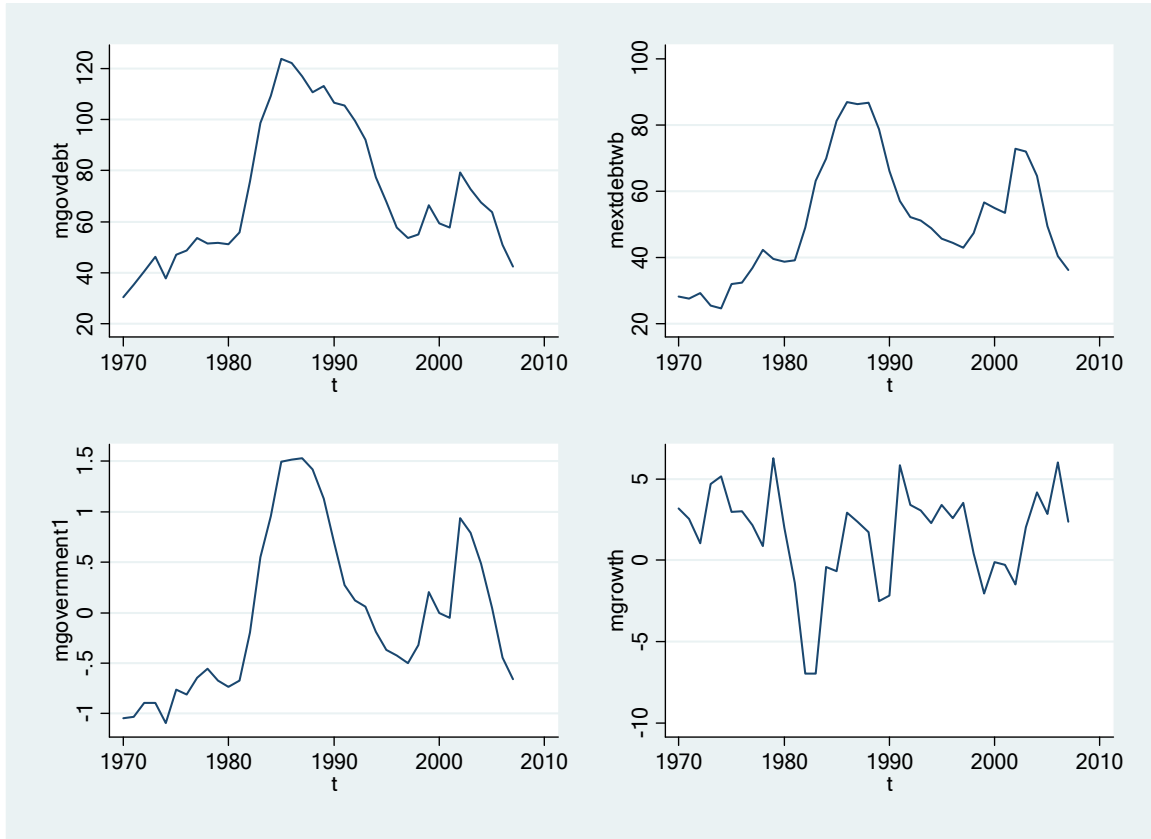


Figure 1: Government debt, external debt, government and economic growth, South America, 1970-2007. Sources: IMF, World Bank and PWT files.

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. 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 automatic stabilisers seem to be smoothly at work in the region.

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

| | DEBT | XDEBT | GOVERN | GROWTH |
|--------|---------|---------|---------|--------|
| DEBT | 1 | | | |
| XDEBT | 0.676* | 1 | | |
| GOVERN | 0.852* | 0.870* | 1 | |
| GROWTH | -0.145* | -0.277* | -0.239* | 1 |

Sources: IMF, World Bank and PWT files. * represents significance at the 5% level.

Furthermore, in Figure Two we provide in clockwise fashion the OLS regression lines amongst all variables for government and external debt against economic growth, and again there is a negative relationship between debt and faster economic activity, which suggests firstly a negative economic relationship between debt and growth, and secondly the importance of the automatic stabilisers in reducing debt, or alternatively speaking, that the neoclassical prediction of tax smoothing might well apply to the region.

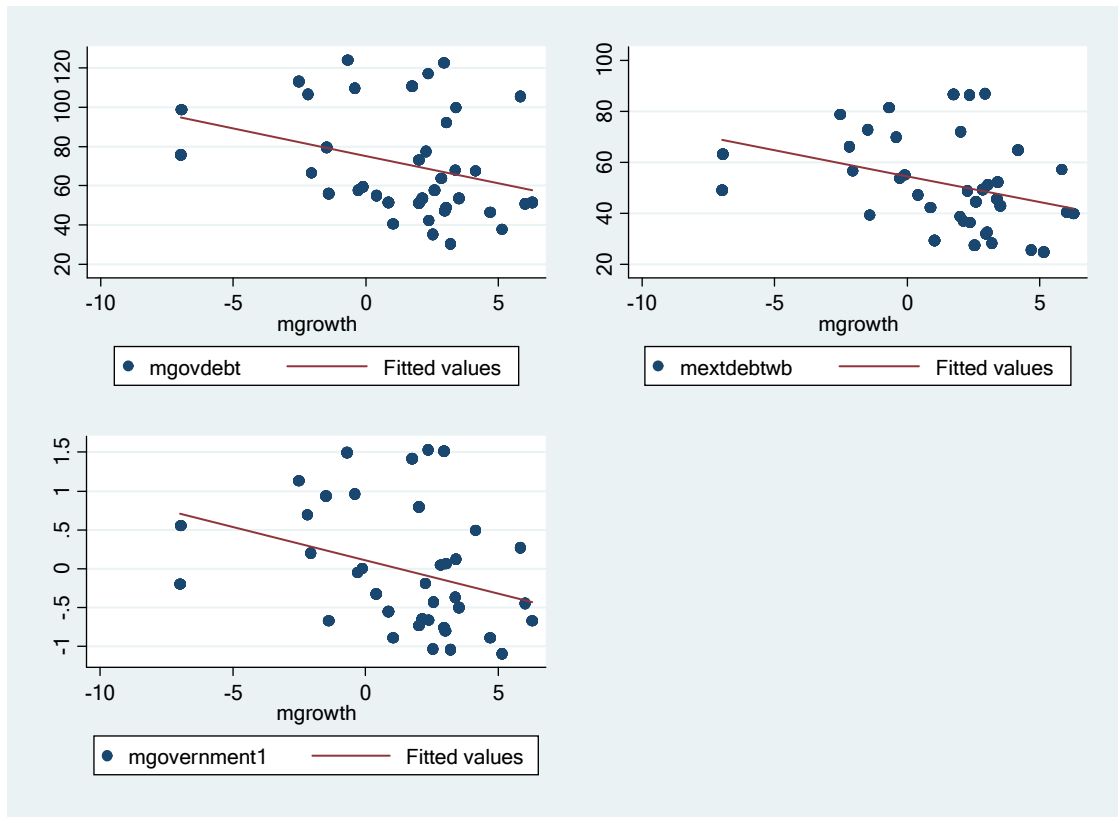


Figure 2: OLS regression lines, government debt, external debt, government and economic growth, South America, 1970-2007. Sources: IMF, World Bank and PWT files.

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, via the automatic stabilisers. This initial descriptive evidence is rather suggestive of the prediction provided by the neoclassical model of tax smoothing, and particularly interesting in times of a serious debt crisis that have been experienced recently by the Giips countries.

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 follow the previous literature and make use of dynamic panel (time-series) data analysis. Initially, since most variables are either ratios, or bounded within closed intervals, we do not pursue the issue of nonstationarity in panels here.

Firstly, we use the baseline Pooled OLS (POLS) estimator which assumes homogeneity of intercepts and slopes (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 minimises the Nickell bias present in short T dynamic panels, but also reduces statistical endogeneity and provides consistent estimates of the expected values.

Thirdly, although we attempt to use—given data availability—the most common (control) 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 $T \rightarrow \infty$, and the first lag of economic growth, inflation and government share to GDP are our identifying instruments for contemporaneous *GROWTH* (the growth literature suggests that government debt are detrimental to economic growth), *INFLAT* (some would argue that higher debt are behind higher inflation) 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 (Bond (2002) and Roodman (2009)), we carefully make use firstly of the Generalised Method of Moments (GMM) estimator proposed by Arellano and Bond (1991) First-Difference GMM (DIF-GMM) which is based on the idea 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 (Δy_{it-1}), SYSTEM (SYS), or the SYS-GMM estimator proposed by Arellano and Bover (1995), and Blundell and Bond (1998). Basically 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 use these two 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 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 for our purposes here. The estimated differenced SYS-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 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 *GROWTH* and the other control variables. Essentially, all *GROWTH* estimates are negative, and mostly statistically significant, which initially highlights the importance of the automatic stabilisers 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.

OPEN presents the predicted negative signs, with most estimates being statistically significant, and *M2* 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, which could have had an impact on the way inflation affects government debt.

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

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. Finally, the Arellano and Bond *m2* tests for second-order serial correlation suggest that we can not reject the null hypothesis and the Sargan tests do 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

| 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) | -1.06 (-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 ₁ | .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 *GROWTH* and also the other controls. Again, the *GROWTH* estimates are all negative and mostly statistically significant, with DIF-GMM being the only exception in terms of statistical significance in this case. This suggests once more the role of the automatic stabilisers 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 again a plausible effect.

OPEN presents the predicted negative signs again, however the estimates are not statistically

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

The other control variables do not present clear estimates in terms of signs either, with some of them actually flipping signs, nor in terms of statistical significance. *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. Finally, 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

| 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 ₁ | .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 $GROWTH$ as well as the other controls. 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 and help to bring the, somehow forgotten, role of the automatic stabilisers back to the discussion of public and external debt in general.

OPEN and *INFLAT* present similar estimates as before, with both variables having the effect of reducing debt (*OPEN* via higher taxes and tariffs, and *INFLAT* probably via the pervasive and distortionary channels of financial repression and full indexation), however those estimates are not entirely always 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. *INEQ* presents 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. Finally, about the validity of the instrument set, the Arellano and Bond, and Sargan tests again do not detect any evidence of invalidity or proliferation of instruments within the DIF-GMM and SYS-GMM framework.

Table Four: Dynamic POLS, FE and GMM Estimates

| 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 ₁ | .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 variable which actually follows the predicted hypothesis, presenting negative and statistically significant estimates against government and external debt in the region. Essentially this indicates not only the importance of the automatic stabilisers, but also the importance of faster economic activity and prosperity on debt reduction, which, in light of a renewed spell of populism in the region and the severe debt crisis that southern 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. 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 for the voracity effect or "starve the Leviathan" predictions in the region.

In terms of policy, these results suggest firstly that the market reforms (*e.g.* the opening up of those economies to international trade, the implementation of fiscal responsibility laws and central bank independence, and some pension and labour market reforms) implemented in South America mostly in the 1990s have been a step in the right direction in terms of generating faster economic activity. Secondly, the South American experience can be extended to the current European case in the sense that the labour market reforms being implemented now are certainly important for the future and even overdue in most cases (Annicchiarico, Di Dio and Felici (2012)), however the combination with fiscal austerity is a worrying cocktail which is not, as we speak, generating faster economic activity, which is at the end of the day the best way for having debt repaid.

Moreover, inflation is an important variable which presents (unexpected) negative estimates. These unexpected estimates are probably because some of those countries engaged in severe interest rate controls (financial repression), which would artificially reduce the impact 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.

Furthermore, our variable $XCONST$, accounting 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. 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, and it is plausible to assume that because of this the data are still not picking those institutional changes up, which are believed to restrain the way governments

behave. Alternatively, it can be suggested that in some countries macroeconomic stabilisation was achieved before these institutional reforms were implemented, which would possibly play down the importance of constraints on the executive, or institutional quality, on debt.

In addition, an old determinant of redistribution, which would lead to bigger government and external debt, inequality, does not play its predicted role in the region either. 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. 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.

D. Final Observations

In this paper we have investigated the role of economic growth, via the automatic stabilisers, or the tax-smoothing model, and also other important variables on government and external debt. The results, based on a sample of South American countries that have gone through particular political (democratisation) and economic (growth collapses and hyperinflationary episodes) structural changes in the last thirty years or so, and on principal component and dynamic panel data analyses, indicate that faster economic activity is the only variable that consistently and significantly has been able to reduce government and external debt in the region.

The importance of this study is that we have been able to specifically study the Latin American case, with all its idiosyncrasies, without having to incur in generalisations which are not always warranted (in particular about the roles of 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 region 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 faster economic growth can play on the current debt crisis that some southern European countries are experiencing at the moment.

All in all, the tax-smoothing model holds in South America and there is no reason to believe that it will not hold in other regions, so the importance of promoting sustained economic activity. In practical terms, we are obviously not advocating any backtracking in terms of much needed labour market reforms, however perhaps the structural reforms being implemented at the moment in Europe should be gradually implemented, or backloaded, and combined with policies which generate faster economic activity which is the best way of repaying debt². On a more anecdotal vein, this is not to mention the fact that some fast-growing economies of today which are still converging towards the technological frontier have been, in fact, financing soaring debt in more mature societies which are already at the frontier, and therefore not growing as fast.

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 role, if any, of economic growth on 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. 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 research³.

Essentially, perhaps the main lesson from the above analysis is 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. This is interesting in itself, since the lesson, or the main policy implication, coming from the analysis is about promoting economic activity, which somehow contrasts with some of the policies being implemented in Europe to tackle the crisis, which are more along the lines of (not) generating faster economic activity.

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Notes

*Department of Economics, University of Pretoria, Lynnwood Road, Pretoria 0002, RSA, e-mail: manoel.bittencourt@up.ac.za. I thank seminar participants at UCT, Pretoria, Goettingen, Stellenbosch and ERSAs Public Economics Workshop in Johannesburg for comments.

¹A parallel literature dealing with political budget cycles is also of some interest for the Latin 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.

²It is worth mentioning that Vavouras (1999) reports results which suggest that economic growth played an important role in reducing debt in Greece for the period between 1981 and 1992, which reinforces the message we are conveying here.

³We have also 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.