Liquidity Constraints and Excess Sensitivity of Consumption in Latin American Countries

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1 Introduction

Recent findings show that saving rates are much less procyclical in Latin America than in OECD countries. This means that consumption is highly procyclical in Latin America.[1] Such evidence is at odds with standard models of consumption smoothing, since the small difference in persistence of output between Latin America and OECD countries cannot explain by itself the much lower procyclicality of saving rates in Latin America.[2]

This study explores two models that may explain the cyclicality of consumption in Latin America: liquidity constraints and "voracity effects" models, which have different implications on the response of consumption to income shocks. Also, we test the permanent income hypothesis model (PIH) as a benchmark.

Liquidity constraints may play an important role in Latin America: if access to credit is very limited during recessions—as it happened in the eighties—that may force consumption to trace income more closely than if consumers and the government can freely borrow.[3] Some liquidity constraints models imply an asymmetric distribution of consumption.[4] If shocks are persistent and consumers cannot borrow, forward looking consumers should drop

[1] Lane and Tornell (1998) find a low procyclicality—or even countercyclicality—of total saving rate in Latin America. Gavin and Perotti (1998), Gavin, Hausmann, Perotti and Talvi (1996) and Talvi and Vegh (1997) find evidence that government savings are countercyclical in Latin America.

[2] See Gavin, Hausmann, Perotti and Talvi (1996).

[3] See Gavin et al. (1996).

[4] See, for example, Deaton (1991).

their consumption at the beginning of recessions, so they can accumulate assets to protect their consumption from the lower income levels they expect. When the recession ends, it is optimal for consumers to adjust consumption to the higher income levels. Thus, if consumers are forward looking and liquidity constrained, consumption will be more tied to expected positive changes in income than to expected negative changes in income.

Political and institutional distortions may also play a role on the behavior of consumption in Latin America. Recent studies explore the impact of such externalities. For example, in "voracity effects" models,[5] consumption is described by the interaction of different interest groups that have common access to aggregate output. This may result in an individually rational but collectively inefficient equilibrium, where consumption increases more than output in response to income shocks (the "voracity effect"). In this case, the incentives to increase consumption and appropriation may be stronger than the incentives to save, which results in a decline of saving rates. Talvi and Vegh (1997) introduce voracity effects in an optimal fiscal policy model as a political distortion that creates spending pressures. Given this distortion, the optimal fiscal policy will be procyclical.[6] The cyclical fluctuations of fiscal policy will in turn affect private consumption and thereby total saving rates.

Voracity effects models imply a more than proportional and symmetric variation in consumption in response to income shocks. The more-than-proportional and symmetric response of consumption to income shocks in voracity effects models and the asymmetric response of consumption in liquidity constraints models are testable implications that allow us to distinguish these models. Based on these implications, we conduct our investigation on the role of liquidity constraints and voracity effects in Latin America.

Campbell and Mankiw (1989) developed a framework to test the permanent income hypothesis where they allow for a fraction of "rule-of-thumb" consumers, who merely consume their current income. We use this approach to re-interpret and examine our questions in a simple and convenient fashion. If a fraction of consumption can be explained by predicted

[5]See Appendix (Lane and Tornell (1996) and Lane and Tornell (1998).

[6]Increase taxes and reduce expenditure in response to negative shocks and lower taxes and increase expenditure following positive shocks.

changes in current income, then we reject the PIH. If liquidity constraints are important, the fraction of consumption that responds to predicted changes in income should be significantly larger for positive shocks than for negative shocks. If voracity effects are relevant, the response of consumption to income shocks should be symmetric.

Our findings are inconsistent with the predictions of the permanent income hypothesis, since a fraction of the changes in consumption can be attributed to predictable changes in current income. We also find evidence of an asymmetric response of consumption to income shocks in Latin America.[7] For positive shocks, changes in consumption cannot be tied to predicted changes in income. For negative shocks instead, changes in consumption seem to be following changes in predicted income more closely, particularly public consumption. But if consumers are forward looking, we should expect the opposite for liquidity constraints to matter. Hence, it seems that neither liquidity constraints nor voracity effects models alone can explain the behavior of consumption in Latin America.

We also examine the behavior of consumption during ongoing recessions and booms. During upturns, public and private consumption behave in similar fashion, namely, changes in consumption cannot be tied to predicted changes in income. After several periods in a boom though, the fraction of consumption explained by predicted changes in income becomes significant. During longer recessions, consumption seems to be more tied to predicted changes in income, particularly government consumption. It seems that neither consumers nor the government accumulate enough assets during upturns to buffer consumption during recessions, and then are forced to trace income more closely during bad times. Therefore, it is possible that short planing horizons, liquidity constraints and voracity effects interact together to cause such behavior. For example, short planning horizons or voracity effects may prevent consumers and the government from accumulating enough buffer stock assets in good times, and then the presence of liquidity constrains forces consumption to trace income closely in bad times. When we study the impact of budget institutions, we find that in countries where poor budget institutions had led to little fiscal discipline, voracity effects may be relevant, whereas in countries with better budget institutions, we cannot

[7] Shea (1995) finds similar results for the U.S.

reject the PIH.

These results are thought provoking, but more research should be done in this area before reaching definite conclusions, since our results may be sensitive to model specifications. Nevertheless, the main point we derive from our investigation is neither the PIH, voracity effects nor liquidity constraints models alone can satisfactorily explain the behavior of consumption and saving in Latin America.

The next section shows some stylized facts about income and consumption volatility in Latin American economies. Section 3 reviews the main results of voracity effects and liquidity constraint models, using the results of the permanent income hypothesis as a benchmark. Section 4 presents the empirical model based on Campbell and Mankiw's rule-of-thumb approach. Section 5 describes the data and discusses the empirical results. The last section concludes.

2 Consumption and Income in Latin America: Stylized Facts.

Income shocks are persistent in Latin America. In Table 1, we display estimates of a measure of persistence developed in Campbell and Mankiw (1987). These estimates are a measure of the response of output in period $t+i$ to an innovation in period t.[8] We examine the persistence of shocks after 1, 2 or 3 periods. The results reveal that income shocks in Latin America are persistent, since shocks do not die out after 3 periods. Similar estimates for OCED countries show equivalent results. This suggests that the difference in the cyclical behavior of consumption between Latin American and OECD countries found in the literature, cannot be attributed to differences in the persistence of income shocks.

Table 2 displays the standard deviation of growth rates of real output and total consumption. The first two columns display real GDP and consumption deflated by the GDP deflator, while the third and fourth columns are deflated by the CPI. The series deflated by CPI tend to be more volatile for most countries than the series deflated by the GDP deflator. The high inflation rates experienced in the region are likely to be the cause of the

[8]The response of output period $t+i$ to an innovation in period t, is given by $1/(1-\sum_i^p \theta_i)$, where the θ_i 's are the coefficients of an AR(p) process $\Delta y_t = \mu + \sum_i^p \theta_i \Delta y_{t-1} + \epsilon_t$.

difference between both deflators.[9] We consider that the variables deflated by the CPI are better proxies for the value of the consumers' budget constraint and consumption, since they reflect the large variations in the purchasing power of output in Latin American countries due to high inflation and changes in the exchange rate. Therefore, we use them for the rest of our analysis. Consumption and income in Latin America are highly volatile. On average, output and consumption in Latin American countries are at least twice as volatile as in OECD countries. A striking feature of these results, regardless of the deflator, is that consumption in Latin America is more volatile than income, in contrast with OECD countries, where consumption is less volatile than income. The question that follows is what may be causing such differences.

Figure 1 displays growth rates of real output and consumption. These figures suggest that for most countries liquidity constraints may be playing a relevant role, since consumption falls drastically during recessions—particularly during the eighties for Mexico, Brazil, Costa Rica and Peru. On the other hand, the more than proportional rise of consumption in Venezuela that followed the oil boom in the seventies, is more in tune with the predictions of voracity effects models. Therefore, we have some a priori support for the presence of liquidity constraints and voracity effects in Latin America.

3 Liquidity Constraints and Voracity Effects Models

This section presents the permanent income hypothesis model that we use as a benchmark, the main results of some voracity effects models (Lane and Tornell (1998) and Talvi and Vegh (1998)) and a liquidity constraints model (Deaton (1991)). Our only goal is to specify the implications of these models that we later use to conduct our empirical analysis.

3.1 A benchmark: The permanent income hypothesis model.

The permanent income hypothesis (PIH) may be formulated so that aggregate consumption is derived from the decisions of a fully rational, forward looking and infinitely lived

[9] The difference is particularly large for some countries that experienced hyperinflation during the past decade (Brazil, Nicaragua and Peru).

representative agent that maximizes her lifetime utility,

$$\max_{\{\mathrm{C}_t\}_{t=0}^{\infty}} \; E_0 \left[\sum_{t=0}^{\infty} (1+\delta)^{-t} U(\mathrm{C}_t) \right]] \tag{1}$$

subject to a budget constraint, where C_t is consumption, δ is a subjective discount factor, and E_0 denotes the expectation taken at $t = 0$.

If the representative consumer can borrow and lend at the real interest rate r, the first order conditions of the problem are given by the Euler equation

$$E_t u'(\mathrm{C}_{t+1}) = \left(\frac{1+\delta}{1+r} \right) u'(\mathrm{C}_t) \tag{2}$$

Assuming that the utility function is quadratic, that r and δ are constant over time and that $r = \delta$, we obtain the martingale result, $E_t \mathrm{C}_{t+1} = \mathrm{C}_t$, i.e., the best prediction of tomorrow's consumption is today's consumption.[10] This implies in turn that

$$\Delta \mathrm{C}_t = \epsilon_t \tag{3}$$

where ϵ is the expectational error, i.e., the innovation in permanent income. Therefore, the PIH implies that changes in the levels of consumption cannot be predicted. Note that the changes in consumption are proportional and symmetric with respect to changes in output.

3.2 A Liquidity Constraints Model

If consumers have limited access to credit, the previous results need not hold. A simple way to incorporate liquidity constraints is shown in Deaton (1991). In a standard intertemporal utility maximization model, the usual Euler equation is modified to capture liquidity constraints. Defining cash on hand by $x_t = A_t + y_t$, where A_t is real assets and y_t is labor income (a random variable), consumption must now satisfy the modified version of the

[10] For a discussion about the implications of these assumptions and how the PIH is related to intertemporal choice theory, see Deaton (1992).

Euler equation

$$u'(\mathrm{C}_t) = max[u'(x_t), \frac{1+r}{1+\delta} E_t u'(\mathrm{C}_{t+1})] \tag{4}$$

where r is the real interest rate and δ is the discount rate, and both are constant. Deaton further assumes that $r < \delta$. This assumption is done in order to guarantee that liquidity constraints will be binding. With $r = \delta$, as we assumed for (3), we may still have liquidity constraints binding, depending on the income path. Equation (4) implies that consumption in any period can be no higher than the amount of cash on hand, x_t, and the marginal utility can be no lower than $u'(x_t)$. The constraint will be binding if $u'(x_t) > E_t\, u'(\mathrm{C}_{t+1})$; otherwise, C_t is derived by equating the two marginal utilities as usual.

The behavior of consumption is a result of the combination on the income process and the credit constraints. If income shocks are persistent[11]—which is the case for Latin American countries—and consumers are forward looking and liquidity constrained, they will save in the beginning of a downturn to protect themselves from future low income draws. Eventually, when the upturn starts, consumers will spend any assets they have left to finance a consumption boom, since they are liquidity constrained. No assets will be accumulated during the rest of the boom and consumption will be set equal to income.

Another way of looking at the implications for the behavior of consumption in the presence of liquidity constraints is the following: for simplicity, assume that the utility function is quadratic and that $r = \delta$ (consistent with the assumptions in the PIH benchmark). The Euler equation in (4) implies that

$$\mathrm{C}_t = min[x_t, E_t \mathrm{C}_{t+1}] \tag{5}$$

Ideally, consumers want a flat consumption path, regardless of the income path, but the presence of liquidity constraints may force consumers to trace their income paths. Suppose consumers expect a declining income path, e.g., at time t consumers expect a drop in income in $t+1$. In order to flatten their consumption, consumers may save by lowering

[11] For most countries, income growth seems to be well described by a positive autocorrelated process, $\Delta y_t = \alpha + \beta \Delta y_{t-1}$, where $\beta > 0$. In this case, positive shocks are likely to be followed by positive shocks and negative shocks are likely to be followed by negative shocks.

their consumption at time t, so that $c_t = E_t c_{t+1}$. Therefore, changes in consumption will be unpredictable. Now suppose that consumers expect an increasing income path, e.g., at time t their income is low, but they expect income to rise at time $t+1$. Since consumers are liquidity constrained at time t and they cannot borrow against future income, the best thing they can do is to set $c_t = x_t$ in period t and then set $c_{t+1} = x_{t+1}$ in period $t+1$. Consumption cannot be smoothed when consumers are credit constrained and expect an increasing income path. Hence, if consumers are credit constrained, consumption responses to predicted changes in income will be asymmetric: if income is expected to rise in period $t+1$ and liquidity constraints are binding in period t, changes in consumption will follow predicted changes in income. If income is expected to decline in period $t+1$, consumers can save in period t to smooth their consumption, and the Euler equation will hold as $c_t = E_t c_{t+1}$, so that changes in consumption will be unpredictable.

3.3 Voracity Effects Models

Lane and Tornell explain voracity effects as the outcome of the dynamic interaction of powerful groups with common access to output. The best response of each group to positive income shocks is to increase appropriation. Compared to a benchmark case,[12] the equilibrium saving rate with voracity effects is always less procyclical. If the intertemporal elasticity of substitution is large enough, the change in consumption will be more than proportional than the change in output, which is what the authors define as the voracity effect. The model implies a symmetric response of consumption to positive and negative income shocks.

Alternatively, Talvi and Vegh introduce the idea of voracity effects in a standard optimal fiscal policy model. When voracity effects are included in the model, if there is a positive shock that increases the tax base, the optimal policy response will be to reduce taxes and increase government spending. Therefore, the optimal fiscal policy will be procyclical with voracity effects, as opposed to the result in standard optimal fiscal policy problems.[13] In

[12] Lane and Tornell refer in particular to a case where the central planner maximizes the intertemporal utility function of the households. Such results are not inconsistent with the ones predicted by the PIH.

[13] In a standard optimal fiscal policy problem (benchmark), where government expenditure is exogenous

this model, household consumption is only affected by voracity effects via tax rates: the procyclicality of tax rates induces further changes in household consumption, which rises in good times and falls in bad times.[14] Therefore, total saving will be less procyclical as a result of the combined behavior of government and total consumption. The reduction of consumption in bad times is not due to the inability to borrow, but is due to the fact that the political distortion prevents the accumulation of a large enough surplus in good times to cancel out debt. This model also implies a symmetric response of saving and consumption to income shocks of any nature.

In this section we sketched liquidity constraints and voracity effects models using the PIH model as a benchmark. From these models we obtain empirical implications that we use in the rest of our analysis. The PIH model implies that changes in consumption cannot be explained by predicted changes in income. An implication of liquidity constraints models is that consumption responses to predicted income variations will not be symmetric, while voracity effects models imply a more than proportional and symmetric variation of consumption in response to income shocks. In the next section we present the empirical model we use to evaluate the role of voracity effects and liquidity constraints in Latin America.

4 The basic empirical model

As the basis for our empirical analysis we use a model developed by Campbell and Mankiw (1989) to test for the permanent income hypothesis. We present the original model first and then we explain the interpretation we give it for the purpose of our investigation.

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and there are no political externalities, we have that: i) the tax rate is constant over time, ii) the correlation between government spending and the tax base is zero, iii) the primary surplus should move one-to-one with the increase in tax revenues.

[14] This is not what happens in the benchmark case, where volatility of private consumption is not increased by fiscal policy.

4.1 The model

Starting from the PIH model shown in Section 3.1, Campbell and Mankiw's approach further assumes that there is a fraction λ of consumption that follows current income, and a fraction $(1-\lambda)$ of consumption that obeys permanent income only. Under this assumption, (3) can be written as

$$\Delta C_t = \lambda \Delta Y_t + (1 - \lambda)\epsilon_t \tag{6}$$

In this alternative specification, the change in consumption is a weighted average of changes in current income, ΔY_t, and the innovation in income, ϵ_t. If $\lambda = 0$, (6) reduces to the PIH.

4.2 The interpretation of λ

Following Campbell and Mankiw, we estimate (6) by instrumental variables, using lagged variables that predict future income growth. Therefore, the λ coefficient is a measure of the response of consumption to predictable current income variations. As we mentioned before, if $\lambda = 0$, equation (6) simply reduces to the PIH. Therefore, values of λ different from zero may be interpreted as departures from the PIH. A high λ indicates that a large fraction of consumption follows predicted current income. Thus, saving rates should be less procyclical when λ takes a high value than when it takes a low value. We do not constrain λ to be less than 1.

We also use this model to investigate the symmetry of the distribution of consumption in the business cycle. If λ is different from zero, and it takes significantly different values for positive and negative income shocks, that indicates an asymmetric response of consumption to predicted income shocks. If voracity effects are relevant, we should not expect significant differences in the estimates of λ for positive and negative income shocks, provided that voracity effects models predict a symmetric response of consumption to income shocks. On the other hand, if liquidity constraints play an important role, we should expect an asymmetric response of consumption to predicted changes in income: λ should be significantly higher for positive shocks than for negative shocks. We will follow this interpretation for most of the analysis, except when we examine the behavior of consumption during ongoing

recessions and booms. During such periods, we consider the responses of consumption to predicted income shocks, conditional on previous changes in income.

In the next section, we test for the PIH, voracity effects and liquidity constraints models in Latin America.

5 Empirical Results

We use panel data for 14 Latin American countries[15] and for 23 OECD countries.[16] The period is from 1973 to 1993. The Latin American data is from the Interamerican Development Bank and the OECD data is from the OECD National Accounts vol. 2. We use aggregate output and total consumption series, both deflated by the CPI, as our measures of income and aggregate consumption, respectively. Our analysis is centered in the results based on the aggregates deflated by the CPI. As we mentioned before, GDP deflated by the CPI gives us a more appropriate measure of the consumers' budget constraint than real GDP, which is a volume measure. The results using both deflators are qualitatively the same, but more noisy when using the GDP deflator. Panel data allows us to obtain more precise estimates than cross-sectional data and to consider country-specific trends by using cross-fixed effects.[17]

At a practical level, we approximate (6) in terms of consumption and income growth rates. We estimate the following equation

$$\Delta \log \mathrm{C}_t^i = \nu^i + \lambda \, \Delta \log \mathrm{GDP}_t^i + \upsilon_t^i, \tag{7}$$

where ν^i are cross-fixed effects and υ_t^i are error the terms.

Since it is likely that GDP_t^i is correlated with υ_t^i, we estimate (7) using instrumental variables. As instruments for changes in growth rates of GDP we use lagged variations in the terms of trade, and lagged changes in growth rates of GDP (at least for two periods).

[15] Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic and Venezuela.

[16] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, USA and Germany.

[17] See Beaudry and van Wincoop, (1996).

We further allow for country-specific variances of the error terms. We then estimate (7) by a two step Generalized Least Squares (GLS). The results are displayed in Tables 3 through 10.

Table 3 reports general results for Latin America and OECD countries. We test for different sets of instruments and show the R^2 of the first stage regression in the last column to give us an idea of the strength of the instruments. In both regions we depart from the PIH since a fraction of consumption follows predicted current income (around 20 percent in Latin America and nearly 40 percent in OECD countries). The results seem to indicate that changes in consumption in Latin America follow predictable changes in current income less closely than consumption in OECD countries. The problem is that lagged changes in GDP are weaker instruments for current changes in GDP for OECD countries as for Latin American countries.[18] Therefore, our results for OECD countries may be biased.[19] Lagged GDP and Δtot seem to be better instruments for Latin American countries. Table 4 shows calculations of λ using public and private consumption in Latin America. The results are very similar to those in Table 3 for total consumption and we also reject the PIH for public and private consumption.

Table 5 displays the estimates of λ for negative and positive shocks. To quantify the fraction of consumption following predicted current income in good and bad times a dummy variable D_t^i is added, so that the right hand side of the equation in the panel regression in (7) would be

$$\nu_i + \lambda\, D_t^i\, \Delta \log \mathrm{GDP}_t^i + \lambda^*\, (1 - D_t^i)\, \Delta \log \mathrm{GDP}_t^i + \upsilon_t^i, \tag{8}$$

where $D_t^i = 1$ if in year t country i's growth rate of GDP is above the average growth rate (across years) of country i's GDP and $D_t^i = 0$ in years when the GDP growth rate of country i is below the trend. The λ coefficient measures the fraction of consumption that traces predicted current income in good times, and similarly λ^* measures the fraction of consumption that traces predicted current income in bad times. The estimates of λ and

[18] Although we are not dealing with very weak instruments—large samples with low first stage R^2—the results for OECD countries using lagged GDP may not be as reliable as the results for Latin American countries.

[19] We may be overestimating λ for OECD countries (see Nelson and Startz (1990)).

λ^* are reported in Table 5. In the last column we report the p-values of a χ^2 test, for the hypothesis that λ=λ^*, i.e., a symmetric response of consumption to income shocks.

For total consumption, the values of λ are significantly different. The λ coefficients are larger during negative than during positive shocks, suggesting that consumption is more responsive to predicted changes in income during downturns than during upturns, but this is the opposite of what we should expect if liquidity constraints were important. The results reveal that the asymmetry in the response of total consumption is mainly due to public consumption. Private consumption seems to behave more symmetrically than public consumption, although in both cases the, whereas the λ coefficients for negative shocks are significant.

So far, our results are not consistent with the predictions of the PIH, voracity effects or liquidity constraints models. The existing models on voracity effects predict a symmetric response of consumption to income shocks, but the evidence of asymmetries we found, does not suggest that liquidity constraints are relevant. It seems that consumption is more smoothed following positive shocks than following negative shocks.

Table 6 examines the behavior of consumption during ongoing booms and recessions. We estimate the response of consumption to predicted changes in income in period t, given that there is a boom or a recession going on for at least two periods. The first two rows estimate the response of consumption in period t, given that Δy_t^i and Δy_{t-1}^i, corrected for its trend, have the same sign. For example, there is an ongoing boom in country i if $\Delta y_t^i > 0$ and $\Delta y_{t-1}^i > 0$, and there is an ongoing recession if $\Delta y_t^i < 0$ and $\Delta y_{t-1}^i < 0$. The estimates in last two rows are equivalent, but the boom or recession is going on for three periods, e.g., the change in income growth in country i, corrected by its the trend, have the same sign in periods t, $t-1$ and $t-2$.

Again, the results in Table 6 show no evidence of asymmetry in private consumption. Government consumption, on the other hand, is more tied to changes in income during recessions than during booms, particularly if the recession has lasted for more than two periods (last row). During ongoing booms, public and private consumption behave in a similar fashion. There seems to be some consumption smoothing during ongoing booms,

although consumption becomes more responsive to predicted changes in income during longer booms (last two rows). In recessions though, consumption is more sensitive to predicted current income, particularly government consumption in longer recessions (last row). It seems that the government is not accumulating enough assets during good times to buffer consumption in bad times, so public consumption is following income closely during prolonged recessions. This type of behavior of consumption may be consistent with a short planning horizon in the presence of liquidity constraints, or with the interaction of voracity effects and liquidity constraints. If consumers and the government have a short planning horizon and are liquidity constrained, it is likely that during prolonged recessions they run out of assets before the recession is over, and then set consumption equal to income. Alternatively, the presence of voracity effects may be making the accumulation of buffer stock assets costly and then liquidity constraints may be forcing consumption to trace income closely during prolonged recessions. Our sample is small though, and that may be a caveat for our results. Nevertheless, these results are thought provoking and the important conclusion we can derive from them, is that neither of the models we are testing for: the PIH, liquidity constraints or voracity effects alone can explain satisfactorily the behavior of consumption in Latin America.

As we mentioned in Section 2, prices are very volatile in Latin America. In order to investigate how these variations may be affecting our results, we further split the sample according to the volatility of the CPI. The results are displayed in Tables 7 and 8. The results for countries with lower volatility of CPI—the ones we expect to provide less noisy information—are very similar to our previous results. Again, there is a fraction of consumption that follows predicted current income and this fraction is significantly larger for negative shocks than for positive shocks, particularly for public consumption. Countries with higher price volatility seem to have a more symmetric response to income shocks.

5.1 Institutional Arrangement and Procyclicality of Fiscal Policy

A recurring topic in recent literature about fiscal policy in Latin America is the link between political and institutional variables and fiscal performance. Stein, Talvi and Grisanti

(1998) investigate how electoral systems and the budgetary process (the set of rules and procedures followed to draft and approve the budget) affect fiscal performance.[20] They find that hierarchical and transparent budget procedures tend to lead to lower deficits and debt in Latin America. Alesina, Hausmann, Hommes and Stein (1996) find evidence that hierarchical and transparent budget processes and the presence of laws limiting the permissible size of deficits generate more fiscal discipline—defined as low average deficits—than collegial and non-transparent budget processes and lack of binding constraints for the deficit in Latin America.[21] Therefore by promoting fiscal discipline, hierarchical and transparent budget institutions may also limit the impact of voracity effects.

Since voracity effects are the outcome of political and institutional externalities, we also examine in this study whether institutional arrangements affect voracity effects and thereby the cyclicality of savings in Latin America.

Table 9 and Table 10 display the results for budget institutions. We split the sample following an index constructed in Alesina, Hausmann, Hommes and Stein (1996) to rank budget procedures in Latin American countries. The higher the index of budget institutions (IBI), the more transparent and hierarchical the budget procedures are, and the lower the index the less transparent and collegial the processes are. Following our previous arguments, asymmetries in consumption suggest that liquidity constraints are important in Latin America, while a symmetric response of consumption to income shocks is more in tune with voracity effects.

Table 9 displays estimates of the total value of λ and in Table 10 we examine the symmetry of consumption. We can only reject the PIH for countries with poor budget institutions. In Table 10, we cannot reject the null of a symmetric response of consumption to income shocks, except for public consumption in countries with better budget institutions. Pub-

[20] Fiscal performance is measured in terms of the size of government expenditure and surplus, the size public debt and the response of fiscal policy to cyclical fluctuations.

[21] Hierarchical processes are those where the balance of power is shifted toward the finance minister and the executive rather than the rest of the spending ministers and the legislative. In collegial processes the spending ministers have as much power as the finance minister and the legislative is able to modify the budget bill to a large extent, once approved by the executive. Transparency of the budget process refers to the incentives to misrepresent expenditures while the budget is drafted. See Alesina, Hausmann, Hommes and Stein (1996) for a more extensive explanation of these definitions.

lic consumption appears to be more symmetric in countries with poor budget institutions, which is not inconsistent with the predictions of voracity effects models. Therefore, voracity effects may be playing a role in countries with poor budget institutions.

6 Concluding Remarks

In this paper we evaluate whether voracity effects or liquidity constraints can explain consumption and saving in Latin America, testing for the PIH as a benchmark. We find that a fraction of consumption in Latin America (around 20 percent) is following predicted changes in current income, suggesting that the PIH model may not be adequate to explain consumption and saving in the region. We found evidence of asymmetries in the response of consumption to income shocks in Latin America, particularly government saving. Changes in consumption are more responsive to predicted changes in income for negative shocks than for positive shocks, which is not to be expected if consumers were forward looking and liquidity constrained. Voracity effects may be playing a role in countries where poor budget institutions have resulted in little fiscal discipline. In spite of the limitations that our basic model specifications may introduce, these results are thought provoking and the important conclusion we can derive from them, is that neither the PIH, liquidity constraints nor voracity effects models alone, can explain satisfactorily the behavior of consumption in Latin America.

It is maybe a combination of voracity effects or short planning horizons with liquidity constraint what explains the behavior of consumption in Latin America. It could be that voracity effects or short planning horizons prevent consumers and the government from accumulating enough buffer stock assets, and then the presence of liquidity constraints forces consumption to trace income more closely during prolonged recessions. In any event, more research should be done in this area before reaching definite conclusions.

References

Alesina, Alberto, Ricardo Hausmann, Rudolf Hommes and Ernesto Stein, 1996, Budget Institutions and Fiscal Performance in Latin America, *NBER Working Paper 5586.*

Beaudry, Paul and Eric van Wincoop, 1996, The Intertemporal Elasticity of Substitution using a US Panel of State data, *Economica*, 63, 495-512.

Campbell, John and Gregory Mankiw, 1987, Are output Fluctuations Transitory, *Quarterly Journal of Economics,* 857–80.

Campbell, John and Gregory Mankiw, 1989, Consumption, Income and Interest Rates: Reinterpreting the Time Series Evidence, *NBER Macroeconomic Annual, 1989.*

Deaton, Angus, 1991, Saving and Liquidity Constraints, *Econometrica*, 59, 1221-48.

Deaton, Angus, 1992, *Understanding Consumption,* Oxford University Press, New York.

Gavin, Michael, and Roberto Perotti, 1997, Fiscal Policy in Latin America, *NBER Macroeconomics Annual, 1997.*

Gavin, Michael, Ricardo Hausmann, Roberto Perotti and Ernesto Talvi, 1996, Managing Fiscal Policy in Latin America and the Caribbean: Volatility, Procyclicality, and Limited Creditworthiness, *Interamerican Development Bank Working Paper Series 326,* Washington, D.C.

Gavin, Michael, Ricardo Hausmann, and Ernesto Talvi, 1997, Savings Behavior in Latin America: Overview and Policy Issues, in: Ricardo Hausmann and Helmut Riesen, eds., *Promoting Savings in Latin America,* OECD Development Center.

Inter-American Development Bank, 1995, *Report on Economic and Social Progress in Latin America, 1995,* Washington, D.C.

Lane, Phillip and Aaron Tornell, 1996, Power, Growth and the Voracity Effect, *Journal of Economic Growth,* 1, 213-241.

Lane, Phillip and Aaron Tornell, 1998, Why aren't saving rates in Latin America Procyclical?, NBER Working Paper, 6502.

Rojas-Suarez, Liliana and Steven R. Weisbrod, 1997, Financial Markets and the Behavior of Private Savings in Latin America, in: Ricardo Hausmann and Helmut Riesen, eds., *Promoting Savings in Latin America,* OECD Development Center.

Nelson, Charles and Richard Startz, 1990, The Distribution of the Instrumental Variables Estimator and Its t-Ratio When the Instrument Is a Poor One, *Journal of Business*, 63 (1), s125–s140.

Shea, John, 1995, Myopia, Liquidity Constraints and Aggregate Consumption: A Simple Test, *Journal of Money, Credit and Banking*, 27 (3), 798–805.

Stein, Ernesto, Ernesto Talvi and Alejandro Grisanti 1998, Institutional Arrangements and Fiscal Performance in Latin American, in: Poterba and J. von Hagen, eds.*Fiscal Institutions and Fiscal Performance,* Chicago University Press, Chicago.

Table 1

Persistence of Output in Latin America. 1973-1993.

Table 1:

	Lags (i)	Average persistence
All countries	1	1.45
All countries	2	1.33
All countries	3	1.27
Lower group	2	1.13
Higher group	2	1.73
Lower group	3	0.93
Higher group	3	1.93

Notes: Notes. Countries: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela. Lower group includes the 12 countries with lower persistence measure. Higher group includes countries with higher persistence measure. The persistence measure indicates the response of the log of output in period $t + i$ to an innovation in period t.

Table 2

Volatility of Consumption and GDP in Latin America.

Standard deviations of growth rates 1971-94 (Percentage).

Table 2:

	Real GDP	Real C.	GDP/CPI	C/CPI
Argentina	4.7	5.0	7.4	—
Bolivia	3.4	3.4	8.3	—
Brazil	5.6	5.1	10.5	10.8
Chile	6.3	7.2	10.7	—
Colombia	2.0	2.2	3.7	3.2
Costa Rica	3.6	3.6	6.7	7.1
Ecuador	7.1	4.4	6.6	4.6
El Salvador	5.1	6.5	7.2	5.8
Guatemala	3.0	3.4	3.1	2.3
Honduras	3.7	5.3	5.2	3.4
Mexico	3.6	4.1	6.4	6.7
Nicaragua	7.9	5.9	19.9	22.3
Panama	5.3	11.5	5.5	5.4
Peru	7.0	6.2	17.7	17.0
Paraguay	4.0	5.3	4.6	5.5
Dominican Republic	4.6	8.1	6.3	7.1
Uruguay	4.4	5.0	5.4	—
Venezuela	4.4	11.4	10.1	15.0
Latin American Average	4.7	5.7	8.1	8.3
OECD average	2.4	2.3	3.2	2.6

Notes: Data sources: Interamerican Development Bank National Account Statistics, OECD National Accounts vol. 2. Nominal consumption data was not available for Argentina, Bolivia, Chile and Uruguay for most part of the period covered and therefore is not included. Own calculations.

Table 3

Estimation Results for the Euler Equation for Latin American and OECD countries.

1973-93.

Table 3:

Sample	Inst.	λ(s.e.)	First Step R^2
Latin	GDP, Δtot	0.18 (0.07)	0.13
Latin*	GDP, Δtot	0.22 (0.08)	0.13
Latin	GDP	0.22 (0.07)	0.12
OECD	GDP	0.37 (0.15)	0.06

Notes. Latin American countries included: Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic and Venezuela. (*) Excludes oil producers Ecuador, Mexico and Venezuela. OECD countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, USA and Germany. The coefficient λ is the slope in the regression of $\Delta \log \mathrm{C}_t^i$ on $\Delta \log \mathrm{GDP}_t^i$. The instrumets for $\Delta \log \mathrm{GDP}_t^i$ are $\Delta \log \mathrm{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$.

Table 4

Estimation Results for the Euler Equation for Latin American countries. Public and Private Consumption. 1973-93.

Table 4:

Consumption	Sample	λ(s.e.)	First Step R^2
Private	Latin	0.18 (0.07)	0.13
Public	Latin	0.17 (0.11)	0.13
Private	Latin*	0.23 (0.08)	0.13
Public	Latin*	0.20 (0.12)	0.13

Notes. Latin American countries included: Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic and Venezuela. (*) Excludes oil producers Ecuador, Mexico and Venezuela. OECD countries included: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Greece, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, USA and Germany. The coefficient λ is the slope in the regression of $\Delta \log \mathrm{C}_t^i$ on $\Delta \log \mathrm{GDP}_t^i$. The instrumets for $\Delta \log \mathrm{GDP}_t^i$ are $\Delta \log \mathrm{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$.

Table 5

Estimation Results for the Euler Equation for Latin American Countries. Positive Shocks and Negative Shocks. 1973-93.

Table 5:

Consumption	λ(s.e.) Positive shocks	Negative shocks	P-value Total
Total	0.07 (0.09)	0.34 (0.12)	0.06
Private	0.11 (0.09)	0.30 (0.11)	0.20
Public	−0.02 (0.13)	0.47 (0.20)	0.03
Total (*)	0.11 (0.09)	0.39 (0.13)	0.08
Private (*)	0.15 (0.10)	0.36 (0.13)	0.18
Public (*)	0.03 (0.14)	0.50 (0.22)	0.06
Total (**)	−0.19 (0.41)	1.11 (0.67)	0.04

Notes. Latin American countries included: Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic and Venezuela. (*) Excludes oil producers, Mexico, Venezuela and Ecuador. (**) Real variables in US dollars deflated by the GDP deflator. The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Positive and negative shocks are determined in according to country i's own average GDP.

Table 6

Estimation Results for the Euler Equation for Latin American Countries. Ongoing Booms and Ongoing Recessions. 1973-93.

Table 6:

Consumption	λ(s.e.)		P-value
	Ongoing booms	Ongoing recessions	Private (*)
Private (*)	0.17 (0.12)	0.39 (0.17)	0.30
Public (*)	0.07 (0.16)	0.48 (0.26)	0.08
Private (**)	0.42 (0.17)	0.48 (0.22)	0.76
Public (**)	0.54 (0.22)	0.91 (0.33)	0.11

Notes. Latin American countries included: Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic and Venezuela. (*) Output growth is below or above trend for periods t and $t-1$. (**) Output growth is below or above trend for periods t, $t-1$ and $t-2$.The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Ongoing recessions and booms are determined in according to country i's own average GDP in period t and in s previous periods. For an ongoing recession, countries' own output should be below trend for at least two periods, t and $t-1$, and vice-versa for ongoing booms.

Table 7

Effects of the Volatility of CPI.

Table 7:

Volatility	Consumption	λ(s.e.)	First Step R^2
Higher	Total	0.07 (0.11)	0.11
Higher	Private	0.06 (0.11)	0.11
Higher	Public	0.13 (0.17)	0.11
Lower	Total	0.20 (0.08)	0.14
Lower	Private	0.22 (0.08)	0.14
Lower	Public	0.18 (0.15)	0.14

Notes. Volatility of CPI (in decreasing order): Brazil, Nicaragua, Peru, Uruguay, Venezuela, Argentina, Ecuador, Colombia, Costa Rica, Paraguay, Mexico, Dominican Republic, Bolivia, Chile, Honduras, Guatemala, El Salvador and Panama. Higher volatility: 1 includes the 7 countries with the highest volatility. Lower volatility: includes the 7 countries with the lowest volatility. Excludes Argentina, Bolivia, Chile and Uruguay because of missing observations. The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Positive and negative shocks are determined in according to country i's own average GDP.

Table 8

Effects of the Volatility of CPI.

Positive Shocks and Negative Shocks. 1973-93.

Table 8:

Volatility	Consumption	λ(s.e.) Positive shocks	Negative shocks	P-value Higher
Higher	Total	0.02 (0.16)	0.19 (0.17)	0.47
Higher	Private	0.02 (0.15)	0.13 (0.16)	0.63
Higher	Public	0.06 (0.22)	0.41 (0.31)	0.30
Lower	Total	0.10 (0.09)	0.36 (0.15)	0.13
Lower	Private	0.14 (0.10)	0.30 (0.15)	0.33
Lower	Public	−0.01 (0.17)	0.35 (0.26)	0.09

Notes. Volatility of CPI (in decreasing order): Brazil, Nicaragua, Peru, Uruguay, Venezuela, Argentina, Ecuador, Colombia, Costa Rica, Paraguay, Mexico, Dominican Republic, Bolivia, Chile, Honduras, Guatemala, El Salvador and Panama. Higher volatility: 1 includes the 7 countries with the highest volatility. Lower volatility: includes the 7 countries with the lowest volatility. Excludes Argentina, Bolivia, Chile and Uruguay because of missing observations. The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Positive and negative shocks are determined in according to country i's own average GDP.

Table 9

Budget Institutions.

Index of Budget Institutions (IBI): High Index and Low Index(*).

Table 9:

Index	Consumption	λ(s.e.)	First Step R^2
High IBI	Total	0.12 (0.10)	0.15
High IBI	Private	0.13 (0.09)	0.15
High IBI	Public	0.08 (0.16)	0.15
Low IBI	Total	0.19 (0.08)	0.19
Low IBI	Private	0.21 (0.08)	0.19
Low IBI	Public	0.12 (0.12)	0.19

Notes. (*) A higher index of budget institutions indicates a more transparent and hierarchical budget process. IBI rank: Chile, Mexico, Colombia, Panama, Uruguay, Guatemala, Costa Rica, Paraguay Venezuela, Ecuador, Brazil, Honduras, Bolivia, Dominican Republic, Argentina, El Salvador, Peru. (Ranked in decreasing order.) Row 1 includes the 7 countries with the highest IBI. Row 2 includes the 7 countries with lowest IBI. Excludes Argentina, Bolivia, Chile and Uruguay because of missing observations. The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Positive and negative shocks are determined in according to country i's own average GDP.

Table 10

Budget Institutions.

Index of Budget Institutions (IBI): High Index and Low Index(*).

Positive Shocks and Negative Shocks. 1973-93.

Table 10:

Index	Consumption	λ(s.e.) Positive shocks	Negative shocks	P-value High IBI
High IBI	Total	0.03 (0.09)	0.26 (0.19)	0.24
High IBI	Private	0.06 (0.09)	0.23 (0.19)	0.38
High IBI	Public	−0.13 (0.15)	0.42 (0.29)	0.07
Low IBI	Total	0.15 (0.13)	0.22 (0.09)	0.65
Low IBI	Private	0.20 (0.13)	0.21 (0.09)	0.96
Low IBI	Public	−0.02 (0.19)	0.25 (0.16)	0.26

Notes. (*) A higher index of budget institutions indicates a more transparent and hierarchical budget process. IBI rank: Chile, Mexico, Colombia, Panama, Uruguay, Guatemala, Costa Rica, Paraguay Venezuela, Ecuador, Brazil, Honduras, Bolivia, Dominican Republic, Argentina, El Salvador, Peru. (Ranked in decreasing order.) Row 1 includes the 7 countries with the highest IBI. Row 2 includes the 7 countries with lowest IBI. Excludes Argentina, Bolivia, Chile and Uruguay because of missing observations. The coefficient λ is the slope in the regression of $\Delta \log C_t^i$ on $\Delta \log \text{GDP}_t^i$. The instruments for $\Delta \log \text{GDP}_t^i$ are $\Delta \log \text{GDP}_{(t-s)}^i$, where $s = 2, 3$ and variations on the terms of trade, $\Delta tot_{(t-s)}^i$ where $s = 2$. Positive and negative shocks are determined in according to country i's own average GDP.