

Income and Consumption Insurance in Latin America: The Role of Transfers, Fiscal Policy and Indebtedness

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Abstract

This paper measures how much income and consumption smoothing is attained in Latin American economies. We find that international transfers play a relevant role in cross-country income insurance, particularly among Central American countries. Private saving carries out most of the smoothing, while fiscal policy does not play an effective role in buffering income shocks. Fiscal discipline and access to international capital markets in the nineties may have increased creditworthiness and reduced cross-border borrowing costs for privates, while limiting the scope for countercyclical fiscal policy. The degree of financial openness does not seem to aid external insurance.

JEL #: E21, G15, H60, F20

Keywords: Latin America, Income Insurance, Risk Sharing, Government Deficits, International Capital Markets.

Abstract

Este trabajo explora en qu medida los choques idosincrticos sobre el ingreso nacional en America Latina son absorbidos por el consumo o si por el contrario son amortiguados mediante mecanismos de "seguro" como la propiedad de activos fuera de las fronteras, transferencias internacionales o ahorro pblico y privado. La evidencia sugiere que las transferencias internacionales juegan un rol importante como mecanismo para amortiguar el ingreso nacional, particularmente en la regin centroamericana. El ahorro privado es el principal mecanismo para amortiguar choques al ingreso, mientras que el ahorro pblico parece no cumplir este rol. La disciplina fiscal de los noventa y el acceso a los mercados internacionales de capital pudo haber facilitado y abaratado el credito externo para los agentes privados, pero a su vez pudo haber limitado aun ms la capacidad del ajuste contraclico de la poltica fiscal. El grado de apertura financiera parecen no haber hecho una diferencia significativa en la capacidad de los pases de proteger sus niveles de consumo.

Palabras Clave: America Latina, Amoritguacin de choques, Suavizar el Consumo, Deficits fiscales, Mercados de Capitales Internacionales.

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1 Introduction

Latin American economies are shock prone and have high volatility of output and consumption. Significant fluctuations of the terms of trade, sudden stops, financial crises, collapsing exchange rate regimes and policy shifts were common throughout the region during the past decades. While the eighties were a decade of tight controls and highly regulated economies, the nineties were characterized by market oriented structural reforms and liberalization. Recent studies about Latin America explore the determinants of volatility of real output and whether it is caused by external shocks or domestic policy shocks.¹

Volatility is costly: it has significant welfare costs if output fluctuations cause consumption fluctuations.² Therefore, it seems crucial for Latin American countries to develop mechanisms to reduce the volatility of income and consumption. To decrease volatility of the terms of trade, for instance, Latin American economies could opt to diversify production. An alternative approach may, however, be to retain a specialized production—according to comparative advantages—but diversify the ownership structure. If ownership is diversified across countries, they may be specialized while still reducing income volatility through inter-country risk sharing. By having capital income well diversified, a country may be able to reduce the total variability of its own income.³ Kalemli-Ozcan, Sørensen and Yosha (2003), in fact, find a strong evidence of a positive relation between risk sharing and industrial specialization among international groups (countries) and intranational regions, although the amount of risk sharing among countries is much smaller than among regions within countries.

In turn, countries may use several channels to insure income across countries and also to smooth consumption. Claims on productive assets in other countries are just one of these channels. International net transfers to a country can also smooth income if these are larger during country specific recessions than during upturns. Consumption can also be smoothed across countries for a given income through public or private saving. A certain fraction of the shocks to GDP are absorbed through each of these channels of smoothing and whatever fraction remains unsmoothed must be absorbed by consumption. The degree to which smoothing is achieved in Latin American countries has not yet been investigated. The objective of this work is to measure how much smoothing is attained in Latin American economies. Asdrubali, Sørensen and Yosha (1996) develop a framework to measure the amount of income and consumption smoothing across countries attained through different channels, which is the approach we follow in this study. We also investigate the performance of groups of countries, such as Mercosur, the Andean Community Countries and Central American countries in terms of income and consumption insurance. We

also explore the role of the of financial and fiscal variables on risk sharing in Latin America. We compare the results in this study to those in Arreaza, Sørensen and Yosha (1999) about smoothing among OECD and EU countries.

Our findings show that there is no cross-country income insurance through claims on productive and financial assets in other countries in Latin America. Factor income flows do not smooth income in Latin America and may even be dis-smoothing, which is in line with findings in Kalemli-Ozcan, Sørensen and Yosha (2003), and not surprising given the limited integration and development of capital markets in the region . In the case of Latin American countries, the dis-smoothing effect through this channel seems of the result of the debt service, particularly in highly indebted countries.

In contrast to OECD and EU countries, risk sharing through international transfers in Latin America is non-negligible, and is most relevant between Central American countries, and to a smaller extent among Mercosur countries. Most probably, this outcome stems from the importance of remittances between resident households and non-resident workers. This proved to be a very important mechanism of income insurance within the region, accounting for about half of the total fraction of smoothing attained in Latin America.

The rest of smoothing in Latin America is achieved by saving, which is also the mechanism that carries out most of the smoothing in OECD countries. The amount of consumption smoothing achieved through saving in Latin America seems to be less than in OECD countries. Private saving is responsible for most of the smoothing attained in Latin America, while government saving does not contribute to smooth consumption or may even dis-smooth it. In OECD countries, government saving smoothes a larger fraction of output shocks than private saving.⁴ This is not at odds with findings about procyclicality of fiscal policy in Latin America.⁵

The total amount of income and consumption smoothing in Latin America seems to be around 44 percent, which is roughly the same as in EU countries. Our findings show that a fraction of about 56 percent of idiosyncratic income shocks in Latin America is not smoothed through any channel and is therefore absorbed by consumption.

There is no clear relation between the amount of smoothing via private and government saving and the level of the deficit in OECD countries.⁶ A striking result for Latin American is that countries with lower average deficits attained more smoothing by saving in the eighties, but this result was reversed in the nineties. During the latter decade, in countries with higher average deficits consumption smoothing via government saving was highly dis-smoothing compared to that in countries with lower average deficits. But at the same time, smoothing through private

saving was dramatically larger in countries with higher deficits. Our findings for the eighties may reflect that government borrowing crowded out private borrowing, during a decade of high deficits in the whole region. Such lack of fiscal discipline made Latin American countries less creditworthy than say, OECD countries, deteriorating the ability of countries to obtain funds in international markets to finance consumption during hard times. In the absence of international credit, the financing needs of governments with higher deficits may create more upward pressures on domestic interest rates, which was followed by larger increases in private saving. In the nineties though, a different story could explain the results. The drastic reduction in fiscal deficits around the region that took place throughout the nineties, may have had different effects on the ability of governments and of private agents to smooth consumption through saving. On the one hand, stringent fiscal policies may have limited the ability of governments to buffer income shocks via saving. On the other hand, the lower levels of deficit increased countries' creditworthiness, allowing private agents access to lower cost borrowing in international capital markets, and thereby improving their ability to smooth consumption.

We also find that the degree of external indebtedness also seems to affect the ability of countries to smooth income and consumption. In countries with higher ratios of external debt to GDP the dis-smoothing effect of the service of the debt is significantly larger than in countries with lower debt ratios. While average deficits in the region dropped in the nineties, the degree of external indebtedness remained virtually the same for both decades. During both periods, debt service is more dis-smoothing in more indebted countries. In the nineties though, cross border borrowing allowed more smoothing through saving in countries with higher ratios of external debt to GDP. This compensated the negative effect on smoothing of debt servicing, amounting to a significantly larger fraction of total smoothing in more indebted countries.

The degree of financial openness does not seem to play an important role in risk sharing in Latin America. Using an index constructed by Chinn and Ito (2002) to measure a country's degree of capital account openness, we find that financially more open countries seem to attain more income insurance through transfers from abroad and through saving, but this difference did not prove to be statistically significant. The development of financial markets, measured by the degree of financial depth, did not prove relevant for smoothing either.

The paper is organized as follows: Section 2 describes the channels through which income and consumption smoothing occurs among regions or countries, Section 3 explains the methodology to measure the fraction of shocks to GDP smoothed through each channel. In section Section 4 we present and discuss the results and in Section 5 we conclude.

2 Channels of Income and Consumption Smoothing among Latin American Countries

This section reviews the channels through which regions and countries smooth income shocks. There are several mechanisms for inter-country income and consumption smoothing. Claims to output produced in other countries can smooth income. For instance, if institutional investors in a country invest internationally, income in that country will comove with output in the other countries.⁷ When financial intermediaries in one country lend to borrowers in other countries, the flows of interest payments smooth income in the lending country—or dis-smooth income in the borrowing country. This mechanism is referred to as income smoothing through cross-border ownership of productive assets.

The privatization process undertaken in most Latin American countries during the nineties may have helped cross-country ownership diversification, and thus contributed to this form of income insurance. The underdevelopment of capital markets and the limited portfolio diversification within the region though, may still be a hurdle for international risk sharing through this channel. Nevertheless, empirical findings indicate that there is little risk sharing between countries through this channel.⁸ Hedging mechanisms can also be used to reduce exposure to fluctuations in the price of exports. A problem with futures and options is that these instruments are mostly short-term contracts (usually less than a year), so even with rollovers they did not solve the problem of uncertainty in the long run.

Another channel of income insurance is through net international transfers. If net international transfers to a country are larger during (country-specific) recessions they smooth income in the recipient country. Remittances to domestic households from non-resident workers may operate in this fashion. A tax-transfer system designed to redistribute income across countries or to finance multinational projects may also contribute to international income smoothing. The empirical implication of income smoothing, whether through capital markets or via international transfers, is that cross-country income variability will be lower than cross-country output variability.

Intercountry consumption smoothing of transitory income shocks can be attained as well by intertemporal consumption smoothing—through saving and dis-saving. Individuals in one country can save and dis-save in response to income shocks, adjusting their wealth by borrowing or lending funds across country borders in interregional credit markets. Corporations may respond to profitability shocks retaining more or fewer profits. These funds can be invested in physical

assets in the corporation's country of origin, or in financial assets; in which case they could finance investment in the home country or in other countries. Again, the empirical implication is that cross-country consumption variability will be lower than cross-country income variability.

The erratic flows of capital from developed countries to the Latin America, and particularly sudden stops of capital inflows, affected the ability of the region to smooth consumption.⁹ Moreover, underdeveloped financial markets, characteristic in the region, led to a distorted valuation of international resources that translated into and external underinsurance (Caballero and Krishnamurthy, 2004). Then, in the absence of international credit, there is not much scope for consumption smoothing and shocks to output will be most likely absorbed by consumption. We should expect then more smoothing through saving in periods when international credit was available than in periods when credit was scarce, that is we may expect more smoothing through saving in the nineties.

Intertemporal consumption smoothing through government saving and dis-saving can also have a stabilizing effect on consumption, if the government follows a countercyclical fiscal policy, i.e. it runs larger deficits during recessions by borrowing internationally and during booms it runs a surplus (or a smaller deficit) reducing its stock of debt (or the growth rate of its debt).¹⁰ A countercyclical deficit requires the adoption of a countercyclical expenditure policy, countercyclical transfers and subsidies, or a procyclical tax policy. These forms of government consumption smoothing have the same empirical consequence, i.e., to reduce cross-country consumption variability.

Countercyclical fiscal policies are not the general rule in Latin America though. the procyclicality of fiscal policy in Latin America is a well known fact. Gavin and Perotti (1997) show that borrowing constraints contributed to the procyclicality of fiscal policy in Latin America, in addition to political and institutional factors that created incentives for fiscal indiscipline, which affects negatively credit worthiness. The argument is essentially that during bad macroeconomic times, Latin American economies experience financial crises that deteriorate their international credit worthiness even more, cutting access to non-inflationary ways of finance when it was most needed, preventing government implementation of countercyclical policies.¹¹ OECD countries do not seem to face such credit constraints, which gives governments more scope for smoothing during bad times.

Since the adjustment to output shocks can be done as well by the private sector within domestic or international financial markets, the justification for the use of fiscal policy for smoothing purposes is not clear-cut. In Latin America domestic financial markets are not well developed as

in OECD countries and access to international credit is easier for the public sector than for the private sector. Government intervention can then be justified in order to compensate for this imperfection of financial markets. This, however, may slow down the development of financial markets. It could also end up dis-smoothing consumption rather than smoothing it, if the levels of the deficit do not correspond to optimal savings behavior. In light of these considerations, it is useful to perform the analysis of the consumption smoothing role of government fiscal policy in a more general framework where other forms of income and consumption smoothing are analyzed.

3 Measuring the fraction of shocks smoothed through various channels

3.1 The Data

The data consists of panel observations for the period 1980-2002 of 18 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

The National Accounts data was obtained from the 2003 Statistical Yearbook for Latin America compiled by CEPAL (United Nations Economic Commission for Latin American and the Caribbean). The population data and the fiscal data are from the International Financial Statistics of the International Monetary Fund, 2004 CD-ROM. The index of financial openness is from Chinn and Ito (2002).

Ideally and for the sake of consistency with previous work, we would have wanted to use GDP as our measure for the budget constraint in Latin American countries. For the present study, we required a data set that allowed consistent comparisons between GDP, income and consumption. We resorted to CEPAL national accounts data based on income variables adjusted for changes in the purchasing power of domestic production, which has all the income variables—Gross Domestic Income (GDI), Gross National Income (GNI) and Gross National Disposable Income (GNDI)—and consumption variables we needed for a consistent analysis of the different channels of smoothing.

As our measure for the national budget constraint we use GDI, which is consistent with the rest of the income variables we use. The total real income that domestic households derive from domestic production depend also upon the rate at which exports may be traded for imports

from the rest of the world. Fluctuations in the terms of trade are large in Latin America. These variations affect the purchasing power of exports, and hence of domestic income, since net exports represent a large fraction of output in most Latin American economies. Therefore, GDI allows us to have a measure of income that, in the case of Latin American countries, may be a better proxy of the budget constraint than GDP and thus better to analyze consumption behavior.¹²

Cross-country income smoothing via factor income flows is reflected in National Accounts data from CEPAL as the difference between GDI and GNI. The difference between the GNI and GDI of a country is precisely the net flow of capital and labor income to that country. Net international current transfers are measured as the difference between GNDI and GNI. These include current international cooperation, social contributions or benefits, insurance premiums and claims, taxes on income and wealth, and remittances between resident and non-resident households. Consumption smoothing can be derived from the National Accounts as the difference between disposable income, GNDI, and total (private and government) consumption, C+G.

3.2 The Methodology

The idea here is to measure the extent of risk sharing attained within a group of countries. We follow the same approach developed in Asdrubali, Sørensen, and Yosha (1996). We assume that the representative consumer of each country is risk averse and maximizes lifetime expected utility from consumption. The benchmark we use is perfect consumption smoothing and full risk sharing. Risk is fully shared within a group of countries if the consumption of a country comoves with the aggregate consumption of the group, but does not comove with country specific shocks.¹³ Denote the period t total (private and public) per capita consumption of the representative consumer of country i by $c_t^i + g_t^i$, and the period t per capita aggregate consumption of the entire group of countries by $c_t + g_t$. When individuals have CRRA utility functions and the same inter-temporal discount rate across countries, full risk sharing implies that

$$c_t^i + g_t^i = k^i (c_t + g_t), \tag{1}$$

where k^i is a country specific (time and state of the world invariant) constant representing the strength of country i 's claim to total consumption in the risk sharing arrangement. In other words, when risk is fully shared, consumption in each country is a country-specific fixed proportion of aggregate consumption.¹⁴

The derivation of (1) can be found in most of the references in footnote 13, so we omit it. It should be stressed, though, that expected utility maximization by the representative consumer in each country is part of this derivation, and for (1) to hold it is necessary that, for each country, the marginal utility of consumption in period t be equal to the expected marginal utility in period $t + 1$. Full risk sharing thus implies perfect consumption smoothing in each country, in the standard Euler equation sense.

Returning to our discussion of the channels of income and consumption smoothing among countries, consumers may attain full risk sharing at different stages. In theory, full risk sharing may be reached through international factor income flows, in which case countries consume their GNI, which is a fraction of the regional income, with no further need for income or consumption smoothing. If full risk sharing is not achieved at this level, there is scope for further income insurance through international transfers. If full risk sharing is not achieved after this, there is scope for consumption smoothing of transitory income shocks, i.e., borrowing and lending by individuals, corporations, or the government.¹⁵ Then, after all channels of income and consumption smoothing are exhausted, equation (1) may or may not hold. Even if equation (1) does not hold, it is still of interest to estimate the incremental amount of smoothing that is achieved through the various channels. We now describe how this estimation is carried out.

Consider the identity $GDI^i = \frac{GDI^i}{GNI^i} \frac{GNI^i}{GNDI^i} \frac{GNDI^i}{C^i + G^i} (C^i + G^i)$, where all the magnitudes are in per capita terms, and i is an index of countries. The national accounting identities that are relevant here are: $GNI = GDI + \text{net factor income}$, $GNDI = GNI + \text{international transfers}$, $C + G = GNDI - \text{net saving}$.

If there is smoothing through net factor income flows, i.e., income smoothing via cross-country ownership of productive assets, then $\frac{GDI^i}{GNI^i}$ should vary positively with GDI^i . If net transfers from abroad contribute to income smoothing, then $\frac{GNI^i}{GNDI^i}$ should vary positively with GDI^i . If saving further smooths total consumption, then $\frac{GNDI^i}{C^i + G^i}$ should vary positively with GDI^i . Finally, to the extent that not all the shocks to GDI^i are smoothed, $C^i + G^i$ will be positively correlated with GDI^i .

The cross-sectional smoothing of income shocks may involve cross-border flows of funds as in the case of factor income flows and international transfers, or it may not, as in the case of domestic investment or capital depreciation.

To obtain a measure of smoothing, we use the identity $GDI^i = \frac{GDI^i}{GNI^i} \frac{GNI^i}{GNDI^i} \frac{GNDI^i}{C^i + G^i} (C^i + G^i)$ that holds for any given year in the sample. To stress the cross-sectional nature of our derivation, we suppress the time index. Taking logs and differences, multiplying both sides by $\Delta \log GDI^i$

(minus its mean), and taking the cross-sectional average, we obtain the following variance decomposition:¹⁶

$$\begin{aligned}
\text{var}\{\Delta \log \text{GDI}^i\} &= \text{cov}\{\Delta \log \text{GDI}^i, \Delta \log \text{GDI}^i - \Delta \log \text{GNI}^i\} \\
&+ \text{cov}\{\Delta \log \text{GDI}^i, \Delta \log \text{GNI}^i - \Delta \log \text{GNDI}^i\} \\
&+ \text{cov}\{\Delta \log \text{GDI}^i, \Delta \log \text{GNDI}^i - \Delta \log(\text{C}^i + \text{G}^i)\} \\
&+ \text{cov}\{\Delta \log \text{GDI}^i, \Delta \log(\text{C}^i + \text{G}^i)\}
\end{aligned}$$

Dividing by $\text{var}\{\Delta \log \text{GDI}^i\}$ we get $1 = \beta_f + \beta_\tau + \beta_s + \beta_u$ where β_f is the ordinary least squares estimate of the slope in the cross-sectional regression of $\Delta \log \text{GDI}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDI}^i$, and similarly for β_τ and β_s . β_u is the coefficient in the cross-sectional regression of $\Delta \log(\text{C}^i + \text{G}^i)$ on $\Delta \log \text{GDI}^i$. We interpret the β coefficients as the incremental percentage amounts of smoothing achieved at each level, and β_u as the percentage of shocks not smoothed. If $\beta_u = 0$, there is full risk sharing and the remaining coefficients sum to 1. Otherwise, they sum to less than 1. We do not constrain any of the β coefficients, at any level, to be positive or less than 1. Therefore, if there is dis-smoothing at some level, it will be reflected in a negative value of β .

At the practical level, the panel equations to be estimated are:

$$\begin{aligned}
\Delta \log \text{GDI}_t^i - \Delta \log \text{GNI}_t^i &= \nu_{f,t} + \beta_f \Delta \log \text{GDI}_t^i + \epsilon_{f,t}^i, \\
\Delta \log \text{GNI}_t^i - \Delta \log \text{GNDI}_t^i &= \nu_{\tau,t} + \beta_\tau \Delta \log \text{GDI}_t^i + \epsilon_{\tau,t}^i, \\
\Delta \log \text{GNDI}_t^i - \Delta \log(\text{C}_t^i + \text{G}_t^i) &= \nu_{s,t} + \beta_s \Delta \log \text{GDI}_t^i + \epsilon_{s,t}^i, \\
\Delta \log(\text{C}_t^i + \text{G}_t^i) &= \nu_{u,t} + \beta_u \Delta \log \text{GDI}_t^i + \epsilon_{u,t}^i
\end{aligned} \tag{2}$$

Where $\nu_{.,t}$ are time fixed effects. The inclusion of time fixed effects is crucial, since they control for year specific shocks that affect the entire region and are thus undiversifiable, particularly of regional output shocks.¹⁷ This allows us to look at idiosyncratic shocks. We estimate the system in (2) by OLS with White period robust standard errors and covariance, to correct for possible serial correlation and time-varying variances in the disturbances.

4 Empirical Results

The results are presented in Tables 4.1 to 4.6. Table 4.1 displays the fraction of the shocks to output absorbed through each channel of income and consumption smoothing for the period

1980–2002 and for two sub-periods: 1980–1990 and 1991–2002. Although this division is arbitrary, it is intended to explore whether the institutional reforms and liberalization process the region underwent in the nineties had any effect on income and consumption insurance, compared to the eighties.

Table 4.1 displays the fraction of shocks smoothed through factor income flows, international transfers (income smoothing) and saving (consumption smoothing). In this case the difference in smoothing in the two periods was not significant, so we focus on the full sample in the analysis. The results from the 1980–2002 regression show that factor income flows do not smooth income much. This result holds when we split the sample into two sub-periods. In spite of the progress toward a larger participation of foreign direct investment and equity investment in Latin America during the nineties, the smoothing effect of diversifying ownership of domestic factors of production is not evident. A plausible cause for the dis-smoothing through factor income flows in Latin America is the service of the external debt most countries accumulated. The service of a country's international debt is not sensitive to GDP fluctuations since it is determined by previously accumulated debt, which does not vary with shocks to GDP. Therefore, the ratio of interest payments to GDP will typically decline when a country is hit by a positive shock and rise in response to a negative shock, contributing to cross-sectional dis-smoothing of shocks to output. For instance, the service of the debt increased, as world interest rates rose in the eighties, while output growth plummeted in Latin America.

In contrast to OECD countries, income smoothing through international transfers is non-negligible in Latin America, and accounted for approximately 21 percent of total smoothing during the full period. This result is likely to be due to the remittances between resident households and non-resident workers. This highlights the importance of remittances for income insurance in Latin America. These transfers act as an international mechanism of social protection based in private transfers. In fact, between 1980 and 2002, remittances have increased dramatically and the highest rate of increase in the flow of remittances has corresponded to Latin American and the Caribbean with a growth of 12.4 percent per annum (Solimano, 2003). Although the fraction of income insured by transfers seems to have increased in the nineties, we were not able to prove that they are statistically different compared to the eighties¹⁸. If remittances continue to grow though, we should expect smoothing through this channel to increase as well.

Saving carries out another important part of the smoothing achieved in Latin American countries. The fraction of idiosyncratic shocks smoothed by saving during the period 1980–2002 in Latin America was 25 percent. This amount is larger in OECD countries, where saving also

carries out most of the smoothing.¹⁹ The overall smoothing attained in Latin America is 43 percent which is roughly in OECD countries. But while smoothing in OECD countries is carried by saving, in Latin America international transfers and saving have similar importance. The overall smoothing remains virtually the same for both sub-periods in Latin America, although the role of transfers seems to be increasing during the last decade.

4.1 Channels of Income and Consumption Smoothing in Regional Groups

In Table 4.2 we examine whether the previous results change if we consider smaller sub-regional groups, which are likely to be more integrated than the region as a whole. We analyzed smoothing among the nine largest economies of the region,²⁰ within the Andean Community of Nations, CAN,²¹ among Mercosur countries,²² and among Central American Countries, CEN.²³

An important result here is that income smoothing in the region, particularly through transfers, may be the outcome of sub-regional integration, rather than of risk sharing within the region as a whole. It is striking that Central American countries achieve a fraction as large as 44 percent of income smoothing via transfers, followed by Mercosur with 14 percent, whereas the largest economies (none of them Central American countries) attain no smoothing by this channel. Again, this may be supporting evidence for remittances as an important channel of income insurance, given that migration of workers in these two regions is perhaps more extended than among others.

Smoothing by saving is significant in every case but it is more relevant for Andean countries and significantly larger than in the whole region.²⁴ Overall income and consumption smoothing is significantly higher for Central American countries compared to the whole region, highlighting again the role of international transfers within these countries.

4.2 Smoothing by Government Deficit

Table 4.1 also displays the percentage of smoothing achieved through total saving, government saving and private saving in Latin America. The results show that private saving carries most of the smoothing in Latin America. Strikingly, government saving smooths a smaller fraction of shocks than private saving, unlike in OECD and EU countries, where government saving carries out the largest fraction of smoothing by saving.²⁵ The estimates even suggest that government saving dis-smoothed consumption during the nineties, compensating the increase in smoothing by private saving. These results are also valid for regional groups, as shown in Table 4.2.

Lane and Tornell (1998) find that saving rates in Latin America are less procyclical than in

OECD countries, and in some cases countercyclical.²⁶ Our results for smoothing by total saving are consistent with this finding, since smoothing by saving in Latin America is less than in OECD and EU countries, particularly through government saving.²⁷ The fact that government deficits do not contribute to smoothing is also consistent with the stylized empirical finding of procyclical fiscal policies in Latin America.

4.3 The Effect of Financial and Fiscal Variables on Smoothing

In the following sections we want to explore which variables may have affected income and consumption smoothing in Latin America during the period. Essentially, we investigate the impact of some financial and fiscal variables such as the degree of financial openness, the degree of financial depth, the level of the budget deficit and the degree of external indebtedness.

Financial openness may affect cross-country income and consumption insurance as it facilitates flows of capital across countries, such as claims to output of other countries, international transfers and interregional funds for borrowing and lending. Deep and more developed financial markets may also facilitate flows of funds across countries and diminish the effect of credit constraints, allowing more lending for inter-temporal consumption smoothing. Regarding fiscal variables, substantial government deficits may increase the cost of cross-country borrowing, deteriorating the creditworthiness of a country. A country with low credit worthiness may face steeply increasing interest costs when trying to borrow during recessions, which makes consumption smoothing via saving more difficult.

Borrowing and lending in international markets is of course an important channel for smoothing transitory income shocks. A large degree of indebtedness over time though may also prove negative for smoothing by increasing the cost of future borrowing. It may also imply larger disbursements destined to debt service that are unrelated to the business cycle and hence become dis-smoothing.

In Table 4.3 we regress $\Delta \log \text{GDI}^i - \Delta \log (C^i + G^i)^i$ on $\Delta \log \text{GDI}^i$ and on a set of proxy variables to assess the effect of the aforementioned financial and fiscal variables on total smoothing. Financial Openness is measured by a yearly index in Chinn and Ito (2002), which captures the extent and nature of the restrictions on external accounts. They construct the index that takes on higher values the more open the country is to cross-border capital transactions. Financial depth is simply proxied by the ratio of M3 to GDP, using SCN World Bank data. An alternative measure could be the ratio of credit to the private sector to GDP, but the result with either proxy was virtually the same. The level of the deficit is actually the ratio of government deficit to GDP,

using IFS data. The degree of indebtedness is measured by the ratio of total external debt to GDP, based on CEPAL data. All are yearly observations.

The results in Table 4.3 suggest that some of these variables became relevant after the nineties. Financial openness, the size of the deficit and the degree of indebtedness are only significant during the 1991–2002 period. This may respond to the process of reforms the region underwent during this period, allowing a more active participation of countries in international financial markets, helping smoothing flows of capital and borrowing across borders. Financial openness and external indebtedness seem to have an overall effect on smoothing, while the size of the deficit proves to be significantly negative for smoothing. This is consistent with our previous finding displayed in Table 4.1 that government saving became dis-smoothing in the nineties. We will further investigate the impact of these variables on different levels of smoothing next.

4.4 How does the level of the Budget Deficit matter?

In Table 4.4 we examine whether the level of fiscal deficit has an effect on consumption smoothing via saving. We divide the sample of countries by half according to the average ratio of the Government Deficit to GDP for each country. The high deficit group includes the 8 countries with the largest average deficit. The same is valid for the low deficit group. The coefficients β^h and β^l measure the fraction of shocks to GDI smoothed in high and low deficit countries respectively. These are estimated by regressing $\Delta \log \text{GNDI}^i - \Delta \log(\text{GNDI}^i + \text{government saving}^i)$ on $\nu_t + \beta^j \Delta \log \text{GDI}_t^i + u_t^i$ for $j = h, l$.

Looking at Table 4.4, we see that the amount of smoothing achieved by total saving seems to be lower in countries with higher deficit, but we could not reject the null of both coefficients been equal. In countries with high average deficits there seems to be no smoothing by government saving, whereas in countries with low deficits, government saving is dis-smoothing and significant, yet again, we could not reject the null of both fractions of smoothing being equal. The same happens with private saving. As in previous results, private saving seems to carry the bulk of smoothing through saving.

For the 1980–1990 sub-period government saving is not smoothing in any group. Private saving smoothes a significantly higher fraction of income shocks in countries with low average government deficits (45 percent versus 2 percent), which translates into more overall smoothing by saving in countries with low average deficits (42 percent versus 16 percent). This is consistent with a crowding out effect: namely, that government deficits are crowding out domestic private borrowers in high deficit countries. It may also be the case that countries with high levels of

deficit have a lower creditworthiness. Therefore, it is more difficult for private agents in countries with high average deficits to borrow funds internationally to smooth their consumption.

During the second period, 1990-2002, smoothing by total saving in countries with low average deficits is dramatically lower than in countries with high average deficits. In countries exhibiting larger deficits, government saving has a dramatically dis-smoothing effect of -20 percent, whereas smoothing by the same channel in countries with lower deficits is negligible. But in contrast to the previous decade, smoothing by private saving in countries with larger deficits is significantly larger (65 percent) than in countries with lower deficits (3 percent). Thus, in high deficit countries smoothing by saving is dramatically higher than in low deficit countries (43 percent versus 0), by virtue of private saving.

It should be mentioned here that the average government deficit to GDP ratio in the region dropped from $-3,87$ percent between 1980 and 1990 to $-1,61$ percent between 1991 and 2002, as a result of the stabilization programs most countries implemented in the nineties. Therefore, in the nineties, the adjustment of government saving in response to income shocks faced severe constraints, which may have not been the case in the previous decade. What is striking though is the extent of the dis-smoothing behavior exhibited by government saving during the nineties in countries with larger average deficits, compared to countries with lower average deficits. This is not at odds with findings in Perotti and Gavin (1997) about the procyclicality of fiscal policy in Latin America in general, but it may well imply that fiscal stringency during the nineties induced even more procyclicality. Moreover, countries with higher average deficits in the eighties—which accumulated more debt—may have faced more severe budget restrictions in the nineties. In fact, some of the countries with higher deficits in the eighties—Bolivia, Mexico, Brazil, Peru, Honduras and Argentina—also have the largest debt of the consolidated public sector in proportion of government revenues of the region.²⁸ Most of those countries still remained among the high deficit group in the nineties. This may pose additional difficulties for countries in terms of implementing countercyclical fiscal policies: adding to the overall reduction of deficit levels, there were still the payments of previously accumulated debt, leaving little scope for smoothing through government saving.

On the other hand, the overall reduction of average deficits in the nineties increased creditworthiness in most countries, which may have made it less costly for private agents to borrow in international markets to smooth consumption. What remains a puzzling finding is that smoothing through private saving in countries with lower average deficits became negligible in the nineties.

4.5 How does the Level of External Indebtedness matter?

We follow here the same empirical strategy as we did for the level of the deficit before, in terms of splitting the sample into two groups: more indebted countries and less indebted countries. Looking at Table 4.5, the level of external indebtedness seems to play a negative role in terms of income smoothing. A higher degree of indebtedness translated into higher disbursements to service the debt in more indebted countries. As we mentioned before, these flows are not related to income and are thus dis-smoothing.

When we split the sample into two periods we find that the debt service is again highly dis-smoothing in more indebted countries in both periods. During the nineties, the degree of external indebtedness seems to have had a positive effect on smoothing through saving, which compensated the negative effect of the debt service, so that countries with higher ratios of debt to GDP attained more smoothing. In this case, smoothing through saving was attained mostly by private saving in both cases (not shown in table), which seemed to be larger in more indebted countries than in less indebted countries. Combining this result with the previously obtained for the level of the deficit, it seems plausible then that the reduction of average fiscal deficits may have reduced the cost for private agents to borrow across borders, so that countries that resorted to a larger extent to foreign markets for funds actually attained more smoothing than countries that did not. It is worth noticing that the average level of indebtedness in the region was virtually the same in both periods (52 percent in the eighties versus 55 percent in the nineties).

4.6 How does the degree of capital account openness matter?

A remaining question is whether the overall reduction of the restrictions on the capital account during the nineties had any effect on income and consumption smoothing in Latin America. This is captured by the Chinn and Ito (2002) index (that we employ to split the sample) since the average value over all countries of the index passes from $-0,73$ in the eighties to 0.30 in the nineties.

Surprisingly, differences in the degree of openness do not seem to be playing a role in Latin American countries, as we see in Table 4.6. Although smoothing through international transfers seems to be larger in more financially open countries, this difference does not appear to be significant in neither decade.

So far then, it appears that the variables that explain differences in income and consumption smoothing in Latin America are the level of the deficit and the level of external indebtedness of countries. Fiscal performance may in turn be related to the strength of fiscal institutions, but

we do not examine that in this paper, remaining a topic for future investigation.

5 Conclusion

In this paper we studied various channels of income and consumption insurance among Latin American countries. We also explored the effect of the size of fiscal deficits and financial variables on smoothing. Our findings suggest that income smoothing through international transfers explains about half of the overall smoothing attained in Latin America. This channel is particularly important among Central American countries and to a lesser extent among Mercosur countries. The smoothing effect of transfers is likely to be the outcome of remittances between resident households and non-resident workers, highlighting the importance of this mechanism for income insurance. Cross-country risk sharing by factor income flows is negligible, but this is a common result at a country level. The other half of overall smoothing in Latin America is carried out by saving, particularly by private saving, since government saving does very little smoothing or even dis-smoothes consumption.

The model used in this paper does not predict the optimal level of savings, which depends, in particular, on shock distributional properties. Compared to findings for OECD and EU countries, there is less smoothing by total saving in Latin America, but incorporating the amount smoothed by transfers, smoothing in both regions is roughly the same. A striking difference between Latin America and OECD countries is the role of government saving. While government saving carries out a large fraction of smoothing in OECD countries, smoothing by government saving in Latin America is small or even negative.

We also find that the size of the budget deficit and the degree of indebtedness affect the ability of countries to insure consumption. The overall reduction of fiscal deficits in the nineties throughout the region may have limited the ability of governments to implement less procyclical policies to buffer income shocks. Even in countries with larger deficits, government saving was highly dis-smoothing compared to countries with smaller deficits. But on the other hand, fiscal discipline may have increased creditworthiness, thereby lowering the cost for private agents to borrow funds internationally. In countries with high levels of indebtedness, the dis-smoothing effect of the debt service is significantly larger than in countries with smaller external debt to GDP ratios. In the nineties though, this negative effect was compensated by the positive effect of smoothing through saving. In fact, more indebted countries attained more overall smoothing than less indebted countries. If fiscal performance and indebtedness are the outcome

of institutional arrangements and polity variables, that may be the real underlying explanation of the risk sharing performance in Latin America. This is not explored in this paper and could be the basis of future work in this area.

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Table 4.1
Channels of Income and Consumption Smoothing 18 Countries(percent)

	1980–2002	Sub-periods	
		1980–1990	1991–2002
Factor Income (β_f)	−3.8** (1.9)	−5.1** (2.0)	−1.7 (4.0)
International Transfers (β_τ)	21.4** (9.7)	16.7** (8.8)	29.2** (11.9)
Total Saving (β_s)	25.1*** (5.9)	30.4** (5.4)	16.4 (10.3)
Central Government Saving	−0.1 (6.6)	5.6 (9.4)	−10.4*** (4.7)
Private Saving	24.2** (9.9)	22.2** (10.7)	27.5* (11.4)
Total Smoothing (β_t)	42.7*** (7.5)	41.9*** (7.9)	43.9*** (9.3)
Not Smoothed (β_μ)	57.3*** (7.5)	58.1*** (7.9)	56.1*** (9.3)

Notes. Countries included: Argentina, Bolivia, Brazil, Colombia, Costa Rica, Chile, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay and Venezuela. Fraction of shocks absorbed at each level of smoothing. Standard errors in brackets. β_f is the slope in the regression of $\Delta \log \text{GDI}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDI}^i$, and similarly for β_τ . β_s is the slope in the regression of $\Delta \log \text{GNDI}^i - \Delta \log (\text{C}^i + \text{G}^i)$ on $\Delta \log \text{GDI}^i$. β_t is the slope in the regression of $\Delta \log \text{GDI}^i - \Delta \log (\text{C}^i + \text{G}^i)^i$ on $\Delta \log \text{GDI}^i$. β_u is the coefficient in the regression of $\Delta \log \text{GDI}^i$. The β coefficients are interpreted as the incremental percentage amounts of smoothing achieved at each level.***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively. In the OLS regressions, smoothing through government savings is measured by estimating the coefficients in the panel regression (with time fixed effects) of $\Delta \log \text{GNDI}^i - \Delta \log (\text{GNDI}^i + \text{government saving}^i)$ on $\nu_t + \beta \Delta \log \text{GDI}_t^i + u_t^i$. Private and government saving do not add up to total saving due to missing observations of government saving. A Wald test for the null that smoothing by government saving is equal in both sub-periods results in a p-value of 0.11.

Table 4.2

Channels of Income and Consumption Smoothing in Regional Groups: Nine Largest Economies, Mercosur, Andean Community Countries (CAN) and Central American Countries (CEN) (percent)

	9 Large	CAN	Mercosur	CEN
Factor Income (β_f)	-4.1*** (1.3)	-5.1** (2.1)	-5.4*** (1.4)	-6.3 (5.2)
International Transfers (β_τ)	0.1 (2.5)	2.4 (3.9)	13.8** (5.3)	44.1*** (8.1)
Total Saving (β_s)	28.4*** (8.5)	46.1*** (11.9)	17.4* (9.4)	22.1** (10.3)
Central Government Saving	-5.1 (5.5)	-6.2 (13.1)	8.8 (7.9)	-5.3* (3.0)
Private Saving	35.4*** (11.8)	54.9*** (19.6)	12.4 (15.3)	19.7*** (8.1)
Total Smoothing (β_t)	24.8*** (8.1)	43.4*** (11.0)	25.8** (10.2)	60.0** (9.0)
Not Smoothed (β_u)	75.2*** (8.1)	56.6*** (11.0)	74.2*** (10.2)	40.0*** (9.0)

Notes. Countries Included: Nine Largest Economies: Argentina, Brazil, Colombia, Chile, Ecuador, Mexico, Peru, Uruguay and Venezuela. CAN: Colombia, Ecuador, Bolivia, Peru and Venezuela. Mercosur: Argentina, Brazil, Paraguay and Uruguay. CEN: Costa Rica, Nicaragua, Panama, Honduras, Guatemala, El Salvador, Dominican Republic. Fraction of shocks absorbed at each level of smoothing. Standard errors in brackets. β_f is the slope in the regression of $\Delta \log \text{GDI}^i - \Delta \log \text{GNI}^i$ on $\Delta \log \text{GDI}^i$, and similarly for β_τ . β_s is the slope in the regression of $\Delta \log \text{GNDI}^i - \Delta \log (C^i + G^i)$. β_t is the slope in the regression of $\Delta \log \text{GDI}^i - \Delta \log (C^i + G^i)^i$ on $\Delta \log \text{GDI}^i$. β_u is the coefficient in the regression of on $\Delta \log \text{GDI}^i$. The β coefficients are interpreted as the incremental percentage amounts of smoothing achieved at each level. Smoothing through government savings is measured by estimating the coefficients in the panel regression (with time fixed effects) of $\Delta \log \text{GNDI}^i - \Delta \log (\text{GNDI}^i + \text{government saving}^i)$ on $\nu_t + \beta \Delta \log \text{GDI}_t^i + u_t^i$. Private and government saving do not add up to total saving due to missing observations of government saving. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 4.3

The effect of financial and fiscal variables on Total Smoothing

	1980-2002	Sub-periods	
		1980-1990	1991-2002
Total Smoothing (β_t)	45.2*** (2.4)	37.4*** (12.5)	55.6*** (10.6)
Financial Openness	0.001 (0.002)	-0.002 (0.006)	0.002* (0.001)
Financial Depth	-0.0001 (0.0001)	-0.0001 (0.0003)	0.0001 (0.0002)
Deficit Ratio	-0.007 (0.054)	0.06 (0.07)	-0.23** (7.9)
Indebtedness	0.004 (0.054)	0.02 (0.03)	0.005** (0.002)

Notes. Countries included: Same as in table 1 and table 2. Standard errors in brackets. Financial Openness is measured by the Chinn and Ito (2002) index. Financial depth proxied by the ratio of M3 to GDP, SCN World Bank data. The deficit ratio is the deficit of the government deficit over GDP, IFS data. The degree of indebtedness is measured by the ratio of total external debt to GDP (CEPAL). All are yearly observations. β_t is the slope in the regression of $\Delta \log \text{GDI}^i - \Delta \log (C^i + G^i)^i$ on $\Delta \log \text{GDI}^i$, controlling for the aforementioned financial and fiscal variables. ***, ** and * indicate significance at the 1, 5 and 10 percent levels respectively.

Table 4.4
Consumption Smoothing (percent) through Central Government Budget Deficits
(Public Saving) and Private Saving: High Deficit versus Low Deficit

	1980–2002			1980–1990			1991–2002		
	High	Low	Wald (p val.)	High	Low	Wald (p val.)	High	Low	Wald (p val.)
Public	−2.2 (23.5)	−7.7*** (2.4)	0.23	13.3 (21.6)	−3.7 (4.9)	0.45	−19.8*** (3.0)	−1.3 (3.0)	0.00
Private	16.8 (20.5)	35.3*** (12.2)	0.13	2.2 (21.9)	45.4*** (6.7)	0.06	64.7*** (17.0)	2.6 (4.6)	0.001
Total	15.2** (7.6)	31.1*** (7.7)	0.14	15.6*** (2.4)	41.7*** (7.8)	0.001	43.4** (13.8)	0.004 (2.9)	0.001

Notes. Countries included: Same as in Table 4.1. Fraction of shocks absorbed at each level of smoothing. Standard errors in brackets. The sample was split according to the average deficit/GDP ratio countries presented throughout the period. The high deficit group includes the 8 countries with the largest average deficit. The same is valid for the low deficit group. The coefficients β^h and β^l measure the fraction of shocks to GDI smoothed in high and low deficit countries respectively. These are estimated by regressing $\Delta \log \text{GNDI}^i - \Delta \log(\text{GNDI}^i + \text{government savings}^i)$ on $\nu_t + \beta^j \Delta \log \text{GDI}_t^i + u_t^i$ for $j = h, l$. The superscripts *, **, and *** mean that the coefficients are significant at a 10, 5 and 1 percent levels respectively. The p values correspond to a Wald test of $H_0 : \beta^h = \beta^l$.

Table 4.5
The Effect of External Indebtedness on Smoothing (percent):
High versus Low Degree of indebtedness

	1980–2002			1980–1990			1991–2002		
	High	Low	Wald (p val.)	High	Low	Wald (p val.)	High	Low (p val.)	Wald
Factor Inc.	−6.9*** (1.7)	1.5 (2.8)	0.01	−9.3** (3.6)	−1.1 (2.2)	0.05	−7.5* (3.9)	−0.1 (8.7)	0.08
Transfers	27.0** (12.8)	14.2 (10.9)	0.45	19.9* (12.2)	18.5 (12.2)	0.93	36.8** (15.2)	14.8** (5.8)	0.18
Saving	27.8*** (7.9)	21.1** (4.4)	0.46	30.0*** (10.5)	27.8*** (6.5)	0.76	26.6** (12.1)	−1.4 (5.3)	0.03
Total	47.8*** (8.3)	36.8*** (14.4)	0.50	41.5*** (10.6)	45.2*** (17.4)	0.86	55.9*** (13.8)	22.4*** (11.9)	0.07
Unsmoothed	52.1*** (8.3)	63.2*** (14.4)	0.50	58.4*** (10.6)	54.8*** (17.4)	0.86	44.1** (13.8)	77.6*** (11.9)	0.07

Notes. Countries included: Same as in Table 4.1. Fraction of shocks absorbed at each level of smoothing. Standard errors in brackets. The sample was split according to the average external debt to GDP ratio countries presented throughout the period. The highly indebted group includes the 8 countries with the largest debt to GDP ratio. The same is valid for the low degree of indebtedness group. The coefficients β^h and β^l measure the fraction of shocks to GDI smoothed in countries with a high and low degree of external indebtedness, according to the index. The superscripts *, ** and *** mean that the coefficients are significant at a 10, 5 and 1 percent levels respectively. The p values correspond to a Wald test of $H_0 : \beta^h = \beta^l$.

Table 4.6
The Effect of Financial Openness on Smoothing (percent):
High versus Low Degree of Openness

	1980–2002			1980–1990			1991–2002		
	High	Low	Wald (p val.)	High	Low	Wald (p val.)	High	Low	Wald (p val.)
Factor Inc.	−4.9** (1.4)	−5.0* (1.8)	0.98	−5.8** (2.5)	−3.6* (1.9)	0.49	−6.6 (6.1)	−5.7** (2.3)	0.89
Transfers	26.8* (15.2)	25.6*** (12.9)	0.95	20.6*** (11.9)	10.4 (7.8)	0.47	47.2*** (17.1)	28.9** (19.5)	0.48
Saving	18.9** (7.3)	21.5** (10.1)	0.83	23.2*** (6.0)	38.0*** (9.5)	.26	7.9 (6.7)	11.1* (5.9)	0.72
Total	40.9*** (8.6)	42.1*** (12.0)	0.93	38.0*** (7.5)	47.8*** (14.1)	0.67	48.5*** (14.1)	34.3 (21.2)	0.58
Unsmoothed	59.1*** (8.6)	57.9*** (12.0)	0.92	62.0*** (7.5)	55.2*** (14.1)	0.67	51.5*** (14.1)	65.7*** (21.2)	0.58

Notes. Countries included: Same as in Table 4.1. Fraction of shocks absorbed at each level of smoothing. Standard errors in brackets. The sample was split according to the average openness index that countries presented throughout the period. The high openness group includes the 8 countries with the highest Chinn-Ito index for financial openness. The same is valid for the low degree of openness group. The coefficients β^h and β^l measure the fraction of shocks to GDI smoothed in countries with a high and low degree of openness, according to the index. The superscripts *, ** and *** mean that the coefficients are significant at a 10, 5 and 1 percent levels respectively. The p values correspond to a Wald test of $H_0 : \beta^h = \beta^l$.

Notes

¹Gavin and Hausmann (1996) investigate the effect of capital flows and economic policy on GDP variability. Gavin, Hausmann, Perotti and Talvi (1996) explore the interplay between procyclicality of fiscal policy, capital flows to the region and credit worthiness, and how it affects output volatility. Gavin and Perotti (1997) find that fiscal policy is procyclical in Latin America instead of countercyclical as in OECD countries.

²Volatility may also have a negative impact on growth. Several studies document a negative correlation between volatility and growth. Mendoza (1995) shows that volatility of the terms of trade is negatively correlated with growth using data from industrial and developing economies. Ramey and Ramey (1994) find that the variability of GDP has a negative impact on growth. Turnovsky and Chattopadhyay (2003) find evidence that terms of trade volatility, and fiscal and monetary volatility have a significant negative impact on growth rates in developing economies, and particularly in highly volatile ones.

³The gains from international diversification may vary depending on how capital is distributed within each country. Such distributional effects are not within the scope of this study though.

⁴See Arreaza, Sørensen and Yosha (1999).

⁵See Gavin and Perotti (1997).

⁶See Arreaza, Sørensen and Yosha (1999).

⁷Unless income takes the form of capital gains, which are not accounted by factor income flows.

⁸See, for example, Sørensen and Yosha, 1998, Kalemli-Ozcan, Sørensen and Yosha, 2003.

⁹See Calvo, Leiderman and Reinhart(1994), Hausmann and Leiderman (1996), Gavin, Hausmann and Leiderman (1995).

¹⁰The government may borrow domestically, crowding out private sector borrowers who are forced to raise money internationally. The final result is the same. In Latin America, governments usually borrow internationally.

¹¹The fiscal contractions that took place in Mexico (1995) and in Argentina (1995 and 2002)

are examples of the role financial constraints have in fiscal policy. After capital flowed out of both countries during the financial crisis, both countries experienced recessions and neither could implement a stabilizing countercyclical policy. The low credit worthiness of both countries at that time prevented investors to be willing to finance larger deficits.

¹²CEPAL measures trading gains and losses with the expression: $T = \frac{X-M}{P} - \left[\frac{X}{P_x} - \frac{M}{P_m} \right]$ Where x is exports at current prices, m is imports at current prices, P_x is the price index for exports, P_m is the price index for imports and P is a price index based on a selected numeraire. CEPAL uses unit value indexes for imports and exports to deflate the current trade balance. The first term measures the current trade balance deflated by the numeraire.

¹³See, e.g., Cochrane (1991), Mace (1991) and Townsend (1994). For extensions of the basic framework, see, e.g., Canova and Ravn (1996) and Lewis (1996). Recent related contributions can be found in Leiderman and Razin (1994). For micro-studies of risk sharing, see, e.g., Altug and Miller (1990) and Hayashi, Altonji, and Kotlikoff (1996).

¹⁴This formulation assumes that private and public consumption are perfect substitutes. It is also assumes that GDP shocks are exogenous, which is a reasonable assumption at relatively short time horizons. If saving rates are constant in time, consumption in each country is a country-specific fixed proportion of the total output of the group.

¹⁵It may not be optimal for consumers to fully smooth shocks to income (i.e., output shocks that were not insured) if these shocks are highly persistent. Lack of consumption smoothing therefore need not imply any imperfections of credit markets.

¹⁶In this equation “var{ X }” and “cov { X,Y }” denote the statistics $\frac{1}{N} \sum_{i=1}^N (X^i - \bar{X})^2$ and $\frac{1}{N} \sum_{i=1}^N (X^i - \bar{X})(Y^i - \bar{Y})$, respectively, where N is the number of countries in the sample.

¹⁷With time fixed effects the β coefficients represent weighted averages of the year by year cross-sectional regressions, where more weight is given to years with large cross-sectional variation in GDI, since they are more informative about risk sharing. See Asdrubali, Sørensen, and Yosha (1996), footnote 5, for an explicit formula.

¹⁸We could not reject the null of both coefficients been equal with a Wald test (not shown)

¹⁹See of the results in Arreaza, Sørensen and Yosha (1999). The fraction of shocks smoothed by saving and the fraction of shocks unsmoothed, may be underestimated and overestimated

respectively, since there is no correction for a possible endogeneity bias. Instruments for GDI for Latin American countries proved weak for this period though, which could lead to less reliable results. (See Nelson and Startz (1990)).

²⁰Argentina, Brazil, Colombia, Chile, Ecuador, Mexico, Peru, Uruguay and Venezuela.

²¹Colombia, Ecuador, Bolivia, Peru and Venezuela.

²²Argentina, Brazil, Paraguay and Uruguay.

²³Costa Rica, Nicaragua, Panama, Honduras, Guatemala, El Salvador and Dominican Republic.

²⁴Wald test not shown.

²⁵See Arreaza, Sørensen and Yosha (1999).

²⁶Given that both groups have similar persistence of output, they attribute the behavior of savings in Latin America to the presence of “voracity effects”, namely, the interaction between multiple powerful groups that have common access to aggregate income which results in an equilibrium where consumption and appropriation by each group is higher than the first best solution, corresponding to social planning. Therefore, the response of savings to output shocks with voracity effects will be less procyclical than the response of savings under social planning.

²⁷See Arreaza, Sørensen and Yosha, 1999.

²⁸See Stein, Talvi and Grisanti (1999).