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Tax Structure in Latin American: Its Impact on the Real Economy

Estructura impositiva en América Latina: efectos sobre la economía real

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Abstract

In this paper we review the structure of tax systems in Latin America and analyze their impact on the real economy - economic growth, macro-economic stability, and income redistribution. We find that in Latin America relatively higher reliance on direct taxes slows economic growth, although this effect is smaller than in the 'Rest of the World.' However, unlike in most other countries, higher reliance on direct taxes in Latin America does not appear to play a significant role in dampening economic volatility or in reducing income inequality in the region.

Keywords: Tax Structure; Economic Growth; Macroeconomic Stability; Income Inequality.

Resumen

En este trabajo revisamos la estructura de los sistemas impositivos en América Latina y analizamos su impacto sobre la economía real: crecimiento económico, estabilidad macroeconómica y redistribución de ingresos. Para el caso de América Latina observamos que una mayor dependencia de los impuestos directos ralentiza el crecimiento económico, siendo este efecto menor que en el "resto del mundo". No obstante, a diferencia de en la mayoría de otros países, una mayor dependencia de los impuestos directos no parece ejercer influencia sobre la reducción de la inestabilidad económica o la desigualdad de los ingresos en la región.

Palabras clave: Estructura de los sistemas impositivos; Crecimiento económico; Estabilidad macroeconómica; Desigualdad.

JEL Codes: H21; H22.

1. Introduction[1]

One of the most researched questions about tax systems in Latin America is the relatively low, tax revenue-to-GDP ratio (with some exceptions). Low levels of tax revenues have frequently associated with inadequate public spending on public infrastructure and human capital (health and education) leading to slower economic growth and insufficient income redistribution.[2] Less research has been carried out on the structural composition of tax systems in Latin America and its consequence vis-à-vis the real economy.[3]

The choice between direct and indirect taxes has contributed to a long political and academic debate regarding advantages and disadvantages of these two forms of taxation. The choice of direct versus indirect taxes is fundamental to the optimal design of tax structures since these forms of taxation may differ in how they affect efficiency and equity. While some early contributions seemed to demonstrate the superiority of direct over indirect taxes under specific conditions (Hicks, 1939),[4] most of the focus early on in the optimal tax literature was on separate forms of taxation (e.g., Ramsey, 1927; Diamond and Mirrlees, 1971). A key development in the optimal tax literature from the perspective of the optimal tax mix was Atkinson and Stiglitz's (1976) seminal paper, which for the first time, considered the interaction of direct and indirect taxes in the attainment of efficiency and equity goals. Today we take for granted by side of direct and indirect forms of taxation.

The mix of direct and indirect taxes[5] can have important consequences on the relative efficiency of economic systems and on their overall performance in terms of economic growth, macro-economic stability (via built-in stabilizers), and the overall ability to redistribute income.

This paper has as its direct focus the structure and composition of tax systems in Latin America and their impact on economic growth, macro-economic

[1] We are also grateful to Pablo Sanguinetti, Roberto Steiner, and two anonymous referees and the guest editors for helpful comments, and to the Confederación Andina de Fomento (CAF) for financial support to conduct this research. We are exclusively responsible for the findings in the paper.

[2] See, for example, Jimenez *et al.* (2010), Bernardi *et al.* (2007), Bird *et al.* (2006).

[3] See, for example, Martinez-Vazquez *et al.* (2011).

[4] Essentially Hicks (1939) assumed identical individuals with perfectly inelastic labor supply (Atkinson, 1977).

[5] Although different definitions exist, we follow Atkinson (1977) defining direct taxes as those that may be adjusted to the individual characteristics of the taxpayer and indirect taxes those as that are levied on transactions irrespective of the circumstances of buyer or seller.

stability, and income distribution. The organization of the rest of the paper is as follows. Section 2 provides general background on taxation, while section 3 discusses the trends in tax structure in Latin America. Section 4 evaluates the impact of tax structure on three important measures of macroeconomic performance: economic growth, macroeconomic stability, and income distribution. Section 5 concludes.

2. SOME GENERAL BACKGROUND ON TAXATION IN LATIN AMERICA[6]

Although it is frequently addressed in fiscal matters as a homogeneous block of countries, the Latin American region shows considerable diversity in economic structures as well as in tax systems (Gómez Sabaini *et al.*, 2010; Tanzi, 2007). The diversity in tax systems is caused by three factors: diversity in per capita income with low, low-medium and medium-high income countries; the availability of natural resources and therefore the relative ease of obtaining alternative revenues to taxes; and size, with three large federations representing over two-thirds of the region's gross product (Argentina, Brazil and Mexico). Of particular relevance for tax systems is the importance of non-tax revenues in some countries in the region; for example in recent years, non-tax revenues in Ecuador comprised close to half of total revenues, over one-third in Mexico, and over one-fourth in Chile.

From one perspective, Latin American tax structures look just like those of countries in other regions of the world, including income taxes (Personal (PIT) and Corporate (CIT)), social security taxes, and value added taxes (VAT) or other consumption taxes (excises and those on imports). From another perspective, Latin American tax structures do not look like those of most other countries because of the frequent use of what have been called "heterodox" taxes,[7] including taxes on financial transactions, on business assets, and even on exports.

Main features of 'traditional' taxes

Personal income taxes traditionally have raised relatively low revenues in most Latin American countries.[8] The reasons for this appear to be multiple (Tanzi, 2007; Profeta and Scabrosetti, 2007). They include:

(i) the presence of larger than usual informal economies;

(ii) the low share of workers' salaries in the composition of national incomes - less than 30 percent in many countries in the region versus over 70 percent in most industrial countries - and therefore a lower role played by withholding and automatic reporting mechanisms;

[6] This discussion builds on Canavire-Bacarreza *et al.* (2013).

[7] See González (2009).

[8] Some countries, like Brazil and Chile, and more recently Argentina, are somewhat of an exception, but even in these countries the actual use of the PIT is limited by international standards.

(iii) political economy considerations related to very uneven distributions of income - with Gini coefficients approaching 0.60 - and the successful opposition of the best-off groups to significantly progressive taxation[9];

(iv) not unrelated to political economy considerations, the structure of the tax typically riddled with high exemption levels and other provisions narrowing the base;[10]

(v) the low taxation of capital income, often taxed at lower rates if not exempt combined with considerable capital flight.[11]

The story with the corporate income taxation (CIT) is different. The experience and performance of Latin American countries with the CIT is similar to that in other countries, and in some ways comparable to that in the OECD countries. Although the CITs are not as diverse in structure, the tax rates differ markedly-- from about 10 percent to about 38 percent. The region has joined the worldwide trend toward lower CIT rates, with the difference that tax bases have not been broadened as much as in other places due to the continuation of exemptions and special tax advantages and incentives.[12] Tax revenues from the CIT nevertheless have improved in recent times because tax bases are now better adapted to deal with inflation than in the past and with the sharp increases in international prices and profits of companies exploiting natural resources. To address the problem of the 'hard to tax' almost every country has introduced a simplified taxation system for small enterprises, often based on presumptive methods of defining the tax bases.

Social security taxes are not as important or as common in the region as in OECD countries, but here again there is considerable diversity. For example, Brazil raises over 15 percent of GDP to finance social security services.

On the side of consumption taxes, the VAT is generally a success in the region, and the most important form of indirect taxation in some countries, like Brazil, Chile and Uruguay, raising over 8 percent of GDP in tax revenues - comparable to other successful experiences in OECD countries (Tanzi, 2007). Rates, which have been increasing, vary considerably-- Panama at 5 percent

[9] As Tanzi (2007) points out, this outcome contradicts the prediction in public choice theory that political majorities would use their power to redistribute income in their favor. Profeta and Scabrosetti (2007) explain the political economy puzzle for the lack of tax redistribution in Latin America by the role played by "vested interests, financial sector, and populist economic policies." These authors argue that Latin American political parties only weakly represent voters' political preferences and that they are more influenced by elites and interest groups. Profeta and Scabrosetti (2007) also make an argument for weaker tax administration in Latin America due to disintermediation and lower penetration of financial institutions in the economy-- an argument originally made by Gordon and Li (2005).

[10] Castelletti (2008) points out that in the vast majority of countries in Latin America (over 90 percent in Brazil, Chile, Colombia, and Costa Rica) most earnings are below the minimum exempt threshold.

[11] For example, Peru exempts interest and capital gains. The fear of capital flight has been a real one; for example, capital still flows to the U.S. in large amounts, in part due to the fact that there deposits by "nonresident aliens" enjoy tax free status (Tanzi, 2007).

[12] Tax expenditures vary from about 1.4 percent for Brazil and 7.4 percent for Colombia (Gómez Sabaiani *et al.*, 2007).

versus Uruguay at 23 percent, and on average are almost 5 percentage points below those of the EU. Most countries operate on a single general rate. The productivity of the VAT-- the ratio of actual collections to GDP times the standard rate-- is low in some countries (for example, less than 25 percent in Mexico) due to the application of multiple rates and the narrowing of the base through the use of exemptions. Like in other regions of the world, the operation of the VAT in Latin America has suffered from fraud with fake credits and delays in paying the legitimate refunds to exporters and other taxpayers. Overall, even though the VAT has been performing well, there is ample fiscal space in the region to increase the yield of the VAT. Excise taxation has been declining in importance in part due to the lack of indexation of specific rates. Finally, customs revenues have also declined as the result of international trade reforms, although revenues from export taxes are quite significant, at least in Argentina.

Main features of 'heterodox' taxes: In search of Eldorado?

A feature that separately defines tax systems in the Latin American region vis-à-vis those in other parts of the world is the use of innovative 'heterodox' forms of taxation (Gonzalez, 2009) in a persistent search for the "Eldorado of the tax world" (Tanzi, 2007). These are approaches to provide tax revenues in more administratively effective and politically less painful ways. But potentially they can impose more severe distortions and excess burdens in the economy.[13] Often introduced in times of crisis, 'heterodox' forms of taxation have become permanent fixes of tax structures; besides providing easy 'tax handles,' they also have been justified as providing useful information to improve the enforcement of traditional taxes.

The list of heterodox taxes includes: taxes on financial transactions, taxes on business assets, and export duties.[14] Far from being "nuisance taxes"—that is, with revenues collected being less than administrative costs-- heterodox taxes can be significant revenue raisers. Gonzalez (2009) reports that the tax on financial transactions represented close to 2 percent of GDP in Argentina in 2007, and that it represented up to 3.5 percent of GDP in Ecuador before it was abolished.

[13] This is the general argument used in Gonzalez (2009) and Tanzi (2007). On the other hand, other regions of the world, such as Africa and South and Southeast Asia, have faced similar problems in implementing the 'traditional tax model,' but there the adoption of heterodox forms of taxation has been much less common.

[14] Gonzalez (2009) also includes presumptive income taxation and simplified tax regimes for small taxpayers as forms of heterodox taxation. However, these are common in other countries outside Latin America and they probably do not belong to the "heterodox" category. In addition, Gonzalez (2009) lists the 'impuesto empresarial de tasa unica' (IETU)" recently introduced in Mexico which is accompanied by a tax "impuesto a los depositos en efectivo" (IDE) on cash deposits on both local and foreign currencies in excess of $2,300 a month (approximate amount) at a 2 percent rate. While the Mexican tax on cash deposits could be considered among the taxes on financial transactions and therefore just one more heterodox manifestation, the IETU is, however, a cash flow-based business tax (excluding wages and salaries). This tax supplements the regular income tax levied at a uniform tax rate of 17.5 percent which in different forms has been discussed in the tax literature and likely is a desirable form of innovation (McLure *et al.*, 1990; and Auerbach and Bradford, 2004).

That needs to be weighed against the large potential excess tax burdens, especially in the case of the financial transactions tax and the export tax. [15] The financial transactions tax initially fell on bank account withdrawals, but generally has been extended to other bank and non-bank financial transactions, and it is currently used in countries such as Argentina, Colombia, Peru, and Venezuela (Table 1.a).[16] The rates actually applied vary from 0.15 percent of value to 1.5 percent (Table 1.b). Baca Campodonico el al. (2006) have investigated the performance of the "bank transaction tax" (BTT) in six Latin American countries, which at some point have used this tax. They conclude that the BTT is an unreliable source of revenue, with tax collections declining over time and with increases in tax rates narrowing the tax base leading to further revenue decline. These authors also review the literature showing that the BTT promotes considerable financial disintermediation,[17] and leads to increases in the cost of government borrowing.

The business assets tax was first introduced in the region by Mexico in 1989 with the goal of having a minimum creditable tax against the corporate income tax, and eventually grew to represent upwards of 1 percent of GDP in revenues. Some form of this tax, under different names, has been used off and on by a number of countries in the region (Table 1.c), most of the time with the purpose of controlling evasion and, as in the case of Mexico, making it a minimum tax creditable against CIT.

Table 1.a. Usage of the financial transaction tax in the region

Country	Name
Argentina	*Impuesto al débito y crédito bancario y otras operaciones*
Bolivia	*Impuesto a las transacciones financieras*
Brazil *	*Contribución provisoria sobre el movimiento o transmisión de valores y créditos de naturaleza financiera*
Colombia	*Gravamen a los Movimientos Financieros*
Dominican Republic	*Impuesto sobre los cheques*
Ecuador *	*Impuesto a la circulación de capitales*
Peru	*Impuesto a las transacciones financieras*
Venezuela	*Impuesto a las transacciones financieras*

(*) abolished.

[15] See Coelho (2009) for a discussion of disintermediation and other economic effects of financial transaction taxes.

[16] Brazil abolished this type of tax in 2007. The tax collection had been earmarked to finance the health system. Other Latin American countries that have or have had bank or financial transactions taxes include Bolivia, Colombia, Dominican Republic, Paraguay and Venezuela.

[17] Kirilenko and Perry (2004) find that the application of the BTT has led to disintermediation; for every dollar raised in revenues by the BTT, they observed disintermediation of 46 cents in Argentina, 58 cents in Brazil, 64 cents in Colombia, 48 cents in Ecuador, 66 cents in Peru, and 49 cents in Venezuela. These losses alone can represent a loss of over 0.5 percent of GDP.

TABLE 1.B. BASE AND RATE OF THE FINANCIAL TRANSACTION TAX IN THE REGION

Country	Tax Base	Tax Rate
Argentina	*Debits/credits on bank accounts (checking), other operations made through financial institutions, and payments made through other payment systems*	0.60%
Bolivia	*Debits and credits on bank accounts*	0.15%
Brazil *	*Debits and credits on financial system accounts, payments through other payment systems*	0.38%
Colombia	*Debits on bank accounts , cashier checks*	0.40%
Dominican Republic	*Debits*	0.15%
Peru	*Debits and credits on bank accounts*	0.08%
Venezuela	*Debits on bank accounts and other types of accounts within the financial system*	1.5%

(*) abolished.

TABLE 1.C. USAGE OF THE BUSINESS ASSETS TAX IN THE REGION

Country	Name
Argentina	*Impuesto Ganancia Mínima Presunta*
Colombia	*Impuesto Renta y Complementarias*
Ecuador*	*Impuesto sobre Activos*
Guatemala	*Impuesto a Empresas Mercantiles y Agropecuarias*
Honduras	*Impuesto sobre Activos Netos*
Mexico*	*Impuesto al Activo*
Nicaragua	*Impuesto al Patrimonio Neto*
Peru	*Impuesto Transitorio a los activos netos (ITAN)*
Dominican Republic	*Impuesto a los Activos*
Uruguay*	*Impuesto a los Activos de Empresas Bancarias*

Sources: Based on Gonzalez (2009); (*) currently abolished.

The export tax is a phenomenon nowadays exclusive to Argentina, where revenues from this source represented close to 3 percent of GDP in 2009. Decades ago, especially in the 1950s and 60s, export taxes had some prominence in many tax systems in the region.[18]. Typically export taxes are seen as leading to trade distortions and large excess burdens. Besides its ability to

[18] These countries included Argentina, Brazil, Colombia, Ecuador and Haiti and covered agricultural products and raw materials (Tanzi, 2007).

raise revenues, this tax has been justified by the Argentinean government as a way to capture some of the rents received by exporters after devaluation of national currency and also to pursue income redistribution goals.

The evolution of tax levels (Tax to GDP ratio)

For decades, the Latin American region has been identified as a low tax pressure region vis-à-vis other regions of the world, with average levels even below much poorer African countries (Bird *et al.*, 2006). This has changed over the past decade with average fiscal pressure increasing from an average of 12 percent in the 1990s to an average of 18 percent in the 2000s - but still at less than half of the average tax pressure in OECD countries (International Monetary Fund, 2011; Gómez Sabaini *et al.*, 2007; Tanzi, 2007). However, these average figures mask important persistent differences in tax pressure across countries in the region with persistent underperformers like Guatemala, and Paraguay collecting less than 10 percent of GDP and countries like Mexico that has been constantly stuck at 12 percent of GDP for decades.[19] Gómez Sabaini *et al.* (2007) aptly classify the countries in the region into three separate groups: the relative high performers (Argentina, Brazil, Uruguay, Costa Rica) which had tax revenues (including Social Security contributions) as percent of GDP of 26.0 in 2005—with Brazil as high as 37.4 percent and Costa Rica at 20.5 percent; a middle group with most countries with an average ratio in 2005 of 17.0 percent; and a lower group with a mean value of 11.7 percent in which stand Guatemala and Haiti both at 9.7 percent of GDP. Also in this last group are countries like Venezuela and Ecuador, which have significant non-tax revenues from natural resources, and Panama with substantial non-tax revenues from exploiting the Canal.

The improvements in the tax ratio in countries like Argentina, Bolivia, Colombia, or Nicaragua have been generally attributed to policy reforms, improvements in tax administration with the incorporation of information technology, and also increases in international prices for those countries exporting natural resources (although the latter is only partially reflected in tax revenues and more so in non-tax revenues).

Typically the discussion of tax levels is accompanied by an analysis of tax effort. Tax effort is defined as the comparison of the taxes actually raised to those that a country may theoretically raise given its economic structure and if it were to employ certain standards (average or maximum) of diligence in collecting taxes.[20] In order to control for economic structure or availability of tax bases, typically GDP per capita, openness (exports plus imports to GDP ratio), value added in agriculture, population growth, etc, are used as control variables. Table 2 reports some recent calculations

[19] See Martinez-Vazquez (2008a) for a discussion of the "Mexican constant" tax pressure.
[20] See, for example, Bird *et al.* (2006) and the references therein.

of tax effort in Latin American countries by Cyan *et al.* (2013) estimated using a stochastic frontier approach.[21,22]

TABLE 2. TAX RATIO AND TAX EFFORT FOR SELECTED LATIN AMERICAN COUNTRIES*

Country	Revenues (tax and non-tax) (% of GDP)	Estimated Revenue Effort (collected over potential, %)
Argentina (2006)	27.13	85.85
Brazil (2005)	32.32	128.58
Bolivia (2002)	15.12	71.98
Chile (2000)	22.68	89.99
Colombia (2004)	17.66	86.40
Costa Rica (2006)	22.73	101.21
Dominican Republic (2006)	15.76	87.35
Ecuador (2006)	13.91	80.00
El Salvador (2004)	12.82	72.99
Guatemala (2004)	11.50	74.28
Honduras (2006)	14.66	83.89
Mexico (2005)	15.05	78.46
Nicaragua (2005)	19.85	125.30
Panama (2000)	15.97	69.14
Paraguay (2005)	12.31	68.82
Peru (2005)	17.87	74.80
Uruguay (1998)	22.73	103.53
World	26.12	87.00
OECD	41.24	87.00
Developing	21.76	87.00
Latin America and the Caribbean	18.96	87.00

* The last year for which all data needed for the calculations are available ; Source: Cyan *et al.*, 2013

It is notable how effort varies across countries, with Guatemala collecting at 74 percent of its potential while Brazil is at almost 129 percent. Poor per-

[21] This study excluded countries with over 30 percent in total revenues coming from non tax sources.
[22] The stochastic frontier approach generates a measure of tax capacity which is specific to each country while the performance benchmark arises out of the experience with general tax effort across countries. It also allows estimation of time-varying inefficiency in tax effort.

formance is generally explained by low buoyancy/elasticity of the tax system, large size of the underground economy, high levels of tax evasion, underperforming tax administration, high tax expenditures (multiple exemptions and deductions), and political reasons aiming to keep low tax effort. These are many interconnected reasons, present in many tax systems in the regions, but obviously with quite different consequences.

3. Trends in tax structure in Latin America

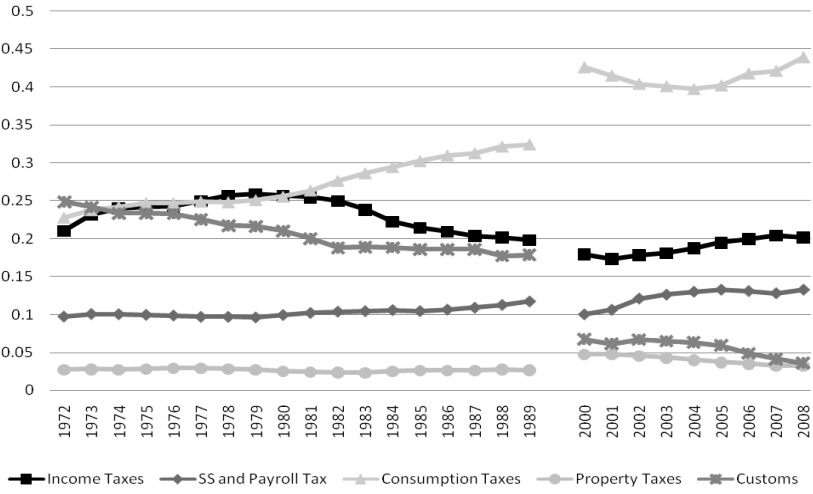
The structure of tax systems in Latin America has changed significantly over the past decades. As shown in Figure 1: [23](i) there has been a rapid increase in the relative importance of consumption taxes led by the introduction and rise of the VAT, which has more than compensated for some reductions in excise taxes; (ii) there has been a very significant decline in the relative importance of taxes on international trade, led by a decrease in customs duties following tariff reform and despite the importance of export taxes in Argentina; (iii) there has been a sustained stagnation of income taxes led by weak collections from the personal income tax only partially offset by the better performance of the corporate income tax, especially in more recent years with higher profits associated with the international prices of natural resources; (iv) there has been an increase in importance of social security contributions and payroll taxes; and (v) there has been a complete stagnation of property taxes at very low levels of taxation.

One important outcome of this evolution of tax structures in Latin America has been a direct to indirect tax ratio that is less than one, markedly tilted toward indirect taxation, especially by comparison to the tax structure of "developed" countries. [24] [25] This is shown in Figure 2 where, for comparison purposes, we show the direct to indirect tax ratio for Latin American countries and those for 'developed' and 'developing' countries, as well as for the full sample of countries. In more recent years, the direct to indirect tax ratio in Latin America shadows that of 'developing' countries and has remained under one because of the much larger importance of consumption taxes. In contrast, the tax ratio in 'developed' countries is much greater than one, reflecting the larger relative importance of income taxes,[26] especially personal income taxes,

[23] From 1990 to 1999 the data downloaded from the International Monetary Fund's (IMF) Government Finance Statistics (GFS) were incomplete and therefore are not reported in the figures. This was due to a change in methodology from 1990 onward which led to scattered data reporting for many years.
[24] Countries are re-classified as "developed" from the year of becoming members of the OECD.
[25] Although some other classifications are possible, in this paper we will categorize as direct taxes, all income taxes, social security and payroll taxes, and property taxes. The main categories of indirect taxes are (domestic) consumption taxes, which include the VAT and excises, and customs taxes or taxes on international trade. For the "heterodox" taxes, those on financial transactions and exports fall into indirect taxes, while the taxes on enterprise assets are considered direct taxes.
[26] It is interesting to note that on average over two-thirds of income taxes in developing countries come from personal income taxes. In Latin America, this is reversed with corporate income taxes representing over two-thirds of the total.

social security taxes, and also, although to a lesser extent, of property taxes. The direct to indirect tax ratio, of course, has important consequences for the impact of tax structure.[27] The predominance of indirect taxation in Latin America tends to produce less progressive and even regressive outcome on income distribution. This has been a frequently mentioned feature in the region. In addition, as we will examine below, the direct to indirect tax ratio can have important impacts on automatic stabilizers and therefore macroeconomic stability, and on economic growth, among other potential effects.

FIGURE 1. AVERAGE ANNUAL TAX STRUCTURE AS A SHARE OF TOTAL TAXES IN LATIN AMERICAN COUNTRIES, 1972-2008

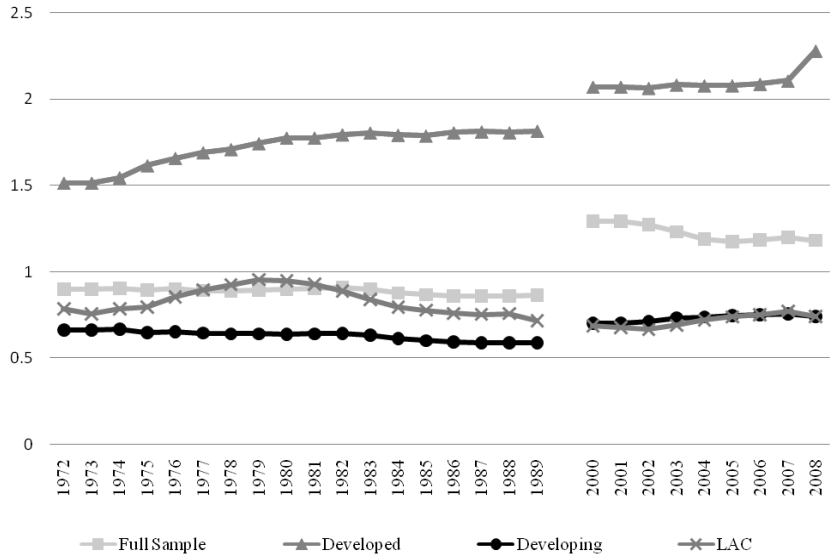


Source: Author's calculations, IMF-GFS Database, and CEPAL.

Notes: All data at the general government level; Based on a sample of 116 countries: the number of countries in the sample varies across years; the breaks are due to change in the GFS methodology after 1990; for 1990–98 the data are not available; property taxes are included in direct taxes.

[27] See Martinez-Vazquez *et al.* (2011) for a review of the theoretical debate in public finance on the need and relevance of direct versus indirect taxation.

Figure 2. Average annual Direct to Indirect Tax Ratio in different groups of countries, 1972-2008

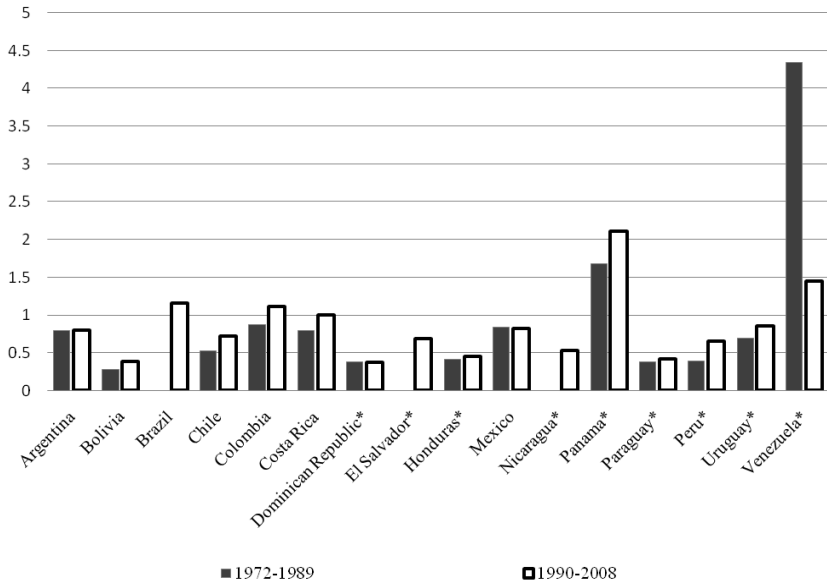


Source: Author's calculations, IMF-GFS Database, and CEPAL.

Based on a sample of 116 countries: the number of countries in the sample varies across years; the breaks are due to change in the GFS methodology after 1990; for 1990–98 the data are not available; property taxes are included in direct taxes.

As usual, the average values hide considerable diversity by country. In a number of countries in the region, including Brazil, Colombia, Costa Rica, Panama and Venezuela, the direct to indirect tax ratio has been close to or has exceeded one. Often the reason is the greater importance of the CIT and the combination with the presence of natural resources.

FIGURE 3. AVERAGE DIRECT TO INDIRECT TAX RATIO IN LATIN AMERICA BY COUNTRY, 1972-2008



Source: Author's calculations; IMF GFS Database, CEPAL; *Data for 1990-2008 at the central government level

4. THE IMPACT OF TAX STRUCTURE ON THE REAL ECONOMY

Alongside the theoretical modeling on optimal tax structure and the empirical literature on its determinants, a separate literature has developed over the past several decades examining the impact of tax structure - the direct to indirect tax ratio - on economic activity. Generally speaking, these empirical studies have been finding increasingly significant effects of the direct versus indirect tax mix on the real economy, perhaps due, among other things, to the estimation methodologies employed. For example, Atkinson and Stern (1980), Poterba *et al.* (1986), Delgado and Salinas (2008), and Xing (2012) find small long-term effects. On the other hand, the European Commission (2006), Johansson *et al.* (2008), Dahlby, (2003); Li and Sarte (2004), Kneller *et al.* (1999), and Padovano and Galli (2001), Arnold *et al.* (2011), and Acosta-Ormaechea and Yoo (2012) find significant effect on income and growth.

In this section we use panel data for Latin American countries plus a large number of other developing and developed countries to explore the impact of tax structure, measured by the direct to indirect tax ratio, on the real economy. We do this along three important dimensions of macroeconomic

performance: economic growth, macro stability, and income distribution.

The tax data represents consolidated general government data and are drawn from the IMF GFS Database covering the period 1972-2005 and we use a dummy variable to identify Latin American countries.[28]

4.1 Tax structure and economic growth

There has been a continued interest in the economics literature on the determinants of economic growth and more in particular on the impact of taxes on growth. Much of the past research has focused on the potential negative long-term growth effects of direct taxes, particularly corporate income taxes and progressive personal income taxes. [29] The most recent empirical results would suggest that higher direct to indirect tax ratios should lead to lower rates of economic growth all other things being equal. Our interest here is to test this conjecture in the context of the Latin America region. To do so we will build on Lee and Gordon (2005) and Martinez-Vazquez *et al.* (2011). [30]

The sample period, covering 1972-2005, is divided it into seven subsample periods: one 3-year period (1972-74), five 5-year periods (1975-79, 1980-84, 1985-89, 1990-94, 1995-99), and one 6-year period (2000-05). Following Lee and Gordon we regress the average subsample real GDP per capita growth rate *(GDPg)* on the average subsample direct to indirect tax ratio (*TaxRatio*)and a vector of other control variables *(X)* which have proven to be robust in previous empirical analyses. The estimating equation is given by:

$$GDPg_{it} = \alpha TaxRatio_{it} + X_{it}\beta + v_i + \varepsilon_{it}, i = 1, \dots, N, t = 1, \dots, T$$

where *i* indicates country and *t* denotes subsample period. Vector X_i includes GDP per capita, top marginal corporate tax rate, [31] primary school enrollment, openness, International Country Risk Guide (ICRG) index, t population growth rate, and inflation rate. [32] [33]

[28] See Martinez-Vazquez *et al.* (2011).
[29] See, for example, Jones *et al.* (1993); Mendoza *et al.* (1997); Kim (1998); Dahlby (2003); Lee and Gordon, (2005)
[30] Our approach differs from Arnold's *et al.* (2011) in that instead of looking at how particular types of taxes (e.g. individual income taxes, corporate income taxes, etc.) affect economic growth, we observe the tax systems as aggregates focusing on the balance between direct and indirect forms of taxation.
[31] We focus on the top marginal corporate income tax rate because capital is relatively much more mobile input of production than labor.
[32] We use values for the initial subsample year for the variables GDP per capita, top marginal tax rate and primary school enrollment, and average subsample values for the other variables.
[33] Given that the time dummies representing sub-sample periods turn out to be not jointly significant, we do not include them in order to save degrees of freedom. In addition, their inclusion in the model does not significantly change our results.

In the estimation we address the potential endogeneity of the direct to indirect tax ratio. We use an instrumental variable approach. Following Lee and Gordon (2005), we instrument each direct to indirect tax ratio observation with the weighted average of the tax ratios for all other countries in the corresponding year, where the weights are the inverse of the distance between the two countries. [34] The instrumental variable for country *i* in year *t, TaxRatioIV*$_{it}$ is, therefore, calculated as:

$$TaxRatioIV_{it} = \frac{1}{\sum_{j=1}^{n} \frac{1}{d_j}} \sum_{j=1}^{n} \frac{1}{d_j} TaxRatio_{jt}; i \neq j$$

where d_j is the distance between the largest cities in country *i* and country *j*, and $TaxRatio_{jt}$ is the tax ratio in country *j* in year *t*. Because we also use the corporate tax rate in our regressions, which as in Lee and Gordon (2005) may be endogenous, we also instrument this variable.[35] Also following Lee and Gordon (2005) we use a battery of estimation approaches: first, we employ ordinary least squares regression, robust regression and median regression to check for the robustness to the outliers; [36] second, we use panel estimation including fixed effects regression and the instrumental variable regression with country dummies. [37] In the last set of regressions we run separate regressions for the full sample of countries, for developing countries, for Latin American countries, and the full sample with interaction terms including a Latin American dummy to allow for the full sample coefficients to vary in the region.

[34] The smaller the size of country , the relatively shorter the distance between its largest city and largest cities in neighboring countries, implying a relatively stronger effect of their tax ratios on the tax ratio in country . The source for the distance measure between two countries is CEPII (Centre D'Etudes Prospectives Et D'Informations Internationales, http://www.cepii.fr/). Geodesic distances are calculated following the great circle formula, which uses latitudes and longitudes of the most important cities/agglomerations in terms of population. The underlying intuition for using this particular instrument is that economic growth in a country relative to others generally should not have an effect on the design of the tax mix of those other countries, so the dependent variable should not be correlated with the instrument. On the other hand, the design of the tax mix in a country should be affected by the design of the tax mix in the neighboring countries, this effect being especially strong in the case of small countries.

[35] Hausman tests for endogeneity concerning the direct to indirect tax ratio variable and the corporate tax rate rejects the null hypothesis that OLS is a consistent estimator, providing support for using instrumental variables methodology.

[36] Robust regression treats all data point equally in the OLS regression, so it is a compromise between excluding the outliers entirely from the regression and including all the data. Observations are weighted differently based on how well behaved they are. Median regression, also known as least-absolute-deviations (LAD) regression, minimizes $\sum_i |e_i|$. Median regression avoids assumptions about the parametric distribution of the error process so it is more robust to outliers than the OLS regression (Baum, 2006).

[37] The Hausman test signaled the appropriateness of fixed effects estimation approach. Some of these results replicate those in Martinez-Vazquez *et al.* (2011).

The estimation results are shown in Table 3. The results with most interest for this paper are those pertaining to the direct to indirect tax ratio. Higher direct to indirect tax ratios appear to have a significant and negative impact on economic growth in all regressions, although the coefficient is not always statistically significant, as in the case of the Latin America regression with country dummies using instrumental variables. Also note that the interaction term of the tax mix variable with the Latin America dummy (column 8) is positive and jointly significant with the general coefficient. However, since it is smaller in size than the general coefficient for the tax ratio variable (5.6 versus 4.6, in absolute terms), we can conclude that the effect of higher reliance on direct taxes (vis-à-vis indirect taxes) in Latin American countries has slowed down economic growth, but the effect is smaller than in the rest of the world. The overall effect would appear to be smaller than for the full sample of countries; this is likely due to the less variation in the tax ratio in the region and that the ratio is hardly ever bigger than one.

Table 3. The impact of the direct to indirect tax mix on economic growth, 1972-2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						Country Dummies + IV		
	OLS	Robust	Median	Fixed Effect	Full Sample	Developing	Latin America	Full Sample1
Tax Ratio	-0.248	-0.323**	-0.338*	-0.872***	-3.910**	-4.620	-2.429	-5.632**
	(0.179)	(0.147)	(0.178)	(0.284)	(1.575)	(4.155)	(2.791)	(2.197)
Tax Ratio*LA								4.645
								(3.264)
TopMarg CTR	-0.028*	-0.03**	-0.031*	-0.05***	-0.09***	-0.207	0.057	-0.10***
	(0.015)	(0.014)	(0.017)	(0.019)	(0.033)	(0.163)	(0.099)	(0.035)
TopMargCTR*LA								-0.219
								(0.155)
Initial GDP pc	-0.89***	-0.77***	-0.92***	-1.92***	-1.654***	-23.964*	-11.24*	-1.504**
	(0.243)	(0.246)	(0.319)	(0.549)	(0.559)	(13.269)	(6.304)	(0.611)
Primary enrollment	0.026	0.016	0.041**	-0.035	-0.089**	0.058	-0.076	-0.132***
	(0.017)	(0.016)	(0.020)	(0.030)	(0.045)	(0.138)	(0.052)	(0.049)
Openness	0.672**	0.641**	0.569	3.825***	4.475***	14.291	3.880	5.185***
	(0.332)	(0.285)	(0.375)	(1.156)	(1.327)	(18.180)	(4.101)	(1.424)
Openness*LA								-26.499***
								(10.109)
Corruption	0.316	0.319*	0.499**	0.417	0.826*	1.314	1.018	1.327**
	(0.195)	(0.170)	(0.221)	(0.393)	(0.449)	(3.889)	(0.887)	(0.552)
Corruption*LA								-6.246**
								(2.389)
Population growth	-0.007***	-0.006***	-0.006***	-0.003**	-0.002**	-0.006*	-0.002	-0.018***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.003)	(0.002)	(0.005)
Population growth*LA								0.014***
								(0.005)
Inflation	-1.21***	-1.11***	-1.06***	-1.084**	-1.461***	5.236	-4.34***	-1.774***
	(0.227)	(0.177)	(0.231)	(0.425)	(0.518)	(6.039)	(1.585)	(0.662)
Inflation*LA								-2.021
								(2.986)
Constant	2.337	3.325*	0.302	8.288**	14.446***	10.443	17.142*	47.958***
	(1.924)	(1.722)	(2.230)	(3.471)	(5.395)	(31.639)	(9.300)	(14.541)
Observations	197	197	197	197	197	38	77	197
R-squared	0.37	0.34		0.28				
Number of id				64				

Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1; 1 Using a dummy variable to distinguish Latin American countries.

For the other control variables, the results are generally similar to those in the previous empirical literature. The coefficient of the corporate tax rate is negative and significant in most of the equations, although for the Latin America regression it is not significant and positive. However, in the full sample regression with the Latin America interaction dummy (column 8) the coefficient for the interaction term for the corporate tax rate is negative and jointly significant, thus reinforcing the negative and significant general coefficient for this variable. A similar set of results holds for the inflation rate, except that in this case the coefficient in the Latin America alone regression is also negative and significant. The negative effect of inflation on economic growth supports the hypothesis that inflation creates uncertainty and reduces investment.[38] The coefficient for the initial period GDP per capita is negative and significant, supporting the conditional convergence of growth rates reported in previous studies.[39] For trade openness the estimated coefficients are generally positive and significant, and strongly so for the full sample with Latin America interaction terms (column 8). Thus openness has a positive and significant effect on the growth rate of Latin American countries, a finding consistent with those in the previous literature.[40] The coefficient for corruption is generally positive and sometimes significant in most of the equations, meaning that lower levels of corruption (the value of the index decreases with the level of corruption) appear to lead to higher growth. However, the important exception is for the full sample equation with interaction dummies for Latin America (column 8). There, the coefficient for the interaction term is negative and highly significant and also quite a bit larger (-6.24) than the general coefficient for this variable (1.32). This means that Latin America seems again to be somewhat of an exception, with higher levels of corruption leading to faster growth, other things equal. This is also a plausible result from the perspective of the past literature.[41] Last, higher population growth appears to lead to slower economic growth, although this effect would appear to be quite a bit smaller in Latin American countries.

4.2. Tax structure and macroeconomic stability

The form of taxation can have an effect on the ability of governments to manage macroeconomic stability. An extensive literature covering many decades has examined the role of direct taxes as automatic stabilizers.[42] The corporate income tax yields higher revenues when profits are high in the ex-

[38] See, for example, Padovano and Galli (2001, 2002) and Romero-Ávila and Strauch (2008).
[39] See Barro (1991); Mankiw *et al.* (1992); and Kneller *et al.* (1999).
[40] See, for example, Dollar (1992); Frankel and Romer (1999); and Dollar and Kraay (2003).
[41] Acemoglu and Verdier (1998) argue that corruption facilitates economic growth because it helps government officials become more efficient in approving projects, etc. On the other hand, Mauro (1995) and Knack and Keefer (1995) argue that corruption leads to uncertainty and higher costs of conducting business, and, therefore, lower economic growth.
[42] This literature goes back to Musgrave and Miller (1948), Brown (1955), Musgrave (1959), and Pearse (1962).

pansion phase of the business cycle but they drop considerably in recessions. The personal income tax with progressive rate schedules has the same effect on disposable income during the business cycle, while social security contributions and payroll taxes also tend to act in a countercyclical manner. On the other hand, property taxes tend to remain more constant over the business cycle but their size is very small vis-à-vis other direct taxes. In contrast, indirect taxes, including the VAT and excises lack those stabilizing features.

In this section we analyze the impact of the direct to indirect tax composition on macroeconomic stability in Latin America in the context of a larger sample of countries. We regress the volatility of economic growth, measured by the standard deviation of GDP growth rate within each subsample period, on the direct to indirect tax ratio-which captures the effect of automatic stabilizers on economic stability--, and a vector of other explanatory variables following the work by Easterly *et al.* (2000) and Beck *et al.* (2001). The vector of other control variables includes the "volatility of inflation" (measured by the standard deviation of the subsample M1 annual growth rate [43]) which attempts to capture exposure to monetary shocks, openness, and GDP per capita.

As for the previous section, the sample period 1972-2005 is divided into seven subsample periods. We proceed to estimate two versions of the following equation, with one version introducing an interaction term with a dummy for Latin America:

$$SD_{GDPg_{it}} = \alpha_1 TaxRatio_{it} + \alpha_2 TotalRev_{it} + X_{it}\beta + v_i + \varepsilon_{it}, i = 1, \dots, N, t = 1, \dots, T$$

where i indicates country and t denotes subsample period. The dependent variable, *SD_GDPg,* is the subsample standard deviation of annual GDP (real) per capita growth rate, *Tax Ratio* is the average subsample direct to indirect tax ratio, *TotalRev* is the average subsample total revenues to GDP, and X_t represents all other control variables.

To identify the correct panel data estimation procedure, we perform a Hausman (1978) test which fails to reject the null hypothesis that the coefficients estimated by the efficient random effects estimator are the same as the ones estimated by the consistent fixed effects estimator. Therefore, we will present the random effects estimates. To correct for the potential endogeneity of "openness" we perform the random effects estimations, without and with an instrumental variable. The instrumental variable is built using an identical methodology to the one used in the previous section on economic growth. Note that to allow for a nonlinear relationship between the tax ratio variable and economic stability, we introduce a squared term for the tax ratio. Because the effectiveness of fiscal stabilizers in helping control the business cycle de-

[43] Money is the sum of currency outside banks and demand deposits other than those of central government. This series, frequently referred to as M1 is a narrower definition of money than M2. Data are in current local currency. For more information, see Table: WDI 4.15.

pends on the size of government, we introduce an interaction term between the tax ratio variable and total revenues to GDP.

TABLE 4. THE DIRECT TO INDIRECT TAX RATIO AND MACRO STABILITY, 1972-2005

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Random Effects				Random Effects IV		
	Full Sample	Developing	Latin America	Full Sample1	Full Sample	Develo-ping	Full Sample1
Tax ratio	-0.934	-1.186**	-0.999	-0.305	-1.556*	-3.383**	-2.126
	(0.663)	(0.543)	(1.105)	(0.897)	(0.841)	(1.651)	(4.954)
Tax ratio*LA				-0.727			1.349
				(1.554)			(8.318)
Tax ratio sq	0.246**	0.004	0.080	0.111	0.240*	0.201	0.388
	(0.110)	(0.095)	(0.228)	(0.166)	(0.130)	(0.210)	(0.850)
Tax ratio sq*LA				-0.000			-0.013
				(0.003)			(0.072)
Total Rev to GDP	1.445	-1.076	3.210	0.850	-4.449	-19.281	-3.434
	(3.693)	(2.977)	(8.373)	(4.193)	(5.245)	(12.496)	(25.434)
Total Rev to GDP*LA				1.901			-182.917
				(10.461)			(1,409.321)
Tax ratio*Total Rev to GDP	-0.028	0.033	0.016	-0.040	0.006	0.091	0.000
	(0.021)	(0.020)	(0.040)	(0.025)	(0.028)	(0.055)	(0.141)
Tax ratio*Total Rev to GDP*LA				0.058			0.463
				(0.053)			(3.305)
StandDev(M1)	1.909	-3.915	0.969	129.619	5.428	16.403	84.464
	(11.644)	(9.405)	(10.389)	(120.942)	(12.329)	(19.007)	(537.489)
StandDev(M1) *LA				-128.721			-15.458
				(121.549)			(723.967)
Openness	1.061**	0.091	0.229	1.126**	3.902***	8.664*	3.753
	(0.422)	(0.369)	(0.768)	(0.496)	(1.331)	(4.887)	(5.804)
Openness*LA				-0.875			77.298
				(1.000)			(582.752)
GDP pc	0.042***	0.080***	0.047***	0.044***	0.039***	0.025	0.039*
	(0.003)	(0.005)	(0.013)	(0.004)	(0.004)	(0.031)	(0.023)
GDP pc*LA				0.005			-0.132
				(0.015)			(0.785)
Constant	60.346	36.391	8.559	39.718	-50.070	-131.435	-16.704
	(71.999)	(53.486)	(127.278)	(88.290)	(106.041)	(151.119)	(575.803)
Observations	256	197	66	256	256	197	256
Number of id	89	72	20	89	89	72	89
R-squared	0.64	0.78	0.75	0.64			

Standard errors in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%; 1 Using a dummy variable to distinguish Latin American countries

The estimation results are shown in Table 4. Overall, the results indicate that the direct to indirect tax ratio plays a significant role in dampening economic volatility. All the estimated coefficients for the tax ratio are negative and most of them statistically significant. However, there does not appear to be any separate significant effects for the Latin American region, which again may be due to the lack of variation and depth of the direct to indirect tax ratio in those countries. There is also only weak evidence that the direct to indirect tax ratio and economic volatility may be quadratic. Interestingly, for the subsample of developing countries, the direct to indirect tax ratio has more automatic stabilizing power but not so for the case of Latin America. Note also that the coefficients for the interaction terms of the tax ratio with total revenues to GDP are not statistically significant.

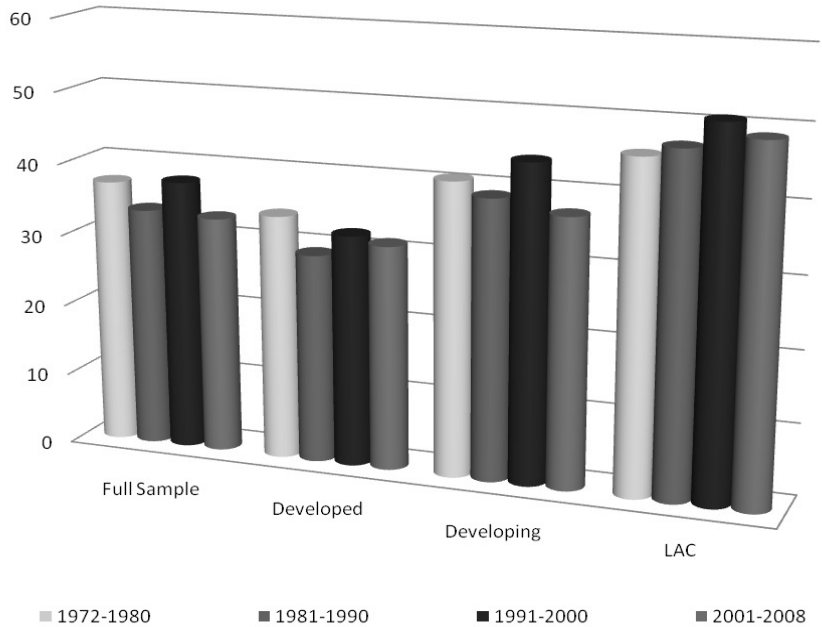
For the other control variables, it appears that the volatility of M1 has no significant effect on economic stability. On the other hand, trade openness appears to be positively correlated with economic volatility in most regressions. But this link also appears to be less strong for the case of Latin America; in the regression for the full sample with interaction terms for Latin America (column 4) the general coefficient is positive and the interaction coefficient is negative and both jointly significant; this suggests that the exposure of Latin American economies to outside shocks is less pronounced for any degree of openness. Lasty, average GDP per capita has a positive effect on economic volatility, even for the subsample of Latin American countries (column 3).

4.3. Tax structure and income inequality

The general presumption in tax and income distribution literatures is that a more equal distributions of income requires a more progressive tax system. In turn, this would generally mean that direct taxes (generally expected to be progressive) would need to be relatively more important than indirect taxes (typically expected to be regressive or much less progressive) in tax systems. These assumptions are generally met for many tax systems around the world with the estimated overall incidence of tax systems ranging from being progressive to mildly progressive or proportional.[44] However, the Latin America region seems to be an exception. Not only are income distributions in Latin America more unequal than in other regions of the world but (Figure 3), not unrelated, tax systems in Latin America for the most part have been found to be regressive and therefore adding to the inequality in income distribution (Gómez Sabaini *et al.*, 2010). Nevertheless, the direct to indirect tax ratio, even though low in the Latin American region, varies significantly across countries.

[44] See, for example, Martinez-Vazquez (2008b).

FIGURE 3. AVERAGE GINI COEFFICIENTS BY SAMPLE GROUP



Source: World Income Inequality Database May 2008; Note: No distinction between the concepts in measuring income inequality was made.

Our interest in this section is to investigate the importance of the direct to indirect tax ratio as a determinant of income inequality in Latin American countries in the context of a larger number of other developed and developing countries. The evidence in the empirical literature on this issue is mixed,[45] and our own empirical findings in this section do not offer strong support to the conjecture that the direct versus indirect composition of taxes plays an important role in observed inequality in distribution of income. However, this conclusion is subject to the important caveat of the difficulties involved in measuring inequality in income distribution across countries and over time through Gini coefficients, our dependent variable.[46]

The following empirical model is estimated for the full sample of developed and developing countries with and without interaction terms with a Latin

[45] The evidence on redistributive effects of taxes is especially weak for developing countries (Bird and Zolt, 2005; Martinez-Vazquez, 2007; and Harberger, 2008).

[46] Gini coefficients are computed on the basis of income distributions using different concepts of income, including gross income, net income and consumption. This presents important measurement and comparability issues, which are difficult to control for in regression analysis.

America dummy to allow the estimated coefficient to vary, and for developing countries and Latin American countries alone:

$$Ginig_{it} = \alpha_1 TaxRatio_{it} + \alpha_2 TotalRev_{it} + X_{it}\beta + GiniConc_{it} + \varepsilon_{it}, i = 1, \ldots, N, t = 1, \ldots, T$$

where i indicates country and t denotes years. Gini is the Gini coefficient as a measure of income inequality[47] over time and across countries; X_i is the set of observable characteristics that affect income inequality, which represent a consensus specification in the empirical literature on aggregate income distribution. Besides our main variable of interest, *TaxRatio*, they include the initial Gini coefficient, total revenue collection to GDP, GDP per capita growth rate, private credit as a percentage of GDP, labor force participation, openness (measured by the ratio of import plus export to GDP), dependency ratio, and dummy for the EU15 countries.

For the estimation we employ 2SLS to address the potential endogeneity of the financial system (measured by the share of private credit in GDP) and the direct to indirect tax mix.[48] For example, Beck *et al.* (2004) suggest that reductions in inequality may lead to higher demand for more efficient financial systems. Following La Porta *et al.* (1999) and Beck *et al.* (2004), we use as instrumental variables for the financial system, latitude (the scaled absolute value of) as well as legal origin (English, French, and German). The potential endogeneity of the tax mix variable may arise from the fact that countries with higher income inequality may attempt to rely more on direct taxes in order to reduce income inequality—although this would appear to be exactly the reverse of what has been occurring in Latin America in reality, if not in intent. We instrument the direct-indirect tax ratio using the same approach described in the section on tax structure and economic growth above. Finally, for the panel estimation, the Hausman test allows us to use the random effects procedure.

The estimation results are presented in Table 5. Our main interest is in the relationship between income inequality and the direct to indirect tax structure with the expectation of a negative relationship between the direct to indirect tax mix and the Gini coefficient for income distribution. The results provide weak support for the conjecture. The coefficient for the tax mix variable is negative but not significant in the Latin America regression (column 3) and the full sample with interaction terms with the Latin America dummy (column 4). In the case of the full sample without interaction terms (column 1) the coefficient for the tax ratio is positive and mildly significant but once we also take into account the negative and significant coefficient for the interaction between tax

[47] To control for the fact that income distributions across countries are based on different measurements of income, including gross income, net income and consumption, we include in our empirical model a set of dummy variables, *GiniConc.* for net income and consumption definitions, and use gross income as the base category.

[48] The Hausman test for endogeneity rejects the null hypothesis that OLS is a consistent estimator for both explanatory variables.

ratio and total revenues, the overall effect is the expected one (equalizing) for countries with high tax levels relative to GDP.

For the other control variables, some results coincide with those in the previous empirical literature on the determinants of aggregate income distribution. The initial level of the Gini coefficient captures the country's initial conditions and it has a strong positive effect for all samples except for the Latin America regression (column 3). The coefficient for the level of financial development takes a negative and significant sign, as expected, but only for the full sample. Age dependency, GDP per capita growth and labor force participation fail to be significant in any of the equations. However, the coefficient for openness is positive and significant but only for the full sample without interaction variables.[49] The control variables for differences in the measurement of the Gini coefficient generally performed as expected, with income inequality being smaller when Gini net income or consumption measures are used vis-à- vis gross income. The dummy for the 15 old European Union members controlling for the generally higher social welfare expenditures in those countries is as expected negative and statistically significant in the full sample regressions.

TABLE 5. TAX MIX AND INEQUALITY, RANDOM EFFECTS, 1972-2005

	(1)	(2)	(3)	(4)
	Full Sample	Developing	Latin America	Full Sample1
Initial Gini	0.74***	0.65***	0.40	0.51**
	(0.09)	(0.13)	(0.83)	(0.26)
Tax ratio	10.04*	1.17	-0.82	-9.72
	(5.95)	(6.67)	(16.11)	(20.75)
Tax ratio*LA				3.46
				(46.84)
Total revenues to GDP	60.28*	8.74	-71.88	-36.79
	(33.84)	(25.84)	(221.97)	(105.49)
Total revenues to GDP*LA				-156.81
				(383.04)
Tax ratio*Total revenues to GDP	-35.21*	-5.95	4.37	26.23
	(19.58)	(24.48)	(62.86)	(59.13)
Tax ratio*Total revenues to GDP *LA				1.52
				(160.75)
Private credit	-4.73*	0.60	90.49	-2.42
	(2.53)	(4.69)	(214.54)	(8.05)
Private credit*LA				141.22
				(157.30)
GDP pc growth	-0.02	-0.04	0.57	-0.03
	(0.11)	(0.12)	(1.58)	(0.20)

[49] The evidence in the literature on the effect of trade openness on income inequality is inconclusive. Barro (2000) finds a positive relationship between trade openness and income inequality, while Calderon and Chong (2001) and Dollar and Kraay (2002) do not find any significant relationship.

GDP pc growth*LA				0.64
				(0.84)
Labor Force Participation	0.06	-0.11	-0.29	-0.17
	(0.08)	(0.09)	(0.51)	(0.18)
LFP*LA				-0.62
				(0.66)
Age dependency	3.55	-9.66	3.87	-2.54
	(6.29)	(8.20)	(84.33)	(22.32)
Age dependency*LA				-14.80
				(35.64)
Openness	2.04**	0.57	-6.46	1.37
	(0.80)	(1.74)	(21.93)	(3.23)
Openness*LA				-15.14
				(17.58)
Gini Concept: Net	-2.11***	0.10	9.54	0.40
	(0.77)	(0.77)	(18.93)	(2.14)
Gini Concept: Consumption	-3.69***	-2.82***	-7.06	-2.23*
	(0.88)	(0.71)	(13.71)	(1.24)
EU15	-3.48**	0.00	0.00	-6.83*
	(1.48)	(0.00)	(0.00)	(3.97)
Constant	-7.18	29.49**	29.15	46.14
	(17.42)	(12.58)	(106.03)	(57.71)
Observations	447	173	53	447
Number of id	62	37	14	62
R-squared	0.506	0.647	0.050	0.437

Standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%;
1 Using a dummy variable to distinguish Latin American countries

5. Conclusion

In this paper we review the structure of tax systems in Latin America and analyze their impact on the real economy - economic growth, macro-economic stability, and income redistribution.

Frequently addressed in fiscal matters as a homogeneous block of countries, the Latin America region shows considerable diversity in tax structures. From one perspective, Latin American country tax structures look like those of countries in other regions of the world in that they use all traditional taxes, but from another perspective, they differ because of the presence of "heterodox" taxes, such as taxes on financial transactions. With traditional taxes, one of the most pronounced characteristics is the small importance of the personal income tax. Corporate income taxes have functioned well in terms of revenues, especially in association with the exploitation of natural resources, and the VAT has performed even better. As in other regions of the world, excise taxes and customs duties have been in decline, while property taxes continue to struggle to have any relevance at all.

As a result the direct tax to indirect tax ratio in Latin America is on average among the lowest in the world, although there is considerable variation in this

ratio across the countries in the region. Countries that are smaller, unitary, more democratic, with large budgets, less open to international trade, and that are endowed with natural resources tend to rely more on direct taxes, the latter due to the role played by corporate income taxes.

In terms of the effect of tax structure, measured by the direct to indirect tax ratio, on the real economy we find that relatively higher reliance on direct taxes slows economic growth, even though this effect is smaller for Latin American countries than for other developed and developing countries in the sample. The direct to indirect tax ratio also appears to play a significant role in dampening economic volatility in the full sample of countries but we do not identify any separate significant effects for the Latin American region. This is not surprising given the relatively low variation and depth of the direct to indirect tax ratio in the region, and especially the lack of presence of progressive personal income taxes. For these same reasons, we can explain the very weak evidence of a positive impact of the direct to indirect tax ratio on income distribution in the region.

There appears to be ample consensus in the literature on taxation in Latin America reviewed in this paper that there is a need to reform tax structures in the region to have direct taxation, and in particular the personal income tax, play a much more important role. The clear benefits from this tax policy reform direction would be to have the tax systems play a real role in reducing income inequality in the region, which is at extraordinary heights by international standards. An additional benefit would be to have tax systems that can play a much more active role in the management of macroeconomic stability via built-in stabilizers.

However, as the findings in this paper clearly indicate, the policy move toward giving direct taxation a much bigger role in the tax systems of Latin American countries will not come without some significant tradeoff costs. In particular, the rate of economic growth could slow down.

These are all tough choices. It is interesting to note that by choosing on average a much lower direct to indirect tax ratio, Latin American countries so far would seem to have weighted more heavily the objective of economic growth. This choice may have also helped with other objectives, including FDI flows, higher tax morale, and relatively smaller shadow economies. Those gains have also implied some sacrifices: more unequal income distributions and less macroeconomic control.

Of course, different people will have different weights for the relative importance of the different effects considered in this paper. But, without something else changing it is not clear that there would be considerable consensus on what the right direction to follow is. For example, if the effectiveness of governments would change in translating higher revenues from income taxes into improved infrastructure and social services like health and education to build human capital, then increased direct taxation might work for higher economic growth, or higher foreign direct investment flows. This would be on top of the gains from a more equitable distribution of income

and more agile fiscal instruments to manage the business cycle. Thus, even though this paper has concentrated on tax structure, the expenditure side of the budget – and more specifically what can be accomplished with it—will need to be taken into account when making decisions on how to tax and how much to tax.

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APPENDIX

TABLE A.1. VARIABLES DESCRIPTION AND SOURCES

Variable	Description	Source
Age Dependency	Age dependency ratio (dependents to working-age population)	World Development Indicators (WDI)
GDP per capita	GDP per capita in 2000 US$	
GDP per capita growth	Real per capita GDP growth rate	
Labor Force Participation	Labor force participation rate, total (share of total population ages 15-64)	
M1 (subsample standard deviation)	Standard deviation of the annual growth of the sum of currency outside banks and demand deposits other than those of central government.	
Openness	(Imports + Exports) / GDP	
Population Growth	Population growth rate	
Corruption	Corruption index, ranging from 0-6, with 6 denoting least corruptive	International Country Risk Guide (ICRG) 2009
Corporate Tax Rate	Top marginal statutory corporate income tax rate in the initial year of the corresponding period	Office of Tax Policy Research (OTPR)
Gini Coefficient	Gini coefficient	UNU-WIDER World Income Inequality Database, May 2008
Latitude	The absolute value of the latitude of the country, scaled to take values between 0 and 1	La Porta *et al.* (1999)
Legal origin	The legal origin of the Company Law or Commercial Code of each country: English, French, or German Commercial Code	
Primary enrollment	Primary enrollment rate (%) (gross)	UNESCo Institute of Statistics
Secondary enrollment	Secondary enrollment rate (%) (gross)	
Private Credit	Private Credit by Deposit Money Banks and Other Financial Institutions to GDP	Beck, Demirgüç-Kunt and Levine (2000, 2008)
Tax Ratio	Direct (income tax, payroll tax, social security contributions, property tax) to Indirect (taxes on goods and services, taxes on int'l trade, other taxes) Tax Ratio	IMF GFS: Authors' calculations
Total Revenues to GDP	Share of total (tax and non tax) revenue in GDP in current prices	IMF GFS, WDI: Authors' calculations

Table A.2. Variables Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Age Dependency	4170	0.67	0.19	0.31	1.17
GDP per capita	3837	7177.76	9061.58	56.45	51673.98
GDP per capita growth	3622	1.99	3.64	-10.00	10.00
Labor Force Participation	3277	69.29	8.61	46.10	93.20
M1 (subsample standard deviation)	686	0.27	1.50	0.01	29.76
Openness	3253	0.79	0.56	0.07	4.32
Population Growth	925	1.46	1.30	-4.80	8.76
Corruption	1092	3.82	1.48	0.00	6.00
Corporate Tax Rate (subsample initial year)	544	34.42	11.36	0.00	60.00
Gini Coefficient	1561	35.76	10.11	16.60	73.90
Latitude	4292	0.32	0.20	0.01	0.72
Legal Origin: English	4292	0.29	0.46	0.00	1.00
Legal Origin: French	4292	0.46	0.50	0.00	1.00
Legal Origin: German	4292	0.04	0.20	0.00	1.00
Openness	3253	0.79	0.56	0.07	4.32
Primary enrollment (subsample initial year)	780	82.32	19.99	9.48	104.57
Secondary enrollment	639	84.92	24.86	19.00	161.66
Private Credit	3367	0.47	0.40	0.01	3.45
Tax Ratio	1967	1.37	1.14	0.02	9.01
Total Revenues to GDP	1865	0.29	0.13	0.03	0.64