Ideology and Taxation in Latin America

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Abstract[1]

This paper examines the impact of ideology on tax revenues in Latin America, using a panel of 17 countries from 1990 to 2010. As a first approach, we use a fixed effect model to identify the impact of ideology on taxation from within-country variation across time. We find that governments from the left are associated with total tax revenues that are 2.1% of GDP higher, and income tax revenues that are 1.3% of GDP higher. There is no effect on VAT revenues, or revenues from social security taxes. In order to deal with endogeneity problems that may arise from an omitted variable, we use an event study type methodology to track the behavior of tax revenues around episodes in which ideology shifts to the left, as well as a difference in differences methodology. We find that tax revenues increase by 1.5% of GDP, and income tax revenues by around 0.8 % of GDP, when we compare revenues just before and after the arrival of the left. Furthermore, revenues increase on impact after the events, suggesting that there is a causal impact of ideology on tax revenues.

Key Words: Ideology, Taxation, Event Study

JEL: H20, P16

Ideology and taxation in Latin America

One of the most important developments in the Latin American political landscape in the last fifteen years has been the significant shift to the left that has been experienced by several countries in the region. The 1998 election of Hugo Chavez in Venezuela was just the beginning; it was quickly followed by the elections of Ricardo Lagos in Chile, Lula in Brazil, Nestor Kirchner in Argentina, Tabaré Vazquez in Uruguay, Evo Morales in Bolivia, and the list goes on. In 1998, before the election of Hugo Chavez, none of the countries in the region (with the exception of Cuba) were under the control of a government on the left. Today, around half of the countries in the region have a left-leaning president.

For the most part, this shift to the left has been pretty robust. With few exceptions, most of the countries that moved to the left have stayed on the left, whether via the reelection of the incumbent, or its replacement by another candidate from the same party.[2] Much has been written about the shift to the left in the region. Most of the work has focused on documenting this shift; on explaining the factors behind it; and on characterizing the different varieties of "left" that coexist within the region.[3] In this paper, we focus instead on the impact of this shift on economic policy. In particular, we study the impact of ideology on tax revenues.

Three stylized facts jump out when looking at tax revenues in Latin America in recent years.[4] The first one is that they are comparatively low. This is not just true when the benchmark for comparison is the OECD. Tax revenues in Latin America are low even in comparison with countries of similar level of development, after controlling for factors such as the level of informality, the sectoral structure of the economy, or the age composition of the population. The second stylized fact is that the revenue gap vis a vis the rest of the world varies substantially depending on the revenue source in question. While Latin American countries collect just as much as developed countries when it comes to VAT revenues, the gap is quite large with regards

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[2] After two terms in office, Lula was recently replaced by Dilma Rousseff, also from the Workers Party; Nestor Kirchner was followed by his wife, Cristina Fernandez de Kirchner; and Tabaré Vazquez was followed by José Mujica, also from the *Frente Amplio*. A recent exception to this emerging trend is Chile, where right-of-center Sebastian Piñera has come to power following four straight left-leaning administrations.
[3] See for example the edited volume by Levitsky and Roberts (2011)
[4] See IDB 2013 report on "More than Revenues" (forthcoming)

to income taxes, and, in particular, personal income taxes. This pattern of taxation –low overall taxes, particularly with regards to the taxes bases most resisted by the elites-- has persisted, even as Latin America has become more democratic. As a result, several authors have focused on ways in which the elites may have exerted their disproportionate influence on the tax policymaking process in order to avoid taxation, in the context of weak States.[5]

While the first two stylized facts are well known, the third one is a little more surprising: while still lagging behind other regions, in recent years tax revenues in Latin America have increased significantly. The region has made some important strides, and has closed some of the gap that separates it from the developed countries, as well as other developing regions. According to an IDB report on taxation in Latin America, in the last fifteen years countries in the region have increased their tax collection by 3.7 percentage points of GDP, a remarkable achievement. This increase is much larger than that achieved in any other region of the world.[6] This leads us to the question we tackle in this paper: could it be that the shift in ideology we have been observing in the region may be partly responsible for this development? Could the arrival of the left have contributed to the elites losing their grip?

Fiscal policy is one area of decision-making where opinions are thought to map neatly into the left/right ideological scale used to frame the political debate. A higher participation of the government in the economy, through higher taxes and spending, is commonly associated with left leaning ideology whereas lower taxes and limited spending are usually attributed to rightist views. If this characterization is correct, the recent rise of left governments in LAC could be a major force in explaining the observed increase in tax revenue by the countries in the region.

In this paper, we explore empirically this potential link between ideology and taxation. We use tax revenue data from a new database on taxation in Latin America put together by the IDB in partnership with the Inter-American Center of Tax Administrations (CIAT). Our ideology variables are taken from expert surveys (Debs and Helmke, 2008, Murillo et al, 2008) as well as

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[5] For Latin America, see Cardenas (2010) and Ardanaz and Scartascini (2011). More generally, see Acemoglu (2005), Acemoglu and Robinson (2008) and Besley and Persson (2009).
[6] In the same period, tax revenues have increased by 1.4 percentage points of GDP in Asia, 0.7 percentage points in the Middle East and 0.4 percentage points in Africa, while remaining virtually unchanged in the OECD.

elite surveys of legislators from the Parliamentary Elites of Latin America (PELA). The details of the data used will be discussed below.

We explore the link between these variables using three different methodological approaches. First, we use fixed effects models to study the link between these variables on the basis of within-country comparisons. Specifically, we look at whether within-country shifts to the left result in increased revenues. We do so for total tax revenues, as well as for specific revenue sources such as the VAT, income taxes, and social security taxes. Second, we exploit the temporal pattern of taxation around shifts in ideology, using event studies methodologies. This allows us to determine whether the increase in taxation may in fact be attributed to the shift to the left. Finally we propose a difference in difference estimation, in which we study whether government changes that involve significant shifts in ideology towards the left are associated with increased revenues, in comparison to other changes in government.

We find that ideology does have an impact on taxation. In particular, a shift to the left is associated with an increase in total tax revenues of the order of 2.1 percent. The mean of total tax revenues for the whole sample of countries considered is just above 14 percent of GDP. This suggests that the impact of ideology, in addition to being statistically significant, is substantial. A shift to the left is also associated with a substantial increase in income tax revenues of about 1 percent of GDP (compared to a mean of income tax revenues of 3.6 percent of GDP). In contrast, the shift to the left seems to have no significant impact on revenues from VAT, or from social security taxes.

Related literature

There is a long tradition of research on the impact of partisanship and ideology on macroeconomic outcomes, going back to the work of Hibbs (1977). Focusing on 12 developed countries, he found that left-leaning governments tended to have higher inflation and lower unemployment than their right wing counterparts. He also found that, for the case of the US and the UK, unemployment had decreased during Democratic or Labour governments, and increased

during Republican and Conservative administrations.[7] The work of Hibbs and others that follow in this partisan tradition departs from Downs' (1957) idea that parties just care about winning elections, and assumes instead that parties cater to different constituents, and thus have different policy preferences.

Since the early work of Hibbs, a number of authors have looked at the impact of ideology on fiscal outcomes. While most of the literature has focused on debt, deficits and expenditures as the fiscal variables of interest (see, for example, Cusak, 1997, Alesina, Roubini and Cohen, 1997, among others), some authors have also focused on tax policies, mostly in developed countries (see for example, Boix, 1998 and Tavares, 2004). A recent study focusing on OECD countries that is closely related to our paper is Angelopoulos, Economides and Kammas (2009). Using different measures of ideology, they study their impact on tax rates, as well as on tax rate structure, and find that left-leaning governments tend to rely more on capital relative to labor income taxation.

A few studies on OECD countries have looked at the relationship between ideology and taxation at the subnational government level. In a study of US States, Besley and Case (2003) find that governments headed by democrats are associated with relatively higher taxes and spending than republican ones. Going even more local, Pettersson-Lidbom (2008) also finds left governments in Swedish municipalities to be characterized by higher taxes and spending than their right counterparts. Migueis (2010), using regression discontinuity design, finds a number of significant differences between left and right governments among Portuguese municipalities. On the one hand, left governments are found to be more likely to adopt corporate taxes and to spend on social infrastructure. Right leaning governments, in turn, were found to give higher compensation to its municipal workers and to run higher levels of debt. In a study about American municipalities, however, Ferreira and Gyourko (2009), using a similar methodology, fail to find a significant effect of mayor ideology on either taxes or spending.

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[7] Hibbs' analysis relies on a stable Philips curve that can be exploited by the parties, as well as naïve voters that vote retrospectively. Alesina (1987) presents a more modern characterization of the partisan political business cycle theory, in which voters are fully rational and forward looking, and only unexpected policy matters for the trade-off between inflation and output. In his work, cycles arise as a result of the uncertainty regarding the results of elections, which leads to surprises in policy when a new incumbent takes office. Alesina and Sachs (1988) found support for this theory for the case of the US.

In Latin America, the literature on ideology and tax policy is very recent, and very sparse. In part this is related to the fact that, until relatively recently, political parties in Latin America were perceived as being personalistic and clientelistic, but not ideological. The first efforts to characterize Latin American political parties in an ideological scale for a limited number of countries –based on expert surveys -- are due to Coppedge (1997). It is only very recently that authors such as Debs and Helmke (2008), and Murillo et al (2008) have built on Coppedge's early efforts, expanding the coverage of the data both geographically as well as over time, in order to cover most countries in the region. The work on Parliamentary Elites of Latin America (PELA) done by the University of Salamanca, in which legislators place themselves as well as other parties and politicians in an ideological scale, provides the basis for alternative measures of ideology (see Saiegh, 2009, on the use of PELA as a measure of ideology).

There are very few papers that look at the link between ideology and taxes in Latin America. In a study investigating partisan business cycles in Brazilian municipalities Sakurai and Menezes-Filho (2010) found that ideology influences local government expenditures but not taxes. Machado and Stein (2012) also look at Brazilian municipalities. Using regression discontinuity design (RDD), they find some evidence that the left collects more revenue than the right from business taxes, but less revenue from property taxes. Hallerberg and Scartascini (2012) look at determinants of different types of tax reform. They find that left leaning governments are more likely to implement tax reforms that result in increases taxes, and, in particular, in income tax revenues.

Perhaps the paper that is closest to ours is Hart (2010). This author uses expert survey data on party ideology for nine Latin American countries and panel data techniques to look at the impact on taxation, in a context in which tax policies are constrained by globalization. He finds a surprising result: tax revenues are higher for right-wing governments compared to their left-leaning counterparts. He argues that, given the constraints faced by policymakers with regards to income taxes, right wing governments tax more because they are more willing to rely on regressive consumption taxes such as the VAT.

In contrast with the work of Hart (2010), we use much wider set of countries (seventeen rather than nine), and a wider coverage in terms of years. While Hart's data goes through 2006, ours has coverage until 2009, allowing us to include recent cases of left-leaning governments such as Morales in Bolivia, Correa in Ecuador and Ortega in Nicaragua, just to name a few. In addition, we use a wider variety of ideology variables, relying both on expert surveys (from Debs and Helmke, 2008 and Murillo et al, 2008) as well as on the Parliamentary Elites of Latin America survey. Finally, unlike Hart, we look carefully at the temporal pattern of revenues around shifts in ideology, which allows us to better identify whether the impact of ideology on taxation is causal.

Data Description

For the purpose of the study we combine different sources of information on taxation and on president's ideology in Latin America from 1990 to 2010. The taxation data was taken from a dataset put together by the IDB in partnership with CIAT, and is available for 21 countries in the region. These are high quality data that has been validated by the respective governments. Unfortunately, Venezuela, the first country to shift to the left in our region, is not included in this dataset. While most of the data we will use corresponds to the level of the general government, we also check for the robustness of the results using central government revenues.[8] In addition to total tax revenues, it has data disaggregated by revenue source. As dependent variables, we will use five revenue variables from this database: i) total tax revenues excluding social security taxes, as a share of GDP; ii) central government tax revenue as a share of GDP iii) revenues from VAT; iv) income tax revenues; and v) revenues from social security taxes. In all cases, the revenue variables will be expressed as a share of GDP. In addition, and in order to account for the fact that many of the countries with left-leaning governments (perhaps more so than others) had been subject to positive shocks associated to the boom in commodity prices, we use a measure of non-commodity tax revenues as a share of non-commodity GDP.[9]

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[8] Central government revenues are actually the ones under the control of the national governments whose ideology we characterize in this paper. However, using central government revenues has the disadvantage that shifts in revenue bases from the central to subnational governments associated with decentralization processes might be confounded with changes in revenues due to changes in ideology.

[9] Unfortunately, this variable, which was kindly provided by Alberto Gonzalez and Rolando Ossowski, is only available for 13 of the countries in our sample. It is also available only through 2009.

On ideology, we use two different measures. The first one, based on expert survey data, is a dummy variable for left-leaning governments taken from Debs and Helmke (2008), who in turn build on the original work on ideology in Latin America by Coppedge (1997), as well as on Castañeda (2006), Cleary (2006) and Weyland (2008).[10] The countries and administrations that are coded as "left" are presented in Table 1, taken from Debs and Helmke. Based on this variable Figure 1 shows the movement towards the left that has swept through the region. We make a slight change compared to the Debs and Helmke database. While they code incoming left governments as "1" regardless of the timing of the change in government, we code as left those governments that are inaugurated between January and June, whereas those that start in July or later only become part of the left the following year. Thus, a country is coded as left in a particular year only if the left has been in office more than half of the year.[11]

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[10] While Debs and Helmke also code political parties on a 5-point ideological scale (1-left, 2-center-left, 3-center, 4-center-right 5-right), for methodological reasons it is more convenient for us to work with the left dummy. To check for robustness, we will use different definitions for this dummy, as well as rely on a different dataset by Murillo et al (2008), an alternative source of ideology data also based on expert surveys. Both the Debs and Helmke and the Murillo et al datasets end in 2009. We extended the Debs and Helmke dummy through 2010 in order to be able to include more countries with a shift to the left in the analysis.

[11] Out of the shifts to the left in our sample, most occurred between January and March. Only in the Dominican Republic and in Paraguay were left governments inaugurated in the second half of the year (in August, to be precise).

Table 1. Left Wing Presidents in Latin America 1998-2009

Country	Year	President
Argentina	2003	N. Kirchner
Argentina	2007	C. Kirchner
Bolivia	2006	Morales
Brazil	2003	Lula
Brazil	2006	Lula
Chile	2000	Lagos
Chile	2006	Bachelet
Dominican Republic	2000	Mejia
Ecuador	2007	Correa
Guatemala	2008	Colom
Nicaragua	2007	Ortega
Paraguay	2008	Lugo
Uruguay	2005	Vazquez
Venezuela	1999	Chavez
Venezuela	2001	Chavez
Venezuela	2007	Chavez

Figure 1. Left Wing Presidents in Latin America

Source: Author's calculation based on data from Debs and Helmke (2008)
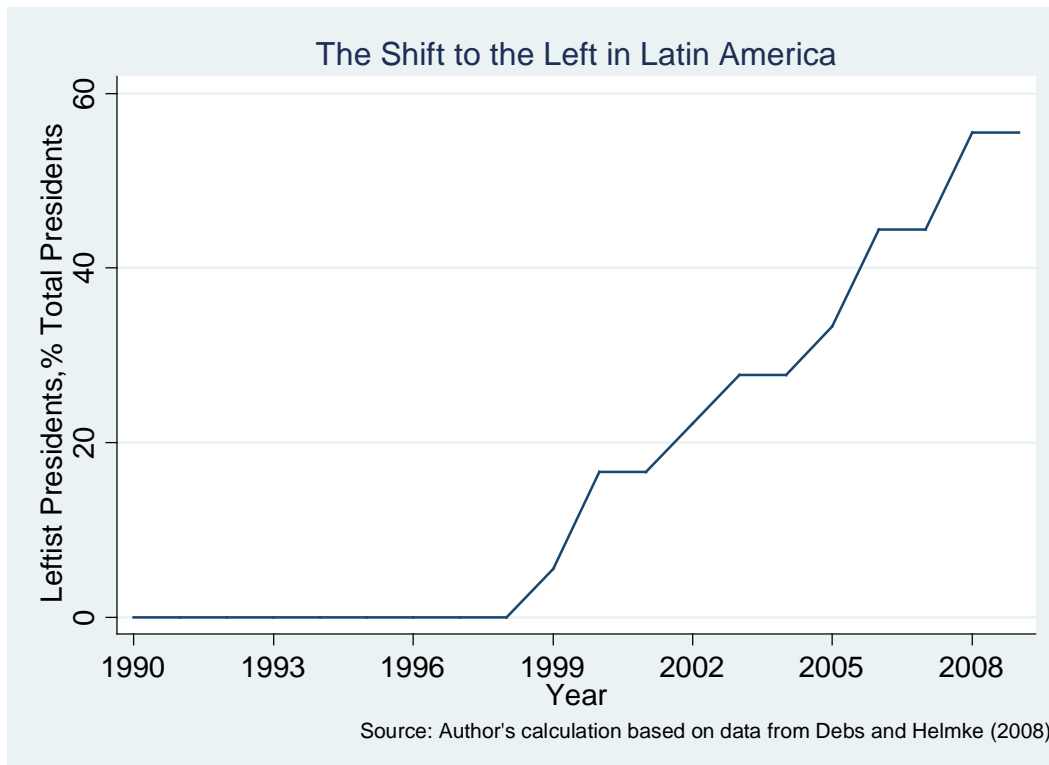
The second ideology measure is based on the Parliamentary Elites of Latin America (PELA) survey, an elite survey of legislators conducted by the University of Salamanca, which asks legislators to place themselves (as well as other parties and a few well known politicians, including the president) on a left to right ideological scale. We use the average placement of the president's (rather than the party's) ideology as our ideology measure. In this case, the ideology scale ranges from 0 to 10, where lower scores are associated with left-leaning presidents. These two ideology measures are available for a sample of 18 and 17 Latin American countries, respectively. Descriptive statistics for all these variables, as well as others which will be used in the empirical analysis (which we will introduce in the section on robustness) are presented in Table 2.

Table 2. Descriptive Statistics

Variable	Number of observations	Mean	Standard Deviation	Min	Max
Revenues					
Total Tax Revenues (% GDP)	357	14.530	4.591	6.940	27.671
Non Commodity Tax Revenues (%GDP)	243	15.078	4.313	6.806	25.932
VAT (% GDP)	345	5.372	2.412	1.194	13.073
Income Tax (% GDP)	349	3.595	1.627	0.675	9.266
Social Security Taxes (% GDP)	349	3.744	2.032	0.052	8.801
Central Government Tax Revenues (%GDP)	349	13.073	3.256	6.890	21.538
Ideology					
Left dummy (D&H)	323	0.164	0.371	0	1
President's ideology (PELA)	203	6.681	1.670	2.216	9.288
Left + Center Left (D&H)	306	0.252	0.435	0	1
Left (Murillo)	323	0.022	0.146	0	1
Left + Center Left (Murillo)	323	0.164	0.371	0	1
D&H + Murillo	289	0.152	0.360	0	1
Controls					
GDP per capita (in logs)	357	7.865	0.660	6.716	9.283
Openness (in logs)	357	80.651	72.341	0.000	404.097
Self Employment	289	39.982	9.997	19.700	69.200
Natural Resources Rents (% GDP)	357	5.004	6.291	0.087	41.633
Share of the population under 15 and over 65 year of age	357	40.060	4.189	31.372	49.070

Methodology and Results

To assess the impact of ideology on tax revenues and tax structure in Latin America, we begin by working with a fixed effects model, which allows us to identify the impact of ideology on taxation from within-country variation across time. This methodology accounts for potential time-invariant, country specific factors that may be responsible for countries collecting more or less revenues. In other words, the question we are trying to answer is not whether countries with left-leaning presidents collect more taxes than countries with right-leaning governments. Rather,

the question is whether it is the case that countries collect more taxes in times in which they are controlled by a left leaning president, compared to times in which they are not.

Our baseline model is:

$$TAX_{i,t} = \propto_i + \lambda_t + Ideology_{i,t}\beta + ln(GDP\ pc)_{i,t}\gamma + \varepsilon_{i,t}$$

where $\propto_i$ is a country specific fixed effect; λ_t is a time fixed effect; $Ideology_{i,t}$ denotes the president's ideology in the country i in year t; $ln(GDP\ pc)_{i,t}$ corresponds to the logarithm of GDP per capita, and is included to account for the potential impact on taxation of changes in the level of development.[12] The specification includes year dummies to avoid potential spurious correlation caused by the simultaneous increase in revenues and the number of left-leaning governments over time. In all the regressions, standard errors are clustered by presidential administration to correct for serial correlation.

The tax revenue variables used as dependent variables –total tax revenues minus social security revenues, and the revenues from different sources—were already discussed in the data section. Using revenues from the VAT, from income taxes and from social security taxes allows us to check whether ideology affects different revenue sources in diverse ways, as would be expected given the fact that the burden of taxation for different revenue sources falls on different groups. In particular, we expect governments on the left to be associated with higher income taxation, since this revenue source falls mainly on the rich.[13] We do not expect clear results with regards to the VAT, which is comparatively more regressive, or with social security taxes, which tend to affect formal workers.

Table 3 presents the results of the fixed effects regressions for total revenues, using the Left dummy and the President's ideology from PELA as variables of interest. The results of the first column, using the Left dummy, suggest that total tax revenues (excluding social security) increase by close to 2,1% of GDP in years in which the government is controlled by the left,

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[12] Studies pointing to the positive link between the level of economic development and taxation include Lotz and Morss (1967), Tanzi (1992), Piancastelli (2001), Gupta (2007) and Pessino and Fenochietto (2010), among others.
[13] In Latin America, income taxes fall only on the two highest deciles in the income distribution.

compared to years with governments of all other ideological categories. The effect is statistically significant. Taking into account that the mean value for total tax revenues as a share of GDP for our sample is about 14.5 percent, it is easy to see that the effects are also substantial from an economic point of view. In the case of the central government tax revenue (column 3) and non-commodity tax revenues (column 5), the effect is slightly smaller, at 1.9% of GDP.

The even numbered columns in the Table show the results using the President's Ideology variable based on the PELA survey. Given the different way in which the ideology variables are constructed, the corresponding coefficients are not comparable to those of the odd-numbered columns. In this case, the coefficients of interest in columns (2) and (4) suggest that a one-step move towards the *right* in the ten-point scale in the ideology of the president is associated with about 0.53% of GDP reduction in total tax revenues, regardless of whether we use general or central government data. Using non-commodity tax revenues yields a smaller, albeit still statistically significant coefficient.

Table 4 shows the impact of ideology on tax structure. The results shown in column (3) suggest that income taxes under left-leaning governments are 1.3% of GDP higher than under governments of other ideologies. The smaller coefficient, compared to that for overall tax revenues, suggest that there are other revenue sources that are higher under governments on the left. However, the fact that the mean of income tax revenues for our sample is only 3.6% of GDP suggests that, relatively speaking, the impact of ideology is greater for income tax revenues than it is for total tax revenues. As expected, we find no evidence of a significant impact of ideology on VAT revenues, a more regressive tax. In the case of social security taxes, the sign of the coefficient is negative, but the coefficient is not statistically significant. The results using the PELA ideology data are consistent with those using the left dummy from Debs and Helmke. A one-step move towards the right in the ten-point ideological scale is associated with a 0.46% of GDP reduction in income tax revenues, but has no impact on VAT or social security taxes.

Table 3. Fixed Effects: Total Tax Revenues

Dependent Variable	Total Tax Revenue/GDP (1)	Total Tax Revenue/GDP (2)	Central Government Tax Revenue/GDP (3)	Central Government Tax Revenue/GDP (4)	NC Tax Revenue/GDP (5)	NC Tax Revenue/GDP (6)
Left	2.109**		1.884**		1.937**	
	[0.576]		[0.562]		[0.546]	
President's Ideology		-0.537**		-0.527**		-0.336**
		[0.145]		[0.145]		[0.104]
Log GDP per Capita	0.0351	2.525	-0.545	1.523	-2.043	0.588
	[2.160]	[2.546]	[2.066]	[2.639]	[2.855]	[3.789]
Constant	13.98	-1.829	14.46	5.076	32.30	13.07
	[16.77]	[20.64]	[15.92]	[21.35]	[23.23]	[30.47]
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Aditional Controls	No	No	No	No	No	No
Observations	323	203	319	203	243	161
Number of countries	17	16	17	16	13	12
Adjusted R-squared	0.882	0.885	0.741	0.850	0.891	0.891

Cluster standard errors in brackets ** $p<0.01$, * $p<0.05$, + $p<0.1$

Table 4. Fixed Effects: Tax Structure

Dependent Variable	VAT/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Income Tax/GDP (4)	Social Security/GDP (5)	Social Security/GDP (6)
Left	0.242		1.301**		-0.217	
	[0.187]		[0.389]		[0.199]	
President's Ideology		-0.0109		-0.457**		0.0660
		[0.0404]		[0.135]		[0.0495]
Log GDP per Capita	0.00361	1.333	2.608*	3.629*	-0.0810	0.496
	[0.950]	[0.996]	[1.158]	[1.446]	[1.168]	[1.854]
Constant	3.396	-4.762	-17.49+	-21.73+	4.126	0.290
	[7.344]	[7.939]	[8.935]	[12.01]	[9.001]	[14.87]
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	319	203	319	203	319	203
Number of countries	17	16	17	16	17	16
Adjusted R-squared	0.930	0.922	0.731	0.734	0.902	0.915

Cluster standard errors in brackets ** $p<0.01$, * $p<0.05$, + $p<0.1$

Robustness

In order to check the robustness of our baseline results, we introduce additional controls, as well as alternative measures of ideology. Tables 5 and 6 show the results of a set of regressions in which we account for other factors that may be explaining changes in taxation. Specifically, we

introduce additional controls to account for openness (log of imports plus exports over GDP);[14] informality (the share of the labor force that is self-employed);[15] age composition of the population (population under 15 and over 65 years old over total population); as well as natural resources rents as a share of GDP.[16] The source of these variables is the World Development Indicators (WDI) of the World Bank, except for the openness measure, taken from World Economic Outlook (WEO) from the IMF.

In all cases, the coefficients for ideology are somewhat smaller once we include these additional controls, whether we use the left dummy or the PELA variable on Presidential Ideology. In the cases of total tax revenues and income taxes, ideology continues to be significant at the 1% level. Left-leaning governments are associated with total tax revenues that are higher by 1.56% of GDP (using general government data), and income tax revenues that are higher by 0.75% of GDP. The impact is smaller when we use the non-commodity tax revenues. The size of the coefficient for the left dummy suggests a still sizable impact of 1 % of GDP on non-commodity revenues, although the coefficient is only significant at the 10% level, perhaps due to the smaller sample of countries available for this variable.

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[14] On the link between government size and openness, see Rodrik (1998)

[15] Authors like Di John (2006), point out that a higher level of informality in the economy has a negative impact on revenue since it reduces the number of people paying income taxes.

[16] Bornhorst, Gupta and Thornton (2009) find that countries with natural resources make a smaller revenue effort compare to those without them.

Table 5. Fixed Effects with additional controls: Total Tax Revenues

Dependent Variable	Total Tax Revenue/GDP (1)	Total Tax Revenue/GDP (2)	Central Government Tax Revenue/GDP (3)	Central Government Tax Revenue/GDP (4)	NC Tax Revenue/GDP (5)	NC Tax Revenue/GDP (6)
Left	1.561** [0.525]		1.249* [0.492]		0.990+ [0.577]	
President's Ideology		-0.396** [0.126]		-0.364** [0.122]		-0.0678 [0.140]
Log GDP per Capita	0.00715 [2.408]	2.118 [2.596]	0.205 [2.228]	1.019 [2.418]	-1.568 [2.762]	1.192 [3.049]
Constant	3.893 [19.97]	1.295 [21.71]	0.756 [19.32]	8.331 [20.78]	3.708 [25.36]	-21.21 [25.68]
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Aditional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	265	184	262	184	210	150
Number of countries	17	16	17	16	13	12
Adjusted R-squared	0.905	0.890	0.817	0.859	0.905	0.909

Controlling for Openness, self employment, the ratio of the population under 15 and over 65 years old and natural resources rents as GDP percentage.
Cluster standard errors in brackets ** p<0.01, * p<0.05, + p<0.1

Table 6. Fixed Effects with additional controls: Tax Structure

Dependent Variable	VAT/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Income Tax/GDP (4)	Social Security/GDP (5)	Social Security/GDP (6)
Left	0.214 [0.207]		0.751** [0.215]		-0.111 [0.204]	
President's Ideology		-0.0211 [0.0463]		-0.289** [0.0717]		-0.00117 [0.0501]
Log GDP per Capita	0.769 [1.055]	1.756 [1.127]	3.580** [0.871]	4.063** [1.044]	0.205 [1.125]	1.487 [1.440]
Constant	-4.616 [8.833]	-14.68 [9.118]	-22.54** [7.652]	-19.77+ [9.903]	8.670 [10.97]	-2.361 [12.80]
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Aditional Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	262	184	262	184	262	184
Number of countries	17	16	17	16	17	16
Adjusted R-squared	0.934	0.933	0.836	0.813	0.907	0.926

Controlling for Openness, self employment, the ratio of the population under 15 and over 65 years old and natural resources rents as GDP percentage

To check whether the results are robust to the use of alternative ideology measures, we construct 4 additional measures of ideology based on the expert survey data provided by Debs and Helmke (2008) and Murillo et al (2008). First, from Debs and Helmke (2008) we construct a variable called "*Left Center Left (D&H)*" which is a dummy variable that takes value of 1 when the ideology of the president is classified as left or center left. Compared to our baseline, this is a more encompassing measure of left-leaning governments. The second and third measures are taken from Murillo et al (2008), where "*Left (Murillo)*" and "*Left and Center Left (Murillo)*" are dummy variables generated under the same logic of the ones described above. The differences with the variables from Debs and Helmke (2008) stem from some disagreements in the classification of the ideology of some of the presidential administrations. In particular, Murillo et al (2008) seem to use a narrower definition of what qualifies as left and center left, so the number of countries that qualify as such is smaller in both cases. [17] Finally, we combine both datasets by building a new dummy variable (DH + Murillo) that takes value of 1 when the president is classified as left or center left in *both* datasets.

The results are presented in Table 7. In order to save space, each one of the cells in the Table presents the results of a separate regression, where only the coefficient of ideology is reported.[18] The first row reports, baseline results using the Left dummy similar to those presented in Tables 3 and 4, but using data through 2009 instead of 2010. This is done for the sake of comparability, since the left dummy from Debs and Helmke (but not their classification in the five point ideological scale) is the only ideological variable we extended through 2010. For the left and center left variable based on Debs and Helmke (second row), we find a smaller impact for Total Tax Revenues and Income Taxes, compared to the baseline results. In the first case, the coefficient of ideology is cut in half, while in the case of income taxes, the size of the coefficient is about 2/3 that of the baseline. The overall reduction in the size of the coefficients is not surprising, if we think that governments on the left are likely to increase taxes by a larger amount compared to governments on the center-left. The only case in which the ideology coefficient increases is the case of social security taxes, which in this case become more negative, and statistically significant. The result suggests that social security taxes are 0.37% of GDP lower

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[17] For example, in recent years, only the governments of Bolivia, Ecuador and Venezuela are classified as "left" in Murillo et al (2008). Unfortunately, the IDB-CIAT database does not have data for Venezuela.
[18] Full results are available upon request.

under governments of left and center-left ideology, a result that is consistent with the findings of Angelopoulos, Economides and Kammas (2009) for the case of developed countries.

When we use the left dummy taken from Murillo et al (2008), the impact on all sources of revenue is always higher in magnitude compared to the baseline. The differences in the coefficients may be attributed to the narrower definition in the classification made by Murillo who, among the countries for which we have fiscal data, only classifies Bolivia and Ecuador as being controlled by the left. Not surprisingly, given the small number of observations for which this dummy takes a value of 1, the standard errors in this case are also higher, so larger coefficients are sometimes associated with lower significance. The results for Left and Center left in the last two rows in Table 7 are generally consistent with those using Debs and Helmke, although the size of the estimated coefficients and the statistical significance tends to be higher when we define left and center left using the intersection of both datasets.

Table 7. Fixed Effects: Robustness Checks

	Total Tax Revenue/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Social Security/GDP (4)
Left	1.965** [0.624]	0.131 [0.197]	1.310** [0.409]	-0.321 [0.193]
Left + Center Left (D&H)	0.987* [0.495]	-0.0103 [0.164]	0.943** [0.295]	-0.374* [0.158]
Left (Murillo)	4.003* [1.629]	0.204 [0.329]	3.141* [1.478]	0.405 [0.377]
Left + Center Left (Murillo)	0.958 [0.682]	0.0683 [0.195]	0.826+ [0.422]	-0.553** [0.196]
Left + Center Left (D&H + Murillo)	1.267* [0.602]	-0.0114 [0.199]	0.893* [0.398]	-0.650** [0.200]

Cluster standard errors in brackets ** p<0.01, * p<0.05, + p<0.1

Exploiting the temporal pattern of taxation around changes in ideology

One obvious threat to the identification of the impact of ideology on tax revenues is related to the fact that the assignment of left-leaning governments to the different countries is not random. Thus, we need to worry about potential endogeneity problems associated with self-selection, as well as omitted variables. The fixed effects methodology presented above deals with these problems only under very restrictive conditions, which are unlikely to hold.

Consider, for example, the case in which the preferences for redistribution of the population, which are not observed, explain, at the same time, the selection into left ideology as well as the level of government revenues. Under the assumption that the preferences for redistribution are time-invariant, then they will be captured by the fixed effects, and the fixed effects methodology will yield unbiased estimates of the impact of ideology on revenues. However, preferences for redistribution –or, for that matter, other omitted variables that could potentially affect ideology— are unlikely to be time invariant. If the population becomes more liberal, this may lead to an increased demand for redistribution, and thus to higher taxes. At the same time, such a shift in preferences would also lead to an increase in votes for left-leaning candidates, thus increasing the odds of a candidate on the left gaining office. In such a case, we could be mistakenly attributing to ideology a change in government revenue that should really be attributed to changes in preferences.

In order to deal with this problem, some authors such as Ferreira and Gyourko (2009) and Migueis (2010) have used a regression discontinuity design (RDD) methodology to study the impact of partisanship on taxation at the municipal level in the US and Portugal, exploiting the fact the many elections at this level are decided by a very narrow margin. Within these cases, selection into the left can be considered random, eliminating self-selection bias. In our setting, however, we cannot use RDD, since we do not have enough observations with a narrow margin of victory.

Instead, in what follows we will exploit the timing of the impact of ideology on taxation to try to address this issue. If we think that political preferences shift gradually, but government ideology jumps discretely when there is a change in administration, the temporal pattern of taxation around changes in government ideology may provide important clues regarding the causal nature of the relationship. The idea is to follow revenues over time, and check whether there is a jump around the moment of the shift to the left. If tax revenues increase following the arrival of left-leaning governments, we may want to attribute the tax revenue increase to the shift in government ideology. Note that the increase may be gradual since, while ideology jumps discretely, changes to tax administration or tax policy may take time to take hold. If tax revenues begin to increase gradually even before the change in ideology, the jump in taxation is more

likely to be linked to a shift in political preferences, or another time-varying variable omitted from the model. If taxation starts to increase gradually before the shift in ideology, but receives an additional boost after the government changes, perhaps both factors could be at work.[19]

Our empirical strategy is loosely based on an event studies methodology, in which we will look at the evolution of revenues in an eight year window centered on the "events", which in this case are the arrival of the left to power in the different countries in Latin America.[20]. For this approach it is convenient to redefine the *left* dummy so that it takes the value of 1 *throughout the whole period* for those "treated" countries that at some point adopted a left-leaning government. Thus, for these regressions, the *left* dummy for a country such as Bolivia adopts a value of 1 throughout, even before the arrival of President Evo Morales.

Additionally, since the introduction of leftist governments in Latin America did not happen at the same time in all the countries, we create a series of dummy variables ("$Period_j$" with j going from -4 to 4), each one of them indicating a period before or after the arrival of the left (e.g. $Period_1$ takes the value of 1 on the first year of the leftist government, $Period_{-3}$ takes the value of 1 three years before the arrival of the leftist government). All the other variables are as in the baseline model, except that we now exclude the country fixed effects.

$$TAX_{i,t} = \lambda_t + \sum_{j=-4}^{4} \beta_j \, left_i * Period_j + ln(GDP \, pc)_{i,t}\gamma + \varepsilon_{i,t}$$

In this case, the coefficients of interest are those of the interaction terms. For example, a positive and significant coefficient corresponding to $left * Period_2$ suggests that in the second year of left-leaning governments, tax revenues are higher relative to their value in other countries, or in these same countries outside of the eight-year window. The key to the interpretation of the results, however, is not in the sign and significance of the coefficients, but rather in the

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[19]Interestingly, Levistsky and Roberts (2011), using data from the World Values Survey, claim that preferences remained fairly invariant during the period, and thus are not the factor behind the shift in government ideology.
[20] Event studies are frequently used in the finance field, to look at the impact of certain events, such as mergers, on the valuation of firms. For a survey of the literature on event studies, see Armitage (1995)

difference in these coefficients within the window, before and after the event.[21] For example, if the coefficients for the interaction terms corresponding to the years following the event are positive and significant, but those corresponding to the years prior to the event are of similar size, we would not be able to conclude that the arrival of the left resulted in increased taxation.

To make the comparison of these coefficients meaningful, the country composition within the window needs to be kept constant. But countries such as Guatemala and Paraguay have moved to the left towards the end of the sample period, so we do not have observations within the left four years after the shift. For this reason, for the purposes of this exercise, we excluded Guatemala and Paraguay from the sample. The results of the estimations are presented in Table 8.

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[21] This model is in the same spirit as a difference in difference approach. In those models, we would have "treated" observations (those that shift to the left) and controls, and we would compare the changes before and after the treatment in these two groups. Here, the treatment occurs at different points in time in different countries, so there is no clear "before and after" for the controls. In addition, we open the "before" and "after" dummies into period dummies in order to uncover in more detail the temporal pattern of taxation around shifts in ideology. A similar identification strategy has been used by Micco, Stein And Ordoñez (2003) to study the impact of the European Monetary Union on trade.

Table 8. Exploiting the temporal pattern of Taxation

Dependent Variable	Total Tax Revenue/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Social Security/GDP (4)
Left* I-4	3.506**	1.861*	-0.0221	0.224
	[1.181]	[0.793]	[0.421]	[0.638]
Left* I-3	3.385*	1.825*	0.0417	0.115
	[1.443]	[0.910]	[0.454]	[0.641]
Left* I-2	3.930*	1.862+	-0.0308	-0.0674
	[1.498]	[0.959]	[0.456]	[0.608]
Left* I-1	4.263**	1.823+	0.343	-0.143
	[1.564]	[0.962]	[0.539]	[0.772]
Left* I+1	5.079**	2.062*	0.897	-0.134
	[1.524]	[0.856]	[0.686]	[0.736]
Left* I+2	5.258**	2.050*	0.822	-0.114
	[1.550]	[0.822]	[0.616]	[0.800]
Left* I+3	5.801**	2.736**	1.135	0.394
	[1.361]	[0.686]	[0.692]	[0.610]
Left* I+4	5.068**	2.041*	0.957+	0.0118
	[1.416]	[0.792]	[0.489]	[0.785]
Log GDP per capita	1.357*	0.775*	0.250	1.620**
	[0.672]	[0.306]	[0.255]	[0.268]
Constant	2.462	-2.811	0.362	-9.733**
	[5.451]	[2.373]	[1.952]	[2.019]
Time Year Dummies	Yes	Yes	Yes	Yes
Observations	315	305	307	307
Number of countries	15	15	15	15
Adjusted R-squared	0.276	0.264	0.445	0.355

Cluster standard errors in brackets ** p<0.01, * p<0.05, + p<0.1
Excluding: Guatemala and Paraguay

Column (1) presents the results for total tax revenue. While the coefficients for the interaction terms are positive and significant throughout the window, and increase gradually even before the shift in ideology, there is an important jump in their magnitude following the arrival of the left.. The first panel of Figure 2 illustrates this graphically.

The rest of the columns in Table 8 and the panels in Figure 2 show similar exercises for other revenue sources. As in the fixed effects model, only income taxes show a significant jump following the shift in ideology (although there is a smaller jump prior to the shift as well). Table 9 tests the difference in means between the three years prior to the change in ideology and the three years following that of the inauguration of the left government (that is, years 2 through 4 in the Figure). The magnitude of the jump is 1.5 % of GDP in the case of total revenues, and 0.85 % points in the case of income taxes, but the difference is only significant at 10 % in the case of income taxes.
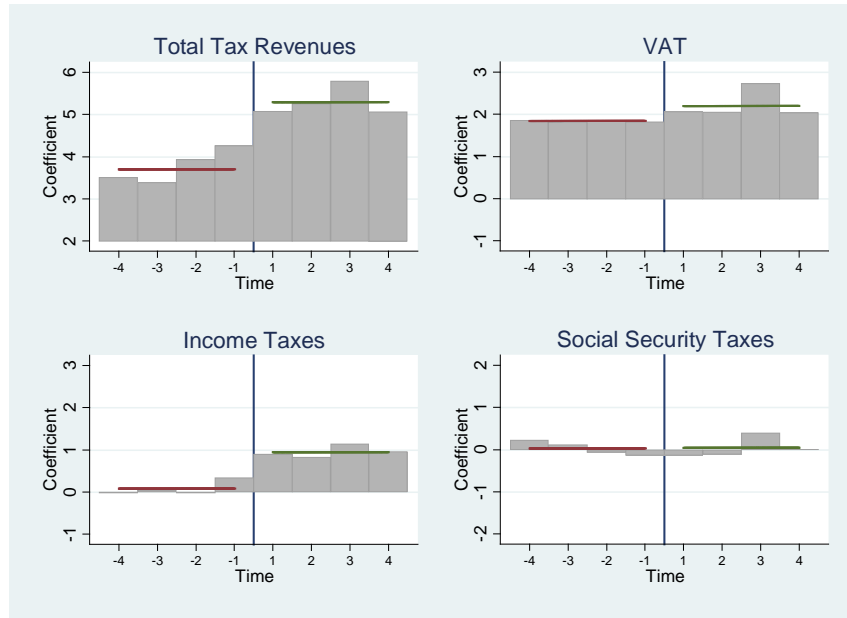
Figure 2. Exploiting the temporal pattern of Taxation

Table 9. Testing differences between means

		Total Tax Revenue/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Social Security Taxes/GDP (4)
Left (D&H)	-3 to -1 vs 2 to 4	1.510	0.439	0.853+	0.129
		1.350	0.310	2.800	0.030
		0.249	0.577	0.099	0.863

Row 1. Difference between means. 2. F-value. 3. p-value

Placebo test

One of our concerns about the event study methodology is that it might be capturing the impact of the political cycle instead of the change in the ideology of the president, since the shift in ideology necessarily coincides with a change in government, so we are comparing revenues in countries with new administrations to countries that are at different points in the political cycle. To test this hypothesis, we conduct a placebo test, in which we center the events on the last election prior to the ideology shift in left-bound countries. If the increase in revenues persists it may be due to the political cycle effect rather than to the ideology effect. Figure 3 shows the estimation results graphically, and Table 10 presents the difference between the means before and after the placebo treatment.
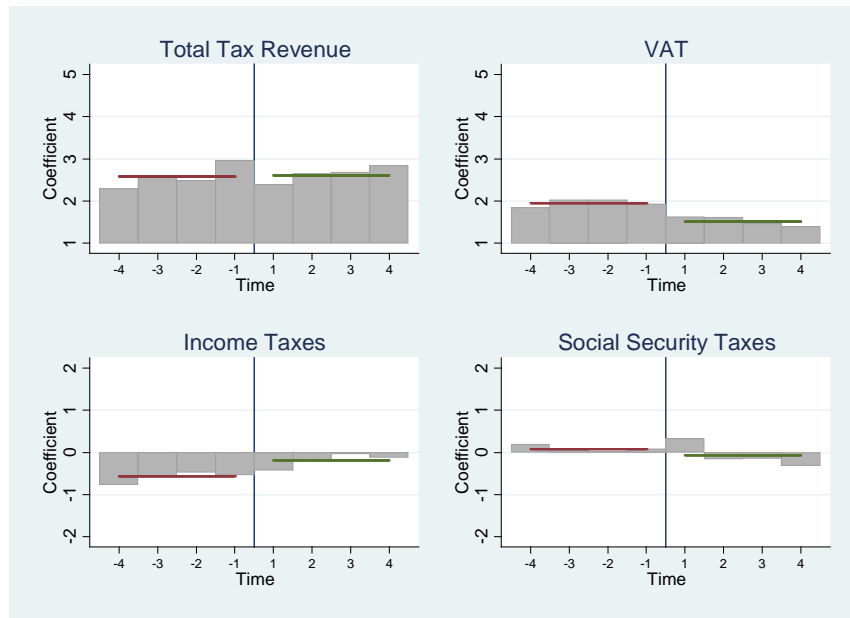
Figure 3. Placebo test

Table 10. Testing differences between means

		Total Tax Revenue/GDP (1)	VAT/GDP (2)	Income Tax/GDP (3)	Social Security Taxes/GDP (4)
Left (D&H)	-3 to -1 vs 2 to 4	0.037 0.000 0.976	-0.504 0.320 0.576	0.394 1.100 0.297	0.264 0.120 0.734

Row 1. Difference between means. 2. F-value. 3. p-value

The results show that there is no significant difference in total tax revenue or any other source of revenue between the period before and after the last government change before the shift in ideology. Thus, we can conclude that our results are not driven by the political cycle but by the arrival of a left leaning president.

Difference in Difference

Another way to isolate the impact of ideology from that of government changes is to just focus on the behavior of revenues around government changes, comparing what happens when these changes entail a shift to the left as opposed to other government changes. We do this through a

difference in difference estimation. This methodology allows us to control for pre-exiting differences in revenues.

To be able to implement the diff-in-diff we classify the switches in the ideology of the president into 4 categories: i) from no left to no left (there are 31 transitions of this type in our sample); ii) from no left to left (there are 9 of these); iii) from left to no left (one of these); and from left to left (there are three of these). We will only analyze the first two categories, which correspond to 90% of the total number of government changes. That is, we will compare the treatment periods (with government transitions from no left to left) to the controls (government transitions from no left to no left).[22]

For every government transition, we look at the 2 years before (pre) the arrival of the new president and 2 years after (post).[23] Based on this pre and post observations we define a $Post$ dummy which equals to 1 in the year in which a new president comes to office and in the following year. Additionally, it is convenient to redefine the $left$ dummy so that it takes the value of 1 during all the transition period, that is, for the 2 years before and 2 years after the arrival of a leftist president. That is, we assign a value of 1 all the periods within the "treatment" transitions. Our coefficient of interest, β_3 in the equation that follows, corresponds to the interaction of our redefined *left* dummy with *Post*. The estimations are presented in Table 11.

$$Tax_{i,j.t} = \beta_1 left + \beta_2 Post + \beta_3 left * Post + \gamma \ln(GDP\ pc)_{i,t} + \alpha_j + \lambda_t + \varepsilon_{i,j,t}$$

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[22] We are only taking into account for this exercise those presidential periods that last more than two years.

[23] If, for example elections, in a country are held every six years, only the two years before and after the election (including the election year) are considered, the rest are dropped from the sample.

Table 11. Difference in Differences

Dependent Variable	Total Tax Revenue/GDP (1)	Total Tax Revenue/GDP (2)	VAT/GDP (3)	VAT/GDP (4)	Income Tax/GDP (5)	Income Tax/GDP (6)	Social Security/GDP (7)	Social Security/GDP (8)
Left	1.531*	1.143+	0.300	0.244	0.838*	0.410	-0.0605	-0.0781
	[0.651]	[0.580]	[0.351]	[0.323]	[0.332]	[0.351]	[0.315]	[0.293]
Post	-0.0907	-0.133	-0.00706	0.0295	0.0708	0.00856	0.0845	0.121
	[0.320]	[0.253]	[0.167]	[0.147]	[0.159]	[0.124]	[0.126]	[0.131]
Left*Post	1.539*	1.378*	0.183	0.217	0.882	0.706+	-0.287	-0.166
	[0.685]	[0.583]	[0.282]	[0.252]	[0.534]	[0.405]	[0.261]	[0.278]
Log GDP per capita	3.461	3.653	4.222*	4.682**	3.703*	4.145**	3.810+	2.488
	[2.876]	[2.329]	[1.638]	[1.508]	[1.657]	[1.123]	[2.112]	[2.023]
Constant	-12.91	-0.562	-28.77*	-35.55**	-25.62*	-23.72+	-25.70	0.147
	[22.12]	[25.36]	[12.59]	[12.58]	[12.72]	[12.76]	[16.21]	[20.43]
Country Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Aditional Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	158	141	156	139	156	139	156	139
Number of countries	17	17	17	17	17	17	17	17
Adjusted R-squared	0.912	0.930	0.926	0.938	0.710	0.815	0.919	0.925

Additional controls are: Openness, self employment, the ratio of the population under 15 and over 65 years old and natural resources rents as GDP percentage
Cluster standard errors in brackets ** p<0.01, * p<0.05, + p<0.1

The results shown above suggest that total tax revenue increase between 1.3 and 1.4% of GDP during transitions to the left, compared to other government transitions, depending on whether we include or not the additional controls. In the case of income taxes, the impact is between 0.7 and 0.9 percent of GDP, although the result is only significant at conventional levels for the case in which additional controls are included.[24] [25] Consistently with the all the other findings there is no evidence of a significant impact of ideology on VAT revenues or social security taxes.

The results obtained under the three different approaches seem consistent with each other. The arrival of the left increases total tax revenues, as well as income tax revenues. The advent of the left, however, has no significant impact on VAT revenues, or on revenues from social security taxes. While the temporal pattern of tax revenues around transitions to the left show some evidence of an increase prior to the change in ideology (which may be consistent with changes in

[24] In the case without additional controls, the p value is 0.106.

[25] We believe the difference in difference may underestimate the impact of ideology, since we only consider the first two periods of the new administrations, when we have seen that the largest impact seems to occur in period 3.

preferences), it also shows that there is a clear jump in revenues once the left governments take office.

This suggests that ideology of the government may be responsible for the jump in tax revenues. Furthermore, although there is a sudden jump on impact starting in year 1, it seems that the full effect of ideology takes a little time to develop. Both in the case of total revenues as in revenues from income taxes, the impact of the left seems to peak around the third year following the transition.

Concluding remarks

Over the last fifteen years, Latin America has been experiencing two simultaneous trends: a shift to the left in government's ideology, beginning with the election of Hugo Chavez in Venezuela in 1998; and a surprising increase in tax revenues, albeit starting from very low levels. In this paper, we study the potential association between these two trends, by looking at the impact of ideology on tax revenues for a sample of 17 Latin American countries between 1990 and 2010.

Using a fixed effect model to identify the impact of ideology on taxation from within-country variation across time, and data on ideology based on expert surveys from Debs and Helmke (2008), we find that total tax revenues are 2.1 percentage points of GDP higher under governments from the left, compared to all other ideologies. As expected, the impact of ideology varies substantially depending on the revenue source in question. In the case of income tax revenues, which fall mainly on the rich, the impact of ideology is very large: income tax revenues increase on average by 1.3 percentage points of GDP (compared to a mean value of income tax revenues of 3.6 percent of GDP) under governments from the left. In contrast, we find no impact on revenues from VAT, a more regressive tax that tends to fall on the population at large, in proportion to consumption. These results are robust to the inclusion of a variety of control variables, as well as the use of different ideology variables. In the case of social security taxes, we find some limited evidence that revenues fall under leftist governments, although in this case the evidence is not robust

In order to deal with endogeneity problems that may arise from an omitted variable, we use an event study methodology to track the behavior of tax revenues around episodes (or "events") in which ideology shifts to the left. Additionally, we use a difference in difference methodology, focusing on presidential transitions, and distinguishing transitions that involve a shift to the left from other transitions. We find that tax revenues increase by 1.4 to 1.5% of GDP, and income tax revenues by 0.7 to 0.9 % of GDP, when we compare revenues just before and after the arrival of the left. The fact that revenues jump just after the ideology shifts suggests that it is appropriate to attribute at least part of the increase in tax revenues to the shift in ideology, rather than to changes in preferences for redistribution. Overall, our results suggest that ideology does matter for taxation, and that the impact is substantial. Furthermore, they suggest that the shift to the left observed in the region may be in part responsible for the increase in tax revenues that we have observed in the last fifteen years.

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