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Ideology and Taxation in Latin America

ABSTRACT This paper examines the impact of ideology on tax revenues in Latin America, using a panel of seventeen countries from 1990 to 2010. As a first approach, a fixed-effects model is used to identify the impact of government ideology on taxation; left-leaning governments are associated with increases in total tax revenues and income tax revenues of 2.2 and 1.3 percent of GDP, respectively. There is no effect on revenues from VAT or social security taxes. To deal with endogeneity problems, an event study methodology is used to track the behavior of revenues around the time of the shifts to the left. A comparison of revenues immediately before and after the shift in government ideology shows that revenues and income tax revenues increase by 1.3 and 0.8 percent of GDP.

JEL Classifications: H20, P16

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One of the most important developments in the Latin American political landscape since the late 1990s has been the significant shift to the left in several countries in the region. The 1998 election of Hugo Chávez in Venezuela was just the beginning; it was quickly followed by the elections of Ricardo Lagos in Chile, Luiz Lula da Silva in Brazil, Néstor Kirchner in Argentina, Tabaré Vázquez in Uruguay, and Evo Morales in Bolivia, among others. In 1998, before the election of Hugo Chávez, none of the countries in Latin America (with the exception of Cuba) were under the control of a government on the left. Until very recently, around half of the countries in the region had left-leaning presidents.

For the most part, this shift to the left has been quite robust. With few exceptions, most of the countries that moved to the left stayed on the left, whether via the reelection of the incumbent or through the election of another

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candidate from the same party.[1] While much has been written about the shift to the left in the region, most of this work focuses on documenting the shift, explaining the factors behind it, and characterizing the different varieties of "left" that coexist within the region.[2] In this paper, we focus instead on the impact of this shift on economic outcomes. In particular, we study the impact of government ideology on tax revenues.

Three stylized facts stand out with regard to tax revenues in Latin America in recent years.[3] First, those revenues are comparatively low. This is not just true when the benchmark for comparison is the Organization for Economic Cooperation and Development (OECD). Rather, tax revenues in Latin America are low even in comparison with countries of a 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-à-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 value added taxes (VAT), the gap is quite large with regard to income taxes, in particular personal income taxes. This pattern of taxation—low overall taxes, particularly with regard to the tax bases most resisted by elites—has persisted, even as Latin America has become more democratic. As a result, several authors focus 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.[4]

While these first two stylized facts are well known, the third one is a little more surprising: while still lagging behind other regions, Latin America has recorded a significant increase in tax revenues in recent years. 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. Within our sample of seventeen Latin American countries, tax collection increased

1. After two terms in office, Lula was replaced by Dilma Rousseff, also from the Workers Party; Nestor Kirchner was followed by his wife, Cristina Fernández de Kirchner; and Tabaré Vázquez was followed by José Mujica, also from the *Frente Amplio*. One exception to this emerging trend is Chile, where right-of-center Sebastián Piñera came to power following two left-leaning administrations, although he was subsequently replaced by the Socialist Party's Michelle Bachelet.

2. See, for example, Levitsky and Roberts (2011).

3. See Corbacho, Fretes Cibils, and Lora (2013).

4. For Latin America, see Cárdenas (2010) and Ardanaz and Scartascini (2011). More generally, see Acemoglu (2005), Acemoglu and Robinson (2008), and Besley and Persson (2009).

by 4.4 percentage points of GDP, on average, between 1990 and 2010—a remarkable achievement. This increase is much larger than that achieved in any other region of the world. This leads us to the question we tackle in this paper: could the shift in ideology observed in the region 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 decisionmaking where opinions are thought to map neatly into the left/right ideological scale used to frame the political debate. Greater participation of the government in the economy, through higher taxes and greater 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-leaning governments in Latin America 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 Inter-American Development Bank (IDB) in partnership with the Inter-American Center of Tax Administrations (CIAT). Our ideology variables are taken from expert surveys, as well as elite surveys of legislators from the Parliamentary Elites of Latin America (PELA).[5] We explore the link between these variables using two different methodological approaches. First, we use fixed-effects models to study the link 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 study methodologies. This allows us to determine whether the increase in taxation may, in fact, be attributed to the shift to the left.

We find that ideology does have an impact on taxation. In particular, within our sample of seventeen Latin American countries between 1990 and 2010, a shift to the left is associated with an increase in total tax revenues on the order of 1.3 to 2.2 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,

5. The expert surveys are by Debs and Helmke (2010) and Murillo, Oliveros, and Vaishnav (2010).

is substantial. A shift to the left is also associated with a substantial increase in income tax revenues of about 0.8 to 1.3 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.[6] Focusing on twelve 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 United States and the United Kingdom, unemployment decreased during Democratic or Labor governments and increased during Republican and Conservative administrations, respectively.[7] The work of Hibbs and others that follow in this partisan tradition departs from Downs' idea that parties just care about winning elections.[8] Rather, these studies assume 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 focuses on debt, deficits, and expenditures as the fiscal variables of interest, some papers also focus on tax policies, mostly in developed countries.[9] In a study that is closely related to our paper but based on different measures of ideology, Angelopoulos, Economides, and Kammas examine the impact on tax rates and tax rate structure in OECD countries; they find that left-leaning governments tend to rely more on capital than labor income taxation.[10]

6. Hibbs (1977).

7. Hibbs' analysis relies on a stable Philips curve that can be exploited by the parties, as well as naïve voters who vote retrospectively. Alesina and Tabellini (1990) present 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 their 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) find support for this theory for the case of the United States.

8. Downs (1957).

9. For analyses of debt, deficits, and expenditures, see, for example, Cusack, (1997) and Alesina, Roubini, and Cohen (1997); for tax policies, see Boix (1998) and Tavares (2004).

10. Angelopoulos, Economides, and Kammas (2009).

A few studies on OECD countries look at the relationship between ideology and taxation at the subnational government level. In a study of U.S. states, Besley and Case find that governments headed by Democrats are associated with relatively higher taxes and spending than Republican administrations.[11] At an even more local level, Pettersson-Lidbom similarly finds left governments in Swedish municipalities to be characterized by higher taxes and spending than their right-wing counterparts.[12] Migueis, using regression discontinuity design, finds a number of significant differences between left and right governments decided by close elections among Portuguese municipalities.[13] Left governments are found to be more likely to adopt corporate taxes and to spend on social infrastructure. Right-leaning governments, in turn, are found to give higher compensation to their municipal workers and to run higher levels of debt. In a study of U.S. municipalities, however, Ferreira and Gyourko fail to find a significant effect of the ideology of the mayor on either taxes or spending, using a similar methodology.[14]

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. Coppedge initiated efforts to characterize Latin American political parties on an ideological scale for a limited number of countries, based on expert surveys.[15] Only recently have authors begun to build on Coppedge's early efforts, expanding the coverage of the data both geographically and over time in order to cover most countries in the region.[16] The work on Parliamentary Elites of Latin America (PELA) by the University of Salamanca, in which legislators place themselves as well as other parties and politicians on an ideological scale, provides the basis for alternative measures of ideology.[17]

Very few papers explore the link between ideology and taxes in Latin America. In a study investigating partisan business cycles in Brazilian municipalities, Sakurai and Menezes-Filho find that ideology influences local government expenditures, but not taxes.[18] Machado and Stein also look at Brazilian

11. Besley and Case (2003).
12. Pettersson-Lidbom (2008).
13. Migueis (2013).
14. Ferreira and Gyourko (2009).
15. Coppedge (1997).
16. Debs and Helmke (2010); Murillo, Oliveros, and Vaishnav (2010).
17. See Saiegh (2009) on the use of PELA as a measure of ideology.
18. Sakurai and Menezes-Filho (2011).

municipalities.[19] 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, who examine the determinants of different types of tax reform, find that left-leaning governments are more likely to implement tax reforms that seek to increase taxes and, in particular, income tax revenues.[20]

Perhaps the paper closest to ours is by Hart, who uses expert survey data on party ideology for nine Latin American countries and panel data techniques to look at its impact on taxation in a context in which tax policies are constrained by globalization.[21] He reports a surprising result: tax revenues are higher for right-wing governments than their left-leaning counterparts. He argues that given the constraints faced by policymakers with regard 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 to the work of Hart, we use a much wider set of countries (seventeen rather than nine) and a wider coverage in terms of years. While Hart's data go through 2006, ours have coverage until 2010, allowing us to include recent cases of left-leaning governments such as Evo Morales in Bolivia, Rafael Correa in Ecuador, and Daniel Ortega in Nicaragua, just to name a few. In addition, we use a wider variety of ideology variables, based on both expert surveys and the Parliamentary Elites of Latin America survey.[22]

Data Description

For the purpose of this study, we combine different sources of information on taxation and on a given president's ideology in Latin America from 1990 to 2010. The taxation data, taken from a data set put together by the IDB in partnership with CIAT, are available for twenty-one countries in the region.[23] These are high-quality data that have been validated by the respective governments. Unfortunately, Venezuela, the first country to shift to the left in our region, is not included in this data set. While most of the data we use correspond to the level of the general government (which includes central,

19. Machado and Stein (2012).
20. Hallerberg and Scartascini (2011).
21. Hart (2010).
22. The expert surveys are from Debs and Helmke (2010) and Murillo, Oliveros, and Vaishnav (2010).
23. Corbacho, Fretes Cibils, and Lora (2013).

state, and local government revenues), we also check for the robustness of the results using central government revenues only.[24] In addition to total tax revenues, we have data disaggregated by revenue source. As dependent variables, we 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 are expressed as a share of GDP. To account for the fact that many of the countries with left-leaning governments (perhaps more so than others) were subject to positive shocks associated with the boom in commodity prices, we include a measure of noncommodity tax revenues as a share of noncommodity GDP.[25]

We use two different measures of ideology. The first, based on expert survey data, is a dummy variable for left-leaning governments taken from Debs and Helmke, who in turn build on the original work on ideology in Latin America by Coppedge and on works by Castañeda, Cleary, and Weyland.[26] The countries and administrations that are coded as left are presented in table 1. Based on this variable, figure 1 shows the movement toward the left that has swept through the region. We make a slight change relative to the Debs and Helmke database. While they code incoming left governments with a value of one 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

24. 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.

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

26. Debs and Helmke (2010); Coppedge (1997); Castañeda (2006); Cleary (2006); Weyland (2011, originally published in 2008). While Debs and Helmke also code political parties on a five-point ideological scale (where one is left, two is center-left, three is center, four is center-right, and five is right), for methodological reasons it is more convenient for us to work with the left dummy variable. To check for robustness, we use different definitions for this dummy variable, as well as a second data set by Murillo, Oliveros, and Vaishnav (2010), an alternative source of ideology data also based on expert surveys. Both the Debs and Helmke and the Murillo, Oliveros, and Vaishnav data sets end in 2009. We extended the Debs and Helmke dummy variable through 2010 to include more countries with a shift to the left in the analysis.

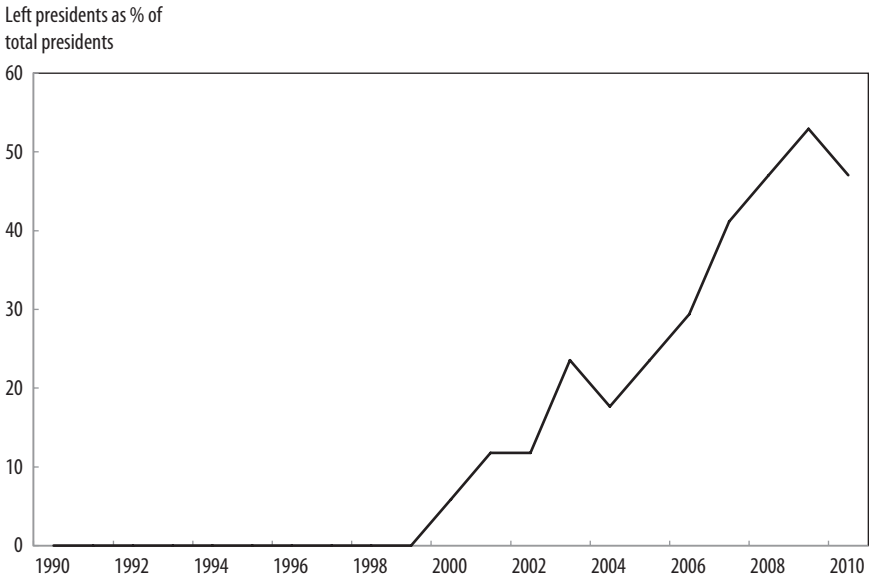
TABLE 1. Left-Wing Presidents in Latin America, 1998–2009[a]

Country	*Year*	*President*
Argentina	2003	Néstor Kirchner
Argentina	2007	Cristina Fernández de Kirchner
Bolivia	2006	Evo Morales
Brazil	2003	Luiz Lula da Silva
Brazil	2006	Luiz Lula da Silva
Chile	2000	Ricardo Lagos
Chile	2006	Michelle Bachelet
Dominican Republic	2000	Hipólito Mejía
Ecuador	2007	Rafael Correa
El Salvador	2009	Mauricio Funes
Guatemala	2008	Álvaro Colom
Nicaragua	2007	Daniel Ortega
Paraguay	2008	Fernando Lugo
Uruguay	2005	Tabaré Vázquez
Venezuela	1999	Hugo Chávez
Venezuela	2001	Hugo Chávez
Venezuela	2007	Hugo Chávez

Source: Debs and Helmke (2010).

a. As discussed in the text, we do not have revenue data for Venezuela, which is included in the table simply because it was the first country to experience the ideological shift in our sample period. The rest of the countries in the sample are Colombia, Costa Rica, Honduras, Mexico, Panama, and Peru, which did not experience an ideological shift.

FIGURE 1. Left-Wing Presidents in Latin America



Source: Authors' calculation based on Debs and Helmke (2010).

has been in office more than half of the year.[27] All the countries in our sample are presidentialist. This justifies our focus on the ideology of the president and his or her government, rather than that of the legislature.

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 ideological scale ranges from zero to ten, where higher scores are associated with left-leaning presidents.[28] These two ideology measures are available for a sample of eighteen and seventeen Latin American countries, respectively. Descriptive statistics for all these variables, as well as others that are used in the empirical analysis, are presented in table 2.

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 higher or lower 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 countries collect more taxes when they are controlled by a left-leaning president than when they are not.

Our baseline model is as follows:

$$\mathrm{TAX}_{i,t} = \alpha_i + \lambda_t + \beta\,\mathrm{IDEOLOGY}_{i,t} + \gamma \ln\left(\mathrm{GDPpc}\right)_{i,t-1} + \varepsilon_{i,t},$$

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

28. While the original PELA ideology codes are higher for the case of right-leaning politicians, we modified this variable so that it would yield the same expected sign as our left dummy variable.

TABLE 2. Descriptive Statistics[a]

Variable	No. observations	Mean	Standard deviation	Minimum	Maximum
Revenue					
Total tax revenues (% GDP)	349	14.470	4.476	6.940	27.671
Noncommodity tax revenues (% NC-GDP)	243	15.078	4.313	6.806	25.930
Vat (% GDP)	345	5.372	2.412	1.194	13.070
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	21.540
Ideology					
Left dummy variable (D&H)	323	0.164	0.371	0	1
President's ideology (PELA)	203	4.319	1.670	1.712	8.784
Left + center left (D&H)	323	0.238	0.427	0	1
Left (MO&V)	323	0.022	0.146	0	1
Left + center left (MO&V)	323	0.164	0.371	0	1
Control					
GDP per capita (in logs)	357	7.865	0.660	6.716	9.283
Openness (in logs)	357	80.651	72.340	0	404.100
Cyclical component of GDP (Hodrick-Prescott filter)	357	0	3,590	−24,893	19,747
Natural resource rents (% GDP)	357	5.004	6.291	0.087	41.633
Share of population under 15 and over 65 years of age	357	40.060	4.189	31.372	49.070

a. Sample size: 17 countries. Period of analysis: 1990–2010. D&H: Debs and Helmke (2010). MO&V: Murillo, Oliveros, and Vaishnav (2010).

where α_i is a country-specific fixed effect; λ_t is a time fixed effect; $\text{IDEOLOGY}_{i,t}$ denotes the president's ideology in country i in year t; and $\ln(\text{GDPpc})_{i,t}$, which represents the logarithm of GDP per capita, is included to account for the potential impact on taxation of changes in the level of development.[29] To deal with reverse causality from tax revenues to GDP per capita, we lag per capita GDP one period. The specification includes year dummy variables 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—namely, total tax revenues minus social security revenues, and the revenues from different

29. Studies pointing to the positive link between the level of economic development and taxation include Lotz and Morss (1970), Tanzi (1992), Piancastelli (2001), Gupta (2007), and Pessino and Fenochietto (2010).

TABLE 3. Fixed Effects: Total Tax Revenues[a]

	Dependent variable					
	Total tax revenue/GDP		*Central government tax revenue/GDP*		*Noncommodity tax revenue/GDP*	
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Left	2.217***		1.999***		1.898***	
	(0.657)		(0.617)		(0.584)	
President's ideology		0.540***		0.529***		0.316***
		(0.156)		(0.157)		(0.108)
Log GDP per capita ($t-1$)	−0.656	1.789	0.000438	1.056	−3.559	−1.346
	(1.837)	(2.677)	(1.785)	(2.757)	(2.771)	(3.866)
Constant	21.06	−1.824	14.19	3.026	45.28**	25.19
	(14.91)	(21.64)	(14.48)	(22.33)	(22.62)	(31.60)
Summary statistic						
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	No	No	No	No	No	No
No. observations	349	203	345	203	243	161
No. countries	17	16	17	16	13	12
Adjusted R squared	0.865	0.885	0.730	0.850	0.893	0.891

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The odd-numbered columns show the results for the left dummy variable from Debs and Helmke (2010); the even-numbered columns in the table show the results using the president's ideology variable based on the PELA survey. Clustered standard errors are in parentheses.

sources—are discussed above in the data section. Using revenues from value added, income, and social security taxes allows us to check whether ideology affects different revenue sources in different 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 the burden of this revenue source falls mainly on the rich.[30] We do not expect clear results with regard to the VAT, which is comparatively more regressive, or with social security taxes, which tend to tax formal workers, a group typically favored by left-leaning governments.

Table 3 presents the results of the fixed-effects regressions for total revenues, using the left dummy variable from Debs and Helmke and the president's

30. While there are differences across countries, income taxes in the region are collected mostly from the two highest deciles of the income distribution. See Corbacho, Fretes Cibils, and Lora (2013, chap. 1 and 7) and Jiménez (2015, table 1.5).

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 2.2 percent of GDP in years in which the government is controlled by the left, relative 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.[31] In the case of central government tax revenues (column 3) and noncommodity tax revenues (column 5), the effect is slightly smaller, at just below 2 percent 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 to the left on the ten-point scale of the president's ideology is associated with an increase of about 0.53 percent of GDP in total tax revenues, regardless of whether we use general or central government data. Using noncommodity tax revenues yields a smaller, albeit 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 percent of GDP higher than under governments of other ideologies. The smaller coefficient, relative to overall tax revenues, suggests 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 percent 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 variable from Debs and Helmke. A one-step move toward the left on the ten-point ideological scale is associated with an increase of 0.48 percent of GDP in income tax revenues, but it has no impact on VAT or social security taxes.

31. For the countries that experienced a shift to the left, total tax revenues increased 7.7 percent, on average. The regression coefficient suggests that close to 30 percent of that change may be associated with the ideological shift.

TABLE 4. Fixed Effects: Tax Structure

	Dependent variable					
	VAT/GDP		*Income tax/GDP*		*Social security/GDP*	
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Left	0.266		1.305***		−0.222	
	(0.185)		(0.434)		(0.207)	
President's ideology		0.00364		0.478***		−0.0659
		(0.0410)		(0.144)		(0.0522)
Log GDP per capita ($t-1$)	−0.247	0.0394	1.593*	4.294***	−0.320	0.306
	(0.960)	(0.933)	(0.917)	(1.397)	(0.793)	(1.785)
Constant	8.488	5.607	−8.287	−32.28***	7.498	2.552
	(7.779)	(7.566)	(7.421)	(11.42)	(6.380)	(14.48)
Summary statistics						
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Time year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	No	No	No	No	No	No
No. observations	341	203	345	203	345	203
No. countries	17	16	17	16	13	12
Adjusted R squared	0.921	0.921	0.730	0.743	0.903	0.914

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The odd-numbered columns show the results for the left dummy variable from Debs and Helmke (2010); the even-numbered columns in the table show the results using the president's ideology variable based on the PELA survey. Clustered standard errors are in parentheses.

Robustness

To check the robustness of our baseline results, we introduce additional controls and alternative measures of ideology. Table 5 shows 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);[32] age composition of the population (population under fifteen and more than sixty-five years old over total population); natural resource rents as a share of GDP;[33] and the cyclical component of GDP.[34] The source of these variables is the World Bank's World

32. Rodrik (1998) finds a robust empirical association between openness and the size of government. He argues that high government consumption is a way to mitigate risk when economies are exposed to significant external risk.

33. Bornhorst, Gupta, and Thornton (2009) find that countries with natural resources make a smaller revenue effort than countries without them.

34. The cyclical component of GDP is included to account for the possibility that some tax bases may respond to the cycle, even when revenues are measured in proportion to GDP.

TABLE 5. Fixed Effects with Additional Controls[a]

	Dependent variable							
	Total tax revenue/GDP		*VAT/GDP*		*Income tax/GDP*		*Social security/GDP*	
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Left	1.579***		0.217		0.916***		−0.0996	
	(0.497)		(0.181)		(0.241)		(0.195)	
President's ideology		0.401***		0.0418		0.284***		0.0211
		(0.121)		(0.0478)		(0.0717)		(0.0496)
Log GDP per capita ($t-1$)	−0.606	0.845	−0.217	0.0842	1.693**	3.425***	−0.138	0.722
	(1.677)	(2.045)	(0.942)	(0.825)	(0.665)	(0.885)	(0.794)	(1.252)
Constant	10.51	6.886	3.531	−0.0578	−7.900	−21.63***	13.65**	8.136
	(14.50)	(17.60)	(7.930)	(7.046)	(5.346)	(7.847)	(6.825)	(10.84)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	349	203	341	203	345	203	345	203
No. countries	17	16	17	16	17	16	13	12
Adjusted R squared	0.882	0.897	0.924	0.929	0.813	0.830	0.910	0.929

* Statistically significant at the 10 percent level.

** Statistically significant at the 5 percent level.

*** Statistically significant at the 1 percent level.

a. The odd-numbered columns show the results for the left dummy variable from Debs and Helmke (2010); the even-numbered columns in the table show the results using the president's ideology variable based on the PELA survey. Clustered standard errors are in parentheses.

Development Indicators (WDI), except for the openness measure, which is from the International Monetary Fund's World Economic Outlook (WEO).

In all cases, the coefficients for ideology are somewhat smaller once we include these additional controls, whether we use the left dummy variable or the PELA variable on presidential ideology.[35] In the cases of total tax revenues and income taxes, ideology continues to be significant at the 1 percent level. Left-leaning governments are associated with total tax revenues that are higher by 1.6 percent of GDP (using general government data) and income tax revenues that are higher by 0.92 percent of GDP.

To check whether the results are robust to the use of alternative ideology measures, we construct three additional measures based on expert survey data.[36] First, from Debs and Helmke, we construct a variable called *Left and Center-Left (D&H)* which is a dummy variable that takes the value of one when the president's ideology is classified as left or center left.[37] Compared to our baseline, this is a more encompassing measure of left-leaning governments. The second and third measures are taken from Murillo, Oliveros, and Vaishnav, where *Left (MO&V)* and *Left and Center-Left (MO&V)* are dummy variables generated under the same logic as the ones described above.[38] The differences with the variables from Debs and Helmke stem from some disagreements in the classification of the ideology of some of the presidential administrations. In particular, Murillo, Oliveros, and Vaishnav 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.[39]

The results are presented in table 6. To save space, each cell in the table presents the results of a separate regression, where only the coefficient of ideology is reported.[40] The first row reports baseline results using the left dummy variable similar to those presented in tables 3 and 4. The second row uses the left dummy variable taken from Murillo, Oliveros, and Vaishnav.[41] The impact on all sources of revenue is always higher in magnitude compared to the

35. The tables, which include the coefficients for the additional controls, are available on request.

36. The expert survey data are provided by Debs and Helmke (2010) and Murillo, Oliveros, and Vaishnav (2010).

37. Debs and Helmke (2010).

38. Murillo, Oliveros, and Vaishnav (2010).

39. For example, in recent years, only the governments of Bolivia, Ecuador and Venezuela are classified as "left" in Murillo, Oliveros, and Vaishnav (2010). Unfortunately, the IDB-CIAT database does not have data for Venezuela.

40. Full results are available on request.

41. Murillo, Oliveros, and Vaishnav (2010).

TABLE 6. Fixed Effects: Alternative Ideology Variables[a]

Alternative ideology variable	*Total tax revenue/GDP (1)*	*VAT/GDP (2)*	*Income tax/GDP (3)*	*Social security/GDP (4)*
Left	2.230***	0.269	1.305***	–0.223
	(0.661)	(0.187)	(0.439)	(0.210)
Left + Center-Left (D&H)	4.701***	0.363	3.566**	0.0164
	(1.372)	(0.307)	(1.420)	(0.417)
Left (MO&V)	1.393***	0.123	1.061***	–0.269*
	(0.498)	(0.150)	(0.314)	(0.159)
Left + Center-Left (MO&V)	1.191**	0.18	0.977**	–0.324*
	(0.481)	(0.169)	(0.389)	(0.187)

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. D&H: Debs and Helmke (2010). MO&V: Murillo, Oliveros, and Vaishnav (2010). Clustered standard errors are in parentheses.

baseline. The differences in the coefficients may be attributed to the narrower definition in the classification made by Murillo, Oliveros, and Vaishnav, who only classify Bolivia and Ecuador as being controlled by the left. Not surprisingly, given the small number of observations for which this dummy variable takes a value of one, the standard errors in this case are also higher, so larger coefficients are sometimes associated with lower significance.

For the left and center-left variables based on Debs and Helmke and on Murillo, Oliveros, and Vaishnav (last two rows), we find a smaller impact for total tax revenues and income taxes, relative to the baseline results. In the first case, the coefficient of ideology is cut by around one-third, while in the case of income taxes, the size of the coefficient is about three-quarters 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 than governments on the center-left.[42] The only case in which the ideology coefficient increases is social security taxes, which become more negative and statistically significant. The result suggests that social security taxes are about 0.3 percent of GDP *lower* under left and center-left governments, a

42. In contrast to the cases in which we use different left or left and center-left dummy variables shown in table 6, using a categorical variable that captures the full five-point ideological scale—namely, left (5), center-left (4), center (3), center-right (2), and right (1)—yields results that are not statistically significant. The reason is that the main difference with respect to tax revenues comes from comparing the different definitions of left with the rest, while there are little differences between, for example, center and right.

result that is consistent with the findings of Angelopoulos, Economides, and Kammas for the case of developed countries.[43]

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 populations' preferences for redistribution, which are not observed, at the same time explain both selection into left ideology and the level of government revenues. Under the assumption that the preferences for redistribution are time invariant, 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, which would increase the odds of a candidate on the left taking office. In such a case, we could be mistakenly attributing a change in government revenue to the government's ideology when the true cause is changes in the ideological preferences of the population.

To address this problem, some authors use a regression discontinuity design (RDD) to study the impact of partisanship on taxation at the municipal level, exploiting the fact that many elections at this level are decided by a very narrow margin.[44] In 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, we exploit the timing of the impact of government ideology on taxation to address this issue. The idea is to follow revenues over time and check whether there is a jump around the moment of the shift to the left in the president's ideology. If tax revenues increase shortly following the arrival of left-leaning governments, we may want to attribute the tax revenue increase

43. Angelopoulos, Economides, and Kammas (2009).
44. See Ferreira and Gyourko (2009) for the United States and Migueis (2013) for Portugal.

to the shift in government ideology. The increase may be gradual since, while ideology jumps discretely, changes in tax administration or tax policy may take time to come into effect. 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.[45]

Our empirical strategy is loosely based on an event study methodology, in which we 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.[46] For this approach, it is convenient to redefine the left dummy variable so that it takes the value of one *throughout the whole period* for those "treated" countries that at some point adopted a left-leaning government. Thus, for these regressions, the left dummy variable for a country such as Bolivia adopts a value of one 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 $t-4$ to $t+3$), each indicating a period before or after the arrival of the left (for example, PERIOD_t takes the value of one on the first year of the leftist government, PERIOD_{t-3} takes the value of one three years before the arrival of the leftist government, and so on). All the other variables are as in the baseline model.

$$\text{TAX}_{i,t} = \lambda_t + \alpha_i + \sum_{j=t-4}^{t+3} \beta_j \text{LEFT}_i \cdot \text{PERIOD}_j + \gamma \ln\left(\text{GDPpc}\right)_{i,t-1} + \varepsilon_{i,t}.$$

In this case, the coefficients of interest are those of the interaction terms. For example, a positive and significant coefficient for $\text{LEFT}\cdot\text{PERIOD}_{t+1}$ suggests that in the second year of left-leaning governments, tax revenues are higher

45. Levitsky and Roberts (2011), who use 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. Similar conclusions may be derived from Panizza and Yañez (2005), who show that there was no shift to the left in the ideological preferences of the population in 1996–2003, based on Latinobarometro surveys on the population's political orientation.

46. Event studies are frequently used in finance to look at the impact of certain events, such as mergers, on the valuation of firms. For an early survey of the literature on event studies, see Armitage (1995).

relative to their value 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 difference in these coefficients within the window, before and after the event.[47] 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. However, countries such as El Salvador, Guatemala, and Paraguay moved to the left toward the end of the sample period, so we do not have observations for all four years after the shift. Consequently, for the purposes of this exercise, we excluded El Salvador, Guatemala, and Paraguay from the sample. The results of the estimations are presented in table 7.

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 government's ideology, there is an important jump in their magnitude following the arrival of the left. The first panel of figure 2 illustrates this graphically. Although the gradual increase in revenues right before the shift in ideology seems to suggest that there may be other factors at play, such as a gradual shift in preferences, the jump in magnitude following the shift in the government's ideology points to a causal impact of ideology on revenues.

The rest of the columns in table 7 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 small increase prior to the ideological shift as well). Table 8 tests the difference in means between the three years prior to the change in ideology and the three years after the year of the inauguration of the left government (that is, years $t + 1$ through $t + 3$ in the figure). The magnitude of the jump is

47. This model is in the same spirit as a difference-in-differences 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 dummy variables into period dummy variables to uncover more detail on the temporal pattern of taxation around shifts in government ideology. Micco, Stein, and Ordoñez (2003) use a similar identification strategy to study the impact of the European Monetary Union on trade.

TABLE 7. Event Study Regressions[a]

Explanatory variable	*Total tax revenue/GDP (1)*	*VAT/GDP (2)*	*Income tax/GDP (3)*	*Social security/GDP (4)*
Left*$t-4$	0.796*	0.276	0.417*	0.261
	(0.445)	(0.193)	(0.251)	(0.278)
Left*$t-3$	0.659	0.236	0.485*	0.146
	(0.456)	(0.213)	(0.284)	(0.253)
Left*$t-2$	1.073**	0.198	0.429	−0.0554
	(0.506)	(0.277)	(0.294)	(0.301)
Left*$t-1$	1.334**	0.122	0.813**	−0.147
	(0.669)	(0.329)	(0.327)	(0.359)
Left*t	2.113***	0.349	1.382**	−0.129
	(0.745)	(0.274)	(0.536)	(0.299)
Left*$t+1$	2.404***	0.401*	1.293***	−0.0947
	(0.800)	(0.225)	(0.472)	(0.241)
Left*$t+2$	2.293***	0.591**	1.482**	−0.106
	(0.831)	(0.228)	(0.569)	(0.266)
Left*$t+3$	2.288**	0.426**	1.410***	0.0307
	(0.885)	(0.193)	(0.406)	(0.251)
Log GDP per capita ($t-1$)	−1.114	0.146	0.876	0.598
	(1.904)	(1.165)	(1.293)	(0.883)
Constant	26.15*	5.367	−1.847	0.240
	(15.61)	(9.514)	(10.71)	(7.168)
Fixed effects	Yes	Yes	Yes	Yes
Time year dummies	Yes	Yes	Yes	Yes
No. observations	294	286	286	286
No. countries	14	14	14	14
Adjusted *R* squared	0.851	0.923	0.703	0.900

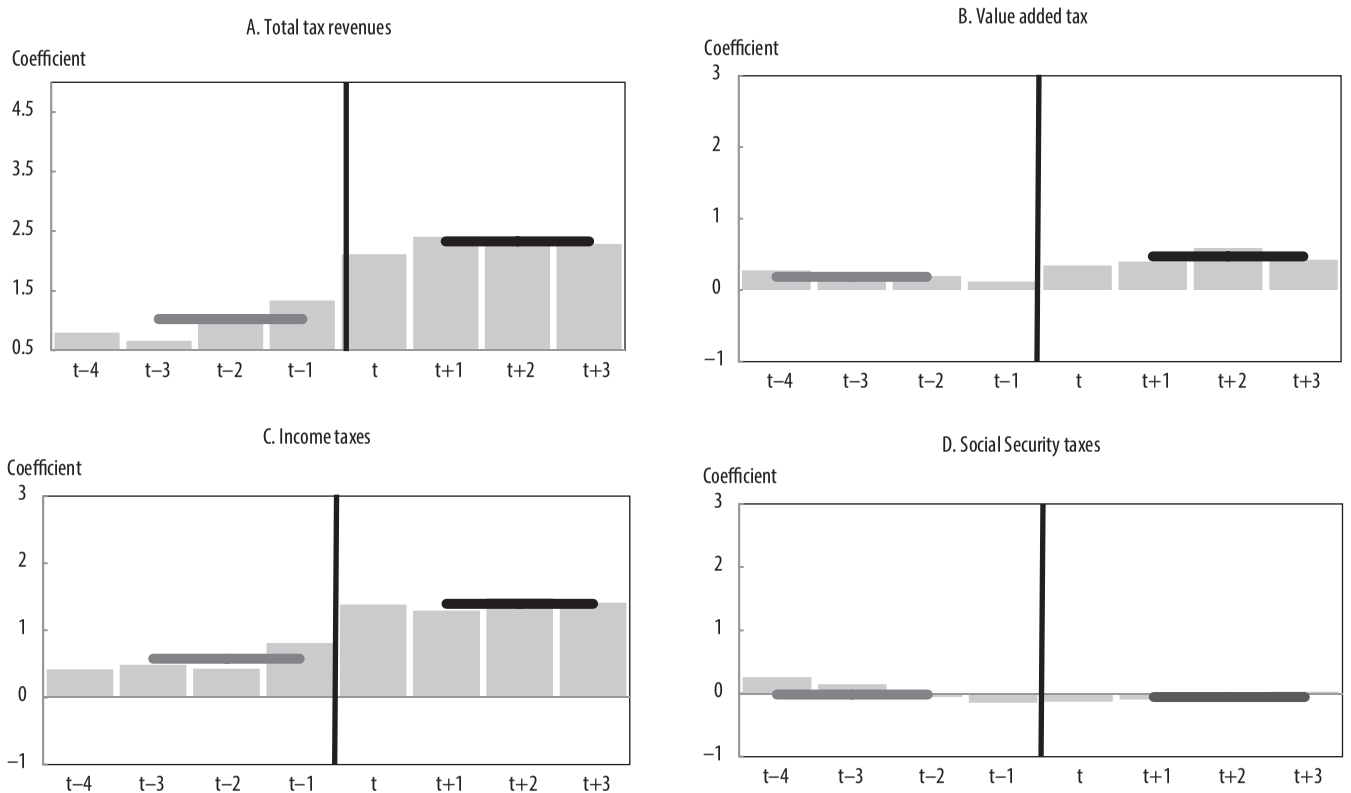
* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. Clustered standard errors are in parentheses.

1.3 percent of GDP in the case of total revenues and 0.8 percent in the case of income taxes.

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. Because the ideological shift necessarily coincides with a change in government, 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

FIGURE 2. Exploiting the Temporal Pattern of Taxation



events on the last election prior to the ideological 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 9 presents the difference between the means before and after the placebo treatment.

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 government ideology. We thus conclude that our results are driven not by the political cycle, but by the arrival of a left-leaning president.

Concluding Remarks

Over the last twenty years, Latin America has experienced two simultaneous trends: a shift to the left in government ideology, beginning with the election of Hugo Chávez 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 seventeen Latin American countries between 1990 and 2010.

We implement a fixed-effects model to identify the impact of ideology on taxation from within-country variation across time, using data on ideology based on expert surveys.[48] We find that total tax revenues are 2.2 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 are collected mainly from 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.

48. Debs and Helmke (2010).

FIGURE 3. Placebo Test

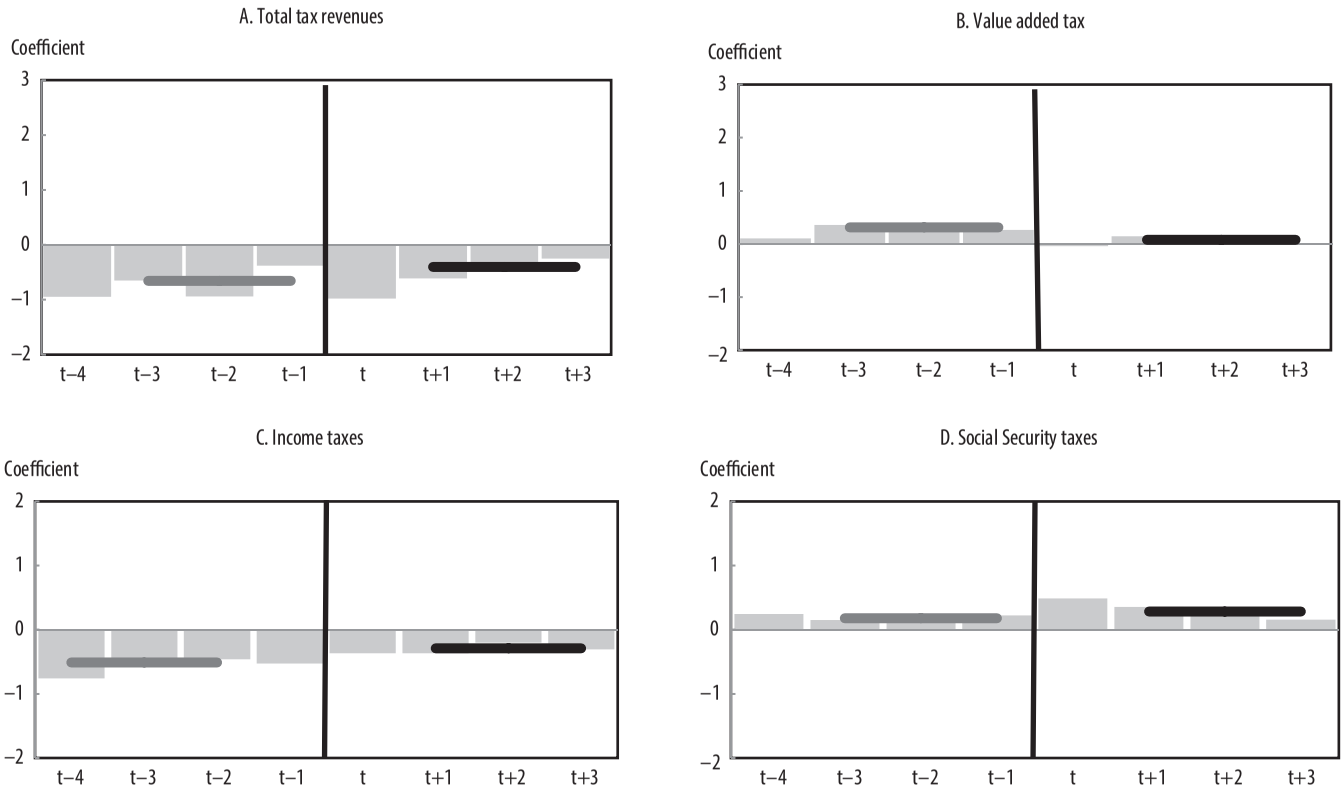


TABLE 8. Testing Differences between Means[a]

Statistic	*Total tax revenue/GDP (1)*	*VAT/GDP (2)*	*Income tax/GDP (3)*	*Social security/GDP (4)*
Difference between means	1.3*	0.287	0.819*	−0.037
F value	3.740	2.540	3.070	0.020
P value	0.056	0.12	0.083	0.89

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The table reports the difference between the means for the periods from $t-3$ to $t-1$ versus from $t+1$ to $t+3$, for the Left (D&H) variable.

TABLE 9. Testing Differences between Means: Election prior to Ideological Shift[a]

Statistic	*Total tax revenue/GDP (1)*	*VAT/GDP (2)*	*Income tax/GDP (3)*	*Social security/GDP (4)*
Difference between means	0.253	−0.235	0.22	0.281
F value	0.88	0.43	1.43	0.09
P value	0.351	0.5125	0.23	0.76

* Statistically significant at the 10 percent level.
** Statistically significant at the 5 percent level.
*** Statistically significant at the 1 percent level.
a. The table reports the difference between the means for the periods from $t-3$ to $t-1$ versus from $t+1$ to $t+3$, for the Left (D&H) variable.

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 government ideology shifts to the left. A comparison of revenues immediately before and after the arrival of the left shows that total tax revenues increase about 1.3 percent of GDP and income tax revenues by 0.8 percent of GDP. The fact that revenues jump just after the shift in government ideology suggests that it is appropriate to attribute at least part of the increase in income tax revenues to the shift in government 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 in the region may be partly responsible for the increase in tax revenues over the last twenty years.

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