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**IDEOLOGICAL CHANGES AND TAX STRUCTURE:  
LATIN AMERICAN COUNTRIES DURING THE  
NINETIES**

CLAUDIO RIBEIRO DE LUCINDA  
PAULO ROBERTO ARVATE

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# Ideological changes and tax structure: Latin American countries during the nineties \*

Cláudio Ribeiro Lucinda  
Getúlio Vargas Foundation <sup>1</sup>

Paulo Roberto Arvate  
Getúlio Vargas Foundation and Pontifical  
Catholic University <sup>2</sup>

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## Abstract

Sabatini (2002) and Roberts and Wibbles (1999) pointed out that voters in Latin American countries are no longer choosing according to their ideological preferences. Ashworth and Heyndels (2002) showed that the tax choice in OECD countries does not follow the ideological pattern of party preferences. The most robust result of this work shows that the tax choice in Latin American countries still depends on this ideological preference. We also verified that changes in the tax structure depend on changes both in the tax burden and the openness of the economy.

**JEL Classification:** H29, F30, H10.

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## 1. Introduction

Recent literature has drawn attention to the fact that the classification of Latin American political parties as left-wing or right-wing is becoming less meaningful.<sup>3</sup> Roberts and Wibbels (1999) pointed out that this change was the result of the growth of an unorganized working class that is part of the informal sector of the economy. According to them, this not only affects the parties, but also the stability of the political system.<sup>4 5</sup>

This result is at odds with another line of research that seeks to assess the effects party ideologies have on tax structure. Pommerehne and Schneider (1983) state that, when elected, governments with a different ideological orientation from their predecessors change taxation in a way that is consistent with their own preferences.<sup>6</sup>

Considering the strong tradition that characterizes the parties in ideological terms in Latin American countries<sup>7</sup> and the establishment of a full democratic system at all government levels in the biggest and most populous countries of the continent, could it be that this loss of the ideological characteristics of the political actors also has an effect on the tax choice? In the current situation are there no longer baskets of taxes that differentiate the left-wing from right-wing parties? If the parties reflect the choice of the electorate, and if they are not choosing parties due to ideology, is the tax structure accompanying this trend?

These questions provide the goal for this work: to investigate whether the ideological changes in governments imposed changes on tax structure according to these ideologies. If this occurred in Latin American countries, should we look with caution at the assertion that voters no longer express their choice according to traditional ideological views?

This is not a question that can be easily answered, because it would imply clear definitions on what basket of taxes are supposed to belong to left-wing or right-wing governments. Such definitions would involve assumptions that are, to a certain extent,

debatable. However, even if we do not impose such assumptions, it is still possible to check whether changes in the tax structure after elections can be traced to ideological changes. We merely have to assume that up until the election, the existing basket of taxes reflects the choice of the government in power. Whenever there is an ideological change after the election, we have to check if this was accompanied by a change in the tax structure. We still will not be able to establish which basket of taxes belongs to each ideological type of government, but there will be evidence on the relationship between ideological and tax structure changes.

In addition to this introduction four sections will be necessary for this goal. In the second section we shall show the movement in the tax structure in Latin American countries. The first step in the analysis is to determine a measure for classifying the changes in tax structure. We chose the methodology used by Ashworth and Heyndels (2002) that is able to capture changes in the tax structure. In the third section we shall discuss the economic and political causes found in literature that justify this movement. Empirical evidence in the fourth section will lend support to our discussion on these issues, so that in the last section we can highlight our main conclusions.

## **2. Was there any change in tax structure in Latin American countries in the nineties?**

Ashworth and Heyndels (2002) constructed an index that was able to reflect changes occurring in tax structure and they tested it using a sample of 19 OECD countries between 1965 and 1995.<sup>8</sup> The equation that represents the index – the tax turbulence index (TURB) – can be seen below:

$$TURB_t^i = \Delta R_t^i = \sum_{j=1}^n |R_{j,t}^i - R_{j,t-1}^i| \quad (1)$$

where

- each  $R_{j,t}^i$  of the vector  $R_t^i = (R_{1,t}^i, R_{2,t}^i, \dots, R_{n,t}^i)$  denotes the share of each of the  $j$  taxes in year  $t$  as a proportion of the total amount collected by country  $i$ ;
- $1 \geq R_{1,t}^i \geq 0$ ;
- The sum of these shares cannot be greater than the whole:  $\sum R_{j,t}^i = 1$ .

If the results of this index are close to zero the tax structure in year  $t$  will have been equal to the tax structure in  $t-1$  and if they reach two the tax structure will have been completely altered.

Ashworth and Heyndels (2002) used the annual data on the structure of national taxes, as published by the OECD. The classification of taxes is very detailed and based on 60 different sources. They chose to work with two groups of taxes, which is the reason why their results were presented in two indices. TURBULENCE 6 reflected the variation of the six main groups of taxes (code '000') and TURBULENCE 19 reflected the change in nineteen tax sub-groups (code '00').<sup>9</sup> Their results showed the existence of a change in tax structure over time for both the group of countries as a whole, as well as for each one of them individually.

We tried to reproduce just one of them (similar to what they had considered with the code '000')<sup>10</sup> for Latin American countries. We used data from the consolidated central government, and the data source was the *Government Finance Statistical Yearbook (GFSY)*.<sup>11</sup>

The charts 1 and 2 show the turbulence index in two different ways, which gives us an idea of how tax composition behaved in fourteen Latin American countries in the nineties (1991-1999).<sup>12</sup>

#### Insert the chart 1 here

We can see in Chart 1 that there was movement in tax structure, although there is not clear trend in the average turbulence index. Although the work of Ashworth and Heyndels (2002) considers a longer period (1965-1995), a comparison of the results indicates the index in Latin

America is greater than for OECD countries. In Chart 2 we can see the average turbulence index, for each country during the same period.

**Insert the chart 2 here**

Only Brazil and Chile presented a degree of turbulence compatible with that of OECD countries, and for the other ones the index was considerably higher. Given the fact that there was a change in the tax structure in Latin American countries greater than the one found for OECD countries, the causes for this movement must be questioned.

### **3. Causes of tax changes: a theoretical viewpoint.**

In traditional neo-classical literature it is assumed that an optimal fiscal policy implies a smoothing of tax rates over time. In the version *à la* Mankiw (1987) this results in equalization of the social marginal cost of all taxes over time.<sup>13</sup> If this result were to prevail it would be very difficult to verify a change in tax structure over time. On the other hand, the literature also discusses whether this result has any empirical validity considering that: 1) it is impossible to maintain the share of each tax, given the changes in the various tax bases;<sup>14</sup> 2) even if the first problem is circumvented, when we include the problem of the uncertainty in the evolution of expenditure, there can be no assurance that changes in total revenue are not accompanied by changes in the structure of taxes in order to satisfy the inter-temporal budget constraint<sup>15</sup> and finally; 3) if the total revenue changes, we cannot fail to consider the political cost of the choice of taxes. In their choice politicians are supposed to consider the relative influence of the electorate on whom the taxes will be levied, and not only the deadweight losses from taxation.<sup>16</sup> This choice can certainly change the initial structure of tax collection.

These criticisms opened up the possibility of investigating which economic and political variables would have an influence on the tax structure. Changes in the tax burden itself, the real

rate of GDP growth, inflation, the level and the change of openness in the economy will be considered to be among the economic causes for this.

We summarize the possible determinants of Latin American tax structure countries on the table below.<sup>17</sup> The sign and timing of the expected effect will be presented. Election years will be presented on the E column, non-election years will be presented on the  $t_{E-n}$  to  $t_{E+n}$ .

**Insert the table 1 here**

Alterations in the *total tax burden* imply changes in the tax structure, as a result of the criticisms already presented: 1) alterations in the total tax burden, in order to adapt to the level of public spending, do not automatically guarantee maintenance of the shares of the various taxes on the total, and 2) alterations in the total tax burden would lead politicians to a new choice on which groups the taxes should be levied.

In the results of Ashworth and Heyndels (2002) we can see that changes in the total tax burden caused changes in the tax structure on OECD countries. We expect that changes in the total tax burden determine positive changes on tax structure.<sup>18</sup>

It is also argued in literature that alterations in the *rate of GDP growth* (in absolute terms)<sup>19</sup> could provoke changes in tax structure. This occurs because the basis for the collection of each tax may react in a different way to this change (elasticity).<sup>20</sup> If the same tax rate is maintained, with differences in the response of the tax base caused by alterations in the rate of GDP growth, there will be certainly changes in the collection of each tax and therefore in the tax structure. Therefore, we would expect the tax base to change due to alterations in the growth rate of GDP. In the study of Ashworth and Heyndels (2002) the coefficient of this variable was not significant at the 10% level in the TURBULENCE 6 index. A significant and positive coefficient was only found in the TURBULENCE 19 index. Wibbels and Arce (2003) do not find a significant effect of GDP growth on capital tax ratio<sup>21</sup> of Latin American countries. Despite this



result, we will expect that changes in the GDP growth to determine changes (positive) on tax structure.

*Inflation* would have a similar effect to those described for the rate of GDP growth. An alteration in the rate of inflation (in absolute terms) would also cause different responses to the tax base of each of the taxes. We can observe that inflation led to a variation in the total tax burden (at all levels of government) in one of the significant results from Perotti and Kontopoulos (1999) between 1960 and 1973.<sup>22</sup> Ashworth and Heyndels (2002) find a significant positive effect of inflation on the tax structure. On the other hand, Steinmo (1993) pointed out that the tax code on the OECD countries was indexed to reduce inflationary losses. Latin American countries have had a hard history concerning inflation. The high or hyperinflation these countries lived through implied differences in response of each tax basis, therefore changing the tax structure and increasing turbulence.

The fundamental difference between countries with low inflation and high (hyper) inflation when it comes to tax collection in real terms lies in the time that elapses until the effective collection of the taxes. Differences in the rate of inflation will determine different levels of tax in real terms. Two responses are possible: 1) If there is indexation on the tax structure, this mechanism would be able to neutralize part of the inflationary effects on the real tax collection (Tanzi effect) – a hypothesis as found in Steinmo (1993);<sup>23</sup> 2) If the main concern of the government is on inflationary tax, the tax collection would be reduced in the real terms (the same Tanzi effect).<sup>24</sup> We do not know which effect prevailed on tax structure of Latin American countries given this history.

Another factor that would have an influence on tax structure would be the *level of openness of the economy*.<sup>25</sup> A greater openness in the economy would reduce the changes in the tax structure because openness in itself removes a degree of freedom from those in

government when it comes to tax choices. The tax structure has to accompany the tax structure of the countries with which the country has commercial relationships in order to avoid a loss of competitiveness. However this is not the only way in which the degree of openness may affect the tax structure. As Ashworth and Heyndels (2002) said:

*“ openness may create turbulence by forcing countries to adapt their structure as a reaction to fiscal externalities from its trade-partners’ policies. As such (absolute) changes in openness will be positively related to turbulence.” (page 355).*

Consequently a *change in the degree of openness* would also influence the composition of tax. In the case of OECD countries, both the level, as well as a change in openness, did not present a significant coefficient to explain the behavior of the tax structure on OECD countries. It is necessary to remember that a large number of the Latin American countries in this sample were relatively closed to trade until the mid-eighties. The opening of the economy in the nineties maybe had a positive influence on the tax structure because these economies would have to adapt their taxes to the standards of their commercial partners. <sup>26</sup> In this case, the level of openness would determine a decrease on tax structure changes. On the other hand, changes on *the degree of openness* would provoke a significant increase on tax structure changes of Latin American countries.

Given that the tax structure does not only respond to economic causes but to political factors, elections, changes in the ideology of government and dispersion of political power are also factors that must be taken into consideration.

As regards elections, there are two possible effects: 1) an increase in tax change due to opportunistic manipulation; the incumbent policymaker tries for re-election and 2) a reduction in tax change, because it is perceived that there would be a large *fixed cost* if it were done.

The model constructed by Rogoff (1990) to show differences in signaling to the voters through spending is a useful theoretical structure for understanding opportunistic manipulation.<sup>27</sup> Applying these results to the case of taxes, Ashworth and Heyndels (2002) showed that the policymaker might change the structure of taxes during election years in order to temporarily signal his competence: income and consumption taxes would be reduced and corporate tax would be increased. The voters, who have more resources to spend at that moment, would only perceive the perverse effect of the tax increase on companies after the election. This would induce them to vote for the incumbent policymaker.

This same signaling structure can be used to understand economic populism in Latin American countries during the seventies and eighties as a new opportunistic manipulation strategy.<sup>28</sup> In trying to understand the hyperinflationary processes in Latin America in this period, Dornbusch and Edwards (1989) coined the term for the economic version of populism, the so-called “economic populism”. According to these authors, with immediate growth and income distribution objectives, at a time of excessive idle capacity and no problems in external accounts, the policymakers promoted an expansionist fiscal policy without worrying about its inflationary financing effects.<sup>29 30</sup> When this initial expansionary phase was over, the hyperinflationary process led to successive crises, which ended in orthodox policies with the gains achieved rapidly disappearing.<sup>31 32</sup> Clearly this was a temporary sign of competence whose effects in the long run were not perceived by the citizens.

Despite not including the electoral moment in their description of the populist cycle,<sup>33</sup> this type of populism can clearly be understood as manipulation - a signal of temporary competence. Just as Roberts (1995) and Knight (1998) developed the idea that populism transformed itself, economic populism could have been transformed and found a new form of manipulation at the time of the election.<sup>34</sup> This type of manipulation would be similar to that

described by Ashworth and Heyndels (2002), by means of taxes. If economic populism, in this modified version, used this strategy the elections would cause changes in tax structure.<sup>35</sup>

On the other hand, considering the fixed costs that a change in the tax structure might bring in terms of election success, there might be no movement in the tax structure. Changes might create uncertainty and attract the special attention of the media about who the real taxpayers are (Peters, 1991), or who the real losers would be. Certainly this could be considered as one of the costs of change for the politicians, particularly if the losers are numerous (Messere, 1993). If this is the case, election years might mean inertia as far as tax changes are concerned (Rose, 1985). Thus, the effect of an election year on the tax structure would be nil.

Ashworth and Heyndels (2002) observed that the election had a negative impact on tax structure of OECD countries. This result corroborates the idea that in election year's changes do not occur in the tax structure because of the cost perceived by the politicians in the period prior to the election.<sup>36</sup> Thus, two opposing results can be expected on Latin American countries: either a decrease or an increase on tax structure changes on the electoral year.

With the *change in ideological regime* we might expect to capture the effects of party preferences. If politicians represent party and ideological preferences and they prefer a certain tax structure, they might change it when they are in power after the elections (Pommerehne and Schneider, 1983). The literature point out this variable was not significant on the tax structure of OECD countries. On the other hand if the idea of Sabatini (2002) is correct, because of the reasons presented by Roberts and Wibbels (1999), ideological change should not be reflected in any change in tax structures in Latin American countries after elections.<sup>37</sup>

Finally *fragmentation of political power* would capture the dispersion of power. According to Roubini and Sachs (1989) political fragmentation makes budget adjustments difficult at times of economic shock, because the game played by the interest groups is not cooperative. If

fragmentation leads to indecision we might expect that a greater dispersion of political power would lead to less movement in tax structure. Admitting to the criticisms of Edin and Ohlsson (1991) about the scale of power dispersion put forward by Roubini and Sachs (1989),<sup>38</sup> Ashworth and Heyndels (2002) constructed three *dummies*<sup>39</sup> to check the independent effect of three forms of dispersion of power on tax structure.<sup>40</sup> None of these dummies was significant to explain the behavior of tax structure.<sup>41</sup> We will expect Latin American countries a decrease of changes on tax structure following an increase of fragmentation of political power.

#### 4. Empirical analysis

In this section we shall test the effect of economic and political variables on the turbulence index as calculated in the second section. We shall work with a sample of eleven countries between the years 1991 and 1999.<sup>42</sup> Our basic specification will be:

$$TURB_t^i = \beta_0^i + \beta_1 TB_{t,t-1}^i + \beta_2 GDP_{t,t-1}^i + \beta_3 IPC_{t,t-1}^i + \beta_4 OP_t^i + \beta_5 OP_{t,t-1}^i + \beta_6 ELEI_t^i + \beta_7 RE_{t-1}^i + \beta_8 RS_{t-1}^i + \beta_9 (RS_{t-1}^i * ELEI_t^i) + \beta_{10} (RS_t^i * RE_{t-1}^i) + \varepsilon_t^i$$

(2)

Subscript *i* represent the country and subscript *t* represents the year. The definition and sources of each of the variables are set out in the following table:

**Insert Table 2 here**

In Appendix 1, table A.1.1, we present the descriptive statistics of each of these variables.

We will not construct the electoral dummy ( $ELEI_t^i$ ) in the same way as proposed in Alesina et alli (1992, 1993) – that characterizes the different impacts arising from an election occurring in the first or second half of the year – because the database that was used for constructing the political variables did not allow us to collect this type of information. It is also unfortunate that for

lack of information we were unable to reproduce the construction of Ashworth and Heyndels (2002) in relation to regime change ( $RE_{t-1}^i$ ):<sup>43</sup>

*"It equals 1 in year t-1 or in the second half of t-2. The idea is that new government which comes into power in the first half of the year can adapt the tax code in the second half of that year, changing tax revenues the year after." (page 358)*

As there is also no classification of the fragmentation of political power ( $RS_{t-1}^i$ ) for Latin American countries in the work of Roubini and Sachs (1989), we chose to construct a single variable to represent it:<sup>44</sup> a dummy with the value zero when the same party controls the Executive and Legislative branches (this would be Roubini-Sachs' index 0) and the value one, when there are different parties controlling the Executive and Legislative branches (this would be Roubini-Sachs' index 1).<sup>45</sup> The value zero will be interpreted as cohesion and the value one as dispersion of power. Ashworth and Heyndels (2002) also included in their tests the interaction between the fragmentation of power, both with the electoral year ( $RS_{t-1}^i * ELEI_t^i$ ) as well as with the change in regime ( $RE_{t-1}^i * RS_t^i$ ). This procedure was the same used in Roubini and Sachs (1989) and its objective is to check whether, when these last two situations are present, the variable representing dispersion of power would weaken or strengthen its effect on the tax structure. We used the lagged value of the fragmentation variable on the ( $RS_{t-1}^i * ELEI_t^i$ ) interaction. In Ashworth and Heyndels (2002) the interaction ( $RS_{t-1}^i * ELEI_t^i$ ) had a positive and significant sign both using the TURBULENCE 19 index as well as the TURBULENCE 6 index (even after changing the definition of the fragmentation of power dummy variable). This was an opposite sign to the one obtained in the variable ( $ELEI_t^i$ ) in isolation.

#### 4.1. Techniques used and basic results.

The estimate will be carried out using a panel database.<sup>46</sup> The presence of both heteroskedasticity and autocorrelation was tested for, and when these problems were present they were corrected.<sup>47</sup> In order to capture the unobserved heterogeneity of countries, individual effects per country and per year were included, and the Wald Test indicates that these were significant. Two alternative ways of modeling the individual country effects: fixed effects and random effects, and the selection between them were based on the results of the Hausman test. The results of estimation of equation (2) above, both using fixed effects and random effects are presented in the first two columns of each table, and the last two give the results of the estimation in which the variables that did not obtain significance at the 10% level were eliminated.<sup>48</sup>

##### 4.2.1. Results

The result of the estimations of equation (2) can be seen in the following table:

**Insert table 3 here**

There are some differences in the results for the sample of Latin American countries from those for OECD countries. We shall focus our comparison on estimate (3) because the Hausman<sup>49</sup> test indicated that the best presentation of the results would be with fixed effects, and the inclusion of the non-significant variables would reduce the efficiency of the significant ones.

Beginning with the economic variables, we can see the change in tax burden in terms of GDP ( $TB_{t,t-1}^i$ ) and the change in the degree of openness in the economy ( $OP_{t,t-1}^i$ ) were significant and with the expected signs.

In the same way as in the OECD countries, the change in tax burden was the variable that most influenced the change in tax structure: an absolute change of one percentage point in

the tax burden relative to GDP led to a change in tax structure of 0,01488 (this effect is more than double the one found in OECD countries).

On the other hand, the change in the level of openness of the economy was significant and explains changes in the tax structure only for Latin American countries. An explanation for this result lies perhaps in the long period that these countries went through with a low level of commercial openness, until the mid-eighties. Even after this period, the level of openness remained low. Comparing the level of openness during the nineties in Latin American countries with the average degree of openness of the twenty countries taking part in the initial sample of Ashworth and Heyndels (2002) between 1965-1995, we find a big difference. For OECD countries the average was around 73% (data from World Development Indicators, 2003); for Latin American countries the average was around 51% (see table A.1.1 in Appendix 1). Even remaining low by the standards of OECD countries, the absolute change in the level of openness provoked changes in tax structure: when the economy was opened up to make it more competitive the tax structure was adapted. The inflation rate was not significant.<sup>50</sup>

Moving on to an analysis of the results of the political variables, the main thrust of our study, two of them proved to be significant enough to explain changes in tax structure: elections ( $ELEI_t^i$ ) and a change in the ideological regime ( $RE_{t-1}^i$ ). Elections gave a negative sign and the change in ideological regime a positive one.

Because of the coefficient sign associated with the variable representing elections we reach the conclusion that, similar to what happens in OECD countries, there was an attempt to reduce tax changes in election years, reflecting the pre-electoral moment.<sup>51</sup> The reason for this, as was shown in literature, is the fact that politicians are not prepared to bear the cost that a tax change represents. Politicians did not make changes in tax structure in election years. In the same way as in Ashworth and Heyndels (2002) this result might remain uncertain because of the



positive effect and the significance of the interaction between fragmentation of power and the election ( $RS_{t-1}^i * ELEI_t^i$ ) in this same estimate. However, as a result of the relative size of the coefficients of these variables, our results indicated that inertia would still prevail, as in OECD countries.<sup>52</sup> From the construction of the variable representing the fragmentation of government - zero if the same party controls the Executive and Legislative branches and one otherwise - if there is no dispersion of power, there is no doubt that inertia will predominate. On the other hand, if there is dispersion of power, inertia in relation to the structure of taxes will be weakened but not reversed because the coefficient of interaction (0,027) is not greater than the coefficient of the election in isolation (0,067).

From the results found it seems to us that a change in ideological regime has led to changes in tax structure.<sup>53</sup> As our variable is a dummy that reflects a change in ideology at the time of the election the only possible interpretation is that a new government (including in terms of ideology) imposed its tax choice immediately after the election. Our hypothesis was that up until the election the existing basket of taxes reflects the choice of the government in power. After the election, if there is an ideological change accompanied by a change in the tax structure, it will be proof of a choice of tax. So, at least as far as the tax dimension is concerned, we have removed the possibility that ideological preferences would not impose a basket of taxes corresponding to it.

Fragmentation of power was not significant enough in the sample of Latin American countries to explain changes in tax structure, although in some cases it was significant enough to explain tax changes in OECD countries (given that there were three dummies reflecting fragmentation).

#### 4.2.2. Robustness and sensitivity tests: country effects

In order to analyze if the results above are sensitive to the countries sampled, we decided to carry out an additional test to check if there is a specific country or group of countries that were having an effect on the previous results. To do this we carried out a Chow Predictive test <sup>54</sup> by removing each of the countries in turn and testing if the estimated coefficients were stable.

Considering all the tests we carried out we ended up concluding that Brazil and Colombia had a clear effect on the estimated coefficients. <sup>55</sup> Following the result of the Hausman test the best interpretation of the results would be, once again, the one where fixed effects (the result in column 3) predominate. Aware of these results we reworked the analysis excluding both countries and the results are shown in Table 3 below:

**Insert table 4 here**

All the results presented the same significance level, with the exception of the variable representing the elections: in isolation ( $ELEI_t^i$ ) or interacting with fragmentation ( $RS_{t-1}^i * ELEI_t^i$ ). It stopped being significant at the 10% level. As we do not have a sufficient number of observations to carry out tests on the two countries, either in isolation or together, we cannot state whether this result is restricted to a single country or to both of them jointly.

From our main investigation, we can be certain that the ideological change at election time is not an effect restricted to just some of the countries in the sample. It is valid for all of them. Tax choice based on ideological preference is the most significant result we found in this work. We can therefore reject the possibility that tax choice does not reflect ideological preference in the Latin American countries sampled. The same economic variables showed before continue being significant and with same signal.

## 5. Main conclusions

The objective of this work was to verify whether ideological changes occurring at election time defined tax structure changes in Latin American countries during the nineties. This issue arises because the theoretical literature indicates that the choice of voters is no longer based on ideological issues in Latin American countries and empirical studies show that this type of change no longer influences the tax choice in OECD countries.

Our most significant result highlights that changes in the ideology of governments at the time of elections cause changes in tax structure the following year. After the election, there was an ideological change accompanied by a change in the tax structure: an ideological choice of tax. This clearly reflects the predominance of ideological choices when it comes to making tax choices

In terms of economic aspects two variables also affected tax structure: change in total tax burden and change in the degree of openness in the economy. In OECD countries the economic variables that provoked changes on tax structure were both total tax burden and inflation. Maybe changes in the openness of the economy are much more important to Latin American countries than to OECD countries because of their history: on several occasions these countries adopted development policies where a policy of closed commerce was fundamental. With the process of economic opening, which they underwent, they were obliged to adapt the tax structure of these countries to the new reality of their commercial partners.

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### Figures inside the text

Chart 1: Turbulence index for selected Latin American countries in the 1990s.

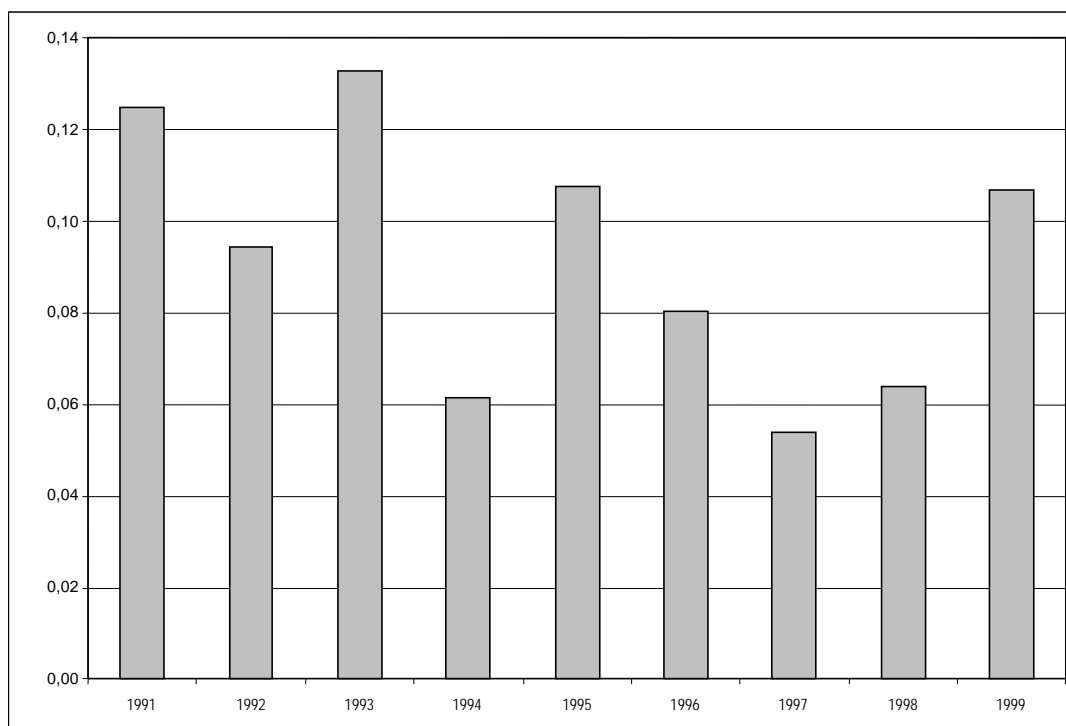


Chart 2: Average Tax Turbulence – Latin American countries in the 1990s

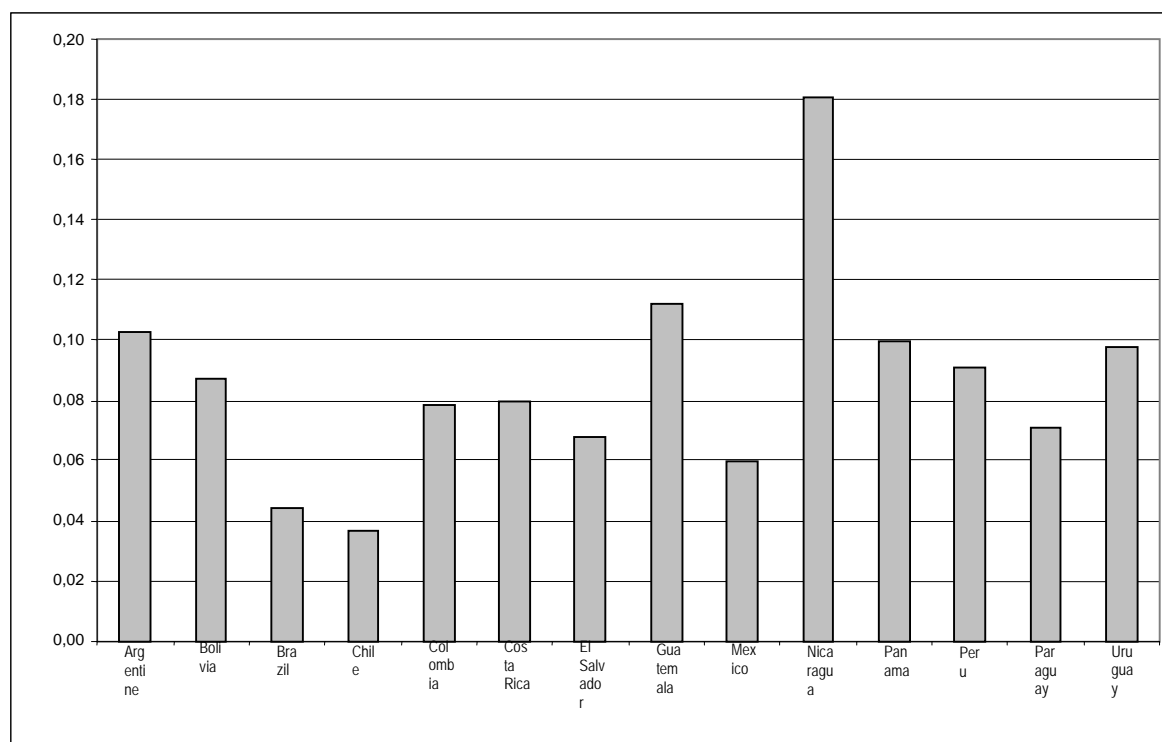


Table 1. Determinants of Latin American changes on tax structure

Year	$t_{E-2}$	$t_{E-1}$	$E$	$t_{E+1}$	$t_{E+2}$
Change in tax burden (absolute value)	+	+	+	+	+
Economic variables					
GDP growth (absolute value)	+	+	+	+	+
Inflation (absolute value)	+ or -	+ or -	+ or -	+ or -	+ or -
Openness (level)	-	-	-	-	-
Change in openness (absolute value)	+	+	+	+	+
Political variables					
Electoral Manipulation			+ or -		
Ideological change				+ or -	
Dispersion of power	-	-	-	-	-

**Note:** The effect of electoral manipulation will be considering the year of election because the effects are considering by years. Following the description on text, our argumentation about Electoral manipulation consists on pre-election moment on the same year of election. The ideological change (regime changing) occur after the year of election following the dynamic of building budget



Table 2: Description of the variables used in the estimation

Factor	Code	Definition	Source
Tax Burden	$TB_{t,t-1}^i$	Variation in total government tax collection, year on year, in absolute terms for each country (it does not matter if the variation is positive or negative)	<i>Government Finance Statistics Yearbook</i> (several years).
Consumer Price Index	$IPC_{t,t-1}^i$	Variation in the consumer price index, year on year, in absolute terms for each country	<i>World Development Indicators 2003</i>
Growth of GDP	$GDP_{t,t-1}^i$	Variation in the rate of GDP growth, year on year, in absolute terms for each country	<i>World Development Indicators 2003</i>
Openness of the Economy	$OP_t^i$	Sum of Exports and Imports as a percentage of GDP for each year	<i>World Development Indicators 2003</i>
Change in the Openness of the Economy	$OP_{t,t-1}^i$	Variation of the degree of openness in the economy, year on year, in absolute terms	<i>World Development Indicators 2003</i>
Election	$ELEI_t^i$	Dummy variable with the value one when it is a presidential election year and zero otherwise	<i>Political Database of Americas</i> (Georgetown University)
Regime (Ideological Changes)	$RE_{t-1}^i$	Dummy variable with the value one when there is an ideological change to the left or to the right in the head of the Executive ; zero otherwise	<i>Beck, Clark, Groff, Keefer and Walsh (2000, 2001)</i>
Fragmentation of Government (Dispersion of power)	$RS_{t-1}^i$	Dummy variable with the value zero when the same party is in control of the Executive and the Legislative branches (Roubini-Sachs' index 0) and with the value one when there are different parties controlling the Executive and the Legislative branches (Roubini-Sachs' index 1).	<i>Beck, Clark, Groff, Keefer and Walsh (2000, 2001)</i>

Table 3: Panel estimation of tax turbulence 1991-1999

	(1)	(2)	(3)	(4)
	Fixed Effects	Random Effects	Fixed Effects	Random Effects
	$TURB_t^i$	$TURB_t^i$	$TURB_t^i$	$TURB_t^i$
<i>Constant</i>	0,127*	0,130*	0,116*	0,126*
	(5,24)	(5,26)	(5,21)	(5,54)
$TB_{t,t-1}^i$	1,485**	1,856***	1,488**	1,803***
	(2,39)	(1,93)	(2,41)	(1,80)
$GDP_{t,t-1}^i$	-0,001	-0,001		
	(0,81)	(0,28)		
$IPC_{t,t-1}^i$	0,000	-0,000		
	(0,90)	(1,14)		
$OP_t^i$	0,000	-0,001*	0,000	-0,001*
	(0,08)	(3,65)	(0,05)	(3,41)
$OP_{t,t-1}^i$	0,004*	0,003**	0,004**	0,003**
	(2,72)	(2,25)	(2,45)	(1,99)
$ELEI_t^i$	-0,067**	-0,059***	-0,067**	-0,057***
	(2,34)	(1,69)	(2,34)	(1,71)
$RE_{t-1}^i$	0,039**	0,053**	0,041**	0,051**
	(2,14)	(2,20)	(2,27)	(2,21)
$RS_{t-1}^i$	-0,002	-0,012***	-0,003	-0,013***
	(0,19)	(1,71)	(0,28)	(1,83)
$RS_{t-1}^i * ELEI_t^i$	0,027**	0,023	0,027**	0,022
	(2,01)	(1,38)	(1,97)	(1,36)
$RE_{t-1}^i * RS_t^i$	0,012	0,018**	0,013	0,017*
	(1,31)	(2,42)	(1,43)	(2,61)
Observations	95	95	95	95
Number of id	11	11	11	11
R-Squared	0,48		0,48	
Test of Autocorrelation	3,95(1)		4,16(1)	
Test of Heteroskedasticity	32,67(11)		28,36(11)	
Significance test of the Fixed Effects of the year	16,52(8)	33,83(7)	61,95(9)	49,63(8)
Significance test of the Individual Effects	22,84(10)		22,04(10)	
Hausman Test (p-value)	32302,14(10, 10)		6,32(6,10)	

Note: z statistics in parentheses. The critical values of the table can be found in parentheses in the table.

\* significant at 1%; \*\* significant at 5%; \*\*\* significant at 10%

Table 4: Panel estimation with Brazil and Colombia exclusion

	(1)	(2)	(3)	(4)
	Fixed Effects	Random Effects	Fixed Effects	Random Effects
	$TURB_t^i$	$TURB_t^i$	$TURB_t^i$	$TURB_t^i$
<i>Constant</i>	0,117*	0,122*	0,112*	0,103*
	(4,92)	(5,07)	(5,70)	(6,07)
$TB_{t,t-1}^i$	1,577**	1,963**	1,612**	
	(2,48)	(2,06)	(2,53)	
$GDP_{t,t-1}^i$	-0,001	-0,000		
	(0,55)	(0,12)		
$IPC_{t,t-1}^i$	0,000	-0,000		
	(0,77)	(0,80)		
$OP_t^i$	-0,000	-0,001*	-0,000	-0,001
	(0,22)	(4,29)	(0,15)	(2,78)
$OP_{t,t-1}^i$	0,004**	0,003***	0,003**	0,004
	(2,34)	(1,77)	(2,05)	(2,17)
$ELEI_t^i$	-0,013	-0,013		
	(1,03)	(1,10)		
$RE_{t-1}^i$	0,043**	0,056**	0,047**	0,057**
	(2,21)	(2,46)	(2,53)	(2,45)
$RS_{t-1}^i$	0,004	-0,008		
	0,039	(1,25)		
$RS_{t-1}^i * ELEI_t^i$	0,001	0,001		
	0,12	(0,18)		
$RE_{t-1}^i * RS_t^i$	0,011	0,017**	0,015	0,016
	1,20	(2,31)	(1,59)	(1,95)
Observations	95	95	95	95
Number of id	11	11	11	11
R-Squared	0,46	0,34	0,45	0,32
Test of Autocorrelation	3,367(1)		4,10(1)	
Test of Heteroskedasticity	37,21(11)		36,01(11)	
Significance test of the Fixed Effects of the year	16,39(8)	19,86(8)	20,51(8)	12,74(7)
Significance test of the Individual Effects	19,57(10)		23,16(10)	
Hausman test	32341,91 (10,10)		2,06(4,10)	

Note: z statistics in parentheses. The critical values of the table can be found in parentheses in the table.

\* significant at 1%; \*\* significant at 5%; \*\*\* significant at 10%

## Appendix 1

**Table A.1.1: The profile of the sample used in the test**

	<i>TURB</i>	<i>TB</i>	<i>IPC</i>	<i>GDP</i>	<i>OP</i>	<i>ELEI</i>	<i>RS</i>	<i>RE</i>
Number of observations	140	116	140	140	140	140	126	128
Mean	0,09	0,15	223,68	4,11	51,48	0,22	0,63	0,07
Standard error	0,1	1,61	993,19	4,31	23,5	0,42	0,49	0,26
Minimum	0	-0.08	-1.17	-10.71	13.75	0	0	0
Maximum	0,81	17,35	7485,5	19,65	122,28	1	1	1

**Note:** Note that the minimum values are not expressed in absolute terms.

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<sup>1</sup> Professor, São Paulo School of Business Administration and São Paulo School of Economics. E-mail: [claudiolucinda@fgvsp.br](mailto:claudiolucinda@fgvsp.br). Address: Av. Nove de Julho, 2029, São Paulo-SP-Brazil. Zip Code: 01313-902. Phone: 55-11-3281-7765. Fax: 55-11-3284-1789.

<sup>2</sup> Professor, São Paulo School of Business Administration and São Paulo School of Economics. E-mail: [parvate@fgvsp.br](mailto:parvate@fgvsp.br). Address: Av. Nove de Julho, 2029, São Paulo-SP-Brazil. Zip Code: 01313-902. Phone: 55-11-3281-7765. Fax: 55-11-3284-1789.

<sup>3</sup> See Sabatini (2002).

<sup>4</sup> Arvate, Lucinda and Schneider (2004) showed that in Latin American countries between 1999/2000 the hidden economy was estimated to be on average 41.5% of official GDP.

<sup>5</sup> This position is not unanimous. Wibbles and Arce (2003) showed that strong leftist political parties in Latin American countries combine with powerful union movements, the government are much more resistant to shifting tax burdens from capital to labor.

<sup>6</sup> Ashworth and Heyndels (2002) did not find evidence that this occurred in 18 OECD countries between 1965-1995.

<sup>7</sup> The work of Coppedge (1997) on classification of the parties in Latin American countries shows how historically important the ideological classification of the parties is.

<sup>8</sup> This index was found in the work of Ashworth and Heyndels (2002) but it was not really created by the authors. They brought into the public arena the methodology developed by Hymer and Pashigian (1962) for the industrial organization area for examining changes in the market share of individual companies.

<sup>9</sup> "These are grouped under 6 main headings (codes ending '000', where the categories are: taxes on income, on profits and capital gains, on social security contributions, on payroll and workforce, on property, on goods and services and other taxes) and 19 sub headings (ending in '00')." Ashworth and Heyndels, 2002, page 349.

<sup>10</sup> It was not possible to reconstruct TURBULENCE 19 for Latin American counties because we did not have data broken down by tax.

<sup>11</sup> We considered this tax with the code '000' plus the inclusion of taxes on international trade and transactions.

<sup>12</sup> The following countries have been used: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Peru and Uruguay. The other five countries were dropped due to the lack of enough data to carry out the empirical procedures described below.

<sup>13</sup> Ashworth and Heyndels (2002) explained the smoothing of taxes by assuming that the average taxation rate of any tax  $i$  would be given by the tax revenue obtained by this tax ( $R_i$ ) divided by its tax base ( $B_i$ ). If the marginal cost of each tax  $i$  is given by  $MC_i(R_i/B_i)$ , where  $MC_i > 0$ , the tax smoothing condition imposes on the  $i$  ( $i = 1 \dots n$ ) taxes that  $MC_i(R_i/B_i) = \dots = MC_n(R_n/B_n)$  over time.

<sup>14</sup> Ashworth and Heyndels (2002) showed that if the rate of growth of the tax base of  $i$  taxes ( $i = 1 \dots n$ ) were equal the tax smoothing equilibrium would be preserved. If not there would be changes in the tax structure. The main idea in this argument is that the tax basis of each tax does not respond to the rate of GDP growth in the same way. If this is true there is no way of preserving the composition of each tax within the total tax revenue over time. Using the methodology of calculating the marginal social cost given in the previous footnote it is difficult to observe that the tax smoothing condition might exist.

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<sup>15</sup> Gordon (1989) demonstrated that in conditions of spending uncertainty the total revenue has to change to accompany the change in the phase of public spending. The possibility of change in the total revenue does not guarantee maintenance of the tax structure over time.

<sup>16</sup> Heitich and Winer (1999).

<sup>17</sup> We do not know of specific works on the effects of both political and economic variables on tax composition and structure tax changes on Latin American countries. The literature on the effects of these variables is much more focused on fiscal results and size of government. See Amorim Neto and Borsani (2004). Tanzi and Zee (2000) had illustrated the differences on the tax structures of both OECD and developing countries in two different periods of time (1985-7 and 1995-7), they did not carry out a formal econometric analysis on which variables are held to cause such changes. The present paper aims to go beyond the results presented there by carrying out such analysis for Latin American countries during the nineties.

<sup>18</sup> Throughout this section, we will refer to positive effects of a variable as increasing the turbulence of the tax structure.

<sup>19</sup> It does not matter if the movement is positive or negative.

<sup>20</sup> Generally what is seen in literature is the opposite of this: taxation determining economic growth. We can see a good example of this in Widmalm (2001)

<sup>21</sup> Defined as the following ratio (corporate income tax + employer social security tax revenue / personal income tax + employee social security + goods and services tax revenue).

<sup>22</sup> Perotti and Kontopoulos (1999) was not found a significant effect coming from inflation on the primary revenue (at all levels of government) between 1974 and 1983.

<sup>23</sup> It is very complicate to imagine a perfect indexing tax system to neutralize the high or hyperinflation. The tax of changing prices is so high that it will be impossible to build the indexation rule to preserve the tax on real terms.

<sup>24</sup> See Dornbusch and Edwards (1989).

<sup>25</sup> Rodrik (1998) had already highlighted the effects of openness on the size of governments.

<sup>26</sup> "Perhaps the most important peculiarity in trying to think about sectoral interests in Latin American currency policy is the role of trade policy, and especially the very high levels of trade protection prevailing in most of the region until the middle 1980s. The trade barriers to finished manufactured goods were prohibitive, as they were in much of region from the 1940s until the 1980s, many factories were essentially in non-tradable production." Frieden, Ghezzi and Stein (2000)

<sup>27</sup> Only in election years. In other years the preference of the voters would be followed.

<sup>28</sup> Read Roberts (1995) and Knight (1998) on the transformation of populism.

<sup>29</sup> The distribution effect via salaries happened when the idea of a nominal devaluation was rejected, given the inflationary process (the idea prevalent in these countries was that the inflationary impact of the devaluation might fuel inflation even more).

<sup>30</sup> See also Bresser Pereira (1991)

<sup>31</sup> Expansion was always accompanied by an external crisis. Nominal devaluation of the exchange rate occurred in the adjustment thereby eliminating the initial distribution gains.

<sup>32</sup> Sachs (1989) also understands that a populist policy goes through a deficit financed by inflation.

<sup>33</sup> See the description of Dornbusch and Edwards (1989), mainly for Chile.

<sup>34</sup> Latin American countries signed up to the so-called Washington Consensus. Among the targets of this consensus is fiscal discipline. In spite of these countries implanted the rules of consensus on different moments (Brazil was the last country to adopt fiscal discipline in 1994 and to control the inflation), the inflationary financing of the deficit was eliminated. See Williamson(1999).

<sup>35</sup> The tax changes in electoral periods to signal possible changes in distribution in the short run to the electors. They might choose to exchange a tax on income for private individuals for higher corporate taxes. Voters would only perceive the damaging effect of this substitution after the elections.

<sup>36</sup> Biglaiser and Brown (2003) pointed out, there exist a period immediately after election called "honeymoon" when governments are most able to carry out any intended changes. This happens because after the election the political leaders have more room to maneuver politically, because they have no longer time horizons and can blame the previous government for any problems.

<sup>37</sup> See also Hibbs (1977) and Tufte (1978) about the ideological influence of parties on public policies.

<sup>38</sup> The power of decision of a minority government over taxes would be three times less than in a party coalition.

<sup>39</sup> "The first (second, third) equals 1 if the Roubini-Sachs index equals 1 (2,3) and 0 in the other cases", (page 359)

<sup>40</sup> RS1 (1 if the Roubini-Sachs index is 1, zero otherwise), RS2 (1 if the Roubini-Sachs index is 2, zero otherwise) and RS3 (1 if the Roubini-Sachs index is 3, zero otherwise). There is the 0 index category that was not used (one-

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party majority parliamentary government; or presidential government, with the same party in the executive and legislative branch).

<sup>41</sup> The dummy RS2 was negative and significant (it reduced tax movement) to explain TURBULENCE 19 index.

<sup>42</sup> Nicaragua, Panama and Paraguay were excluded from the test because of lack of data for the independent variables.

<sup>43</sup> Any Ideological classification of both parties and coalition in Latin American countries will be subject a controversy. The major problem is the political spectrum presents characteristics beyond the traditional left and right on European countries (see Coppedge, 1997). This is the case of populism, for example. We could classify populism as right-wing (Peru's Fujimori and Argentina's Menem are examples – see Kaufman and Ubiergo, 2004) and left-wing. As mentioned, we adopted the classification from Beck, Clark, Groff, Keefer and Walsh (2000, 2001)

<sup>44</sup> We chose to build the variable this way because we would like to compare the OECD countries (excluded Mexico) and Latin American countries in terms of variables and because the variable representative of dispersion of power (more restrictive than the effective number of parties competing, for example) was not our focus in terms of tests of hypothesis. It is a political control variable.

<sup>45</sup> As in all countries in our sample there are only presidential regimes we only got to construct Roubini-Sachs' indices 0 and 1.

<sup>46</sup> Techniques to deal with this sort of database can be found in Wooldridge (2002).

<sup>47</sup> The correction of these problems was as follows: for the fixed effects models, the Panel Corrected Standard Errors Estimator of Beck and Katz (1995) was employed. For the Random Effects Models, the Huber/White Robust Covariance Matrix was used. The software in which the estimations were carried out was STATA, version 7.0.

<sup>48</sup> We chose to keep some results when they were only significant at the 10% level in one of the estimates: fixed and random effects.

<sup>49</sup> Note that the version of the Hausman test used is the robust version in the presence of the autocorrelation and heteroskedasticity that is present in Wooldridge (2002, p. 291), because group-wise heteroskedasticity and autocorrelation was diagnosed as being present in all models. For this reason the statistic presented there has two values for degrees of freedom, since it is based upon the F distribution.

<sup>50</sup> Additional tests were carried out in order to check for the robustness of this result, including one and two period lagged economic variables. Unfortunately, since these variables reduced the number of degrees of freedom in the estimation, the results were not presented and did not allow us to choose between the hypotheses.

<sup>51</sup> We test the effect of election lag. The result is not report but it will not significant.

<sup>52</sup> In OECD countries the interaction coefficient was always positive and greater than the negative coefficient of the election.

<sup>53</sup> Another test was carried out in which we included a dummy variable in order to discriminate if the ideological change was from the left to the right of the political spectrum. A dummy with value equal 1 if the new government has the same ideology as the old one, 0 otherwise to allow for the effects of changes in government per se with the same dummy of ideological changes. The results – not presented – indicated one does not find a different effect.

<sup>54</sup> Greene (1997)

<sup>55</sup> Argentina (F-Statistic = 0,424375; p-value=0,916853); Bolivia (F-Statistic = 0,781613; p-value=0,633942); Brasil (F-Statistic = 2,783848; p-value=0,024649); Chile (F-Statistic = 0,387569; p-value=0,936491); Colombia (F-Statistic = 2,105658; p-value=0,0432); Costa Rica (F-Statistic = 0,994193; p-value=0,454805); El Salvador (F-Statistic = 0,561302; p-value=0,822975); Guatemala (F-Statistic = 0,992162; p-value=0,456387); Mexico (F-Statistic = 0,648229; p-value=0,75128); Peru (F-Statistic = 1,093783; p-value=0,381531) and Uruguay (F-Statistic = 1,39846; p-value=0,209702).