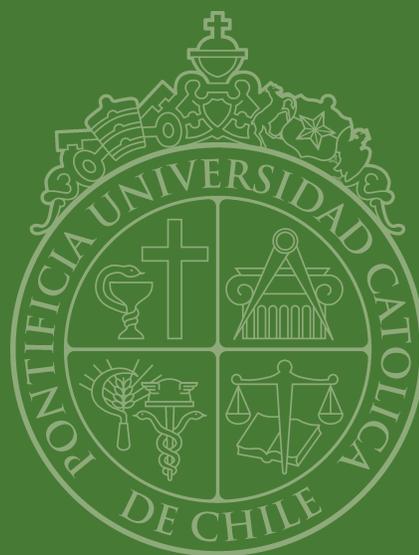


I N S T I T U T O D E E C O N O M Í A



TESIS de DOCTORADO

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Essays in Political Economics: Causes and Consequences of Political Competition

Wilber Baires.

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**PONTIFICIA UNIVERSIDAD CATOLICA DE CHILE
INSTITUTO DE ECONOMIA
DOCTORADO EN ECONOMIA**

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Baires, Montano, Wilber Isaac

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**ESSAYS IN POLITICAL ECONOMICS:
CAUSES AND CONSEQUENCES OF POLITICAL COMPETITION**

Wilber Isaac Baires Montano

Comisión

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Santiago, julio de 2017

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Introduction

There is some growing literature exploring the effects of political competition on economic outcomes. This thesis studies not only the economic consequences of political competition, but their causes. On the one hand, I explore the effects of political competition on economic development and some interaction effects of this variable. And on the other, I study the determinants of political competition. In particular, I study the scale effects on political competition.

In the first chapter, I investigate the extent to which political competition, as a mechanism of political accountability, may improve economic outcomes. This question is of considerable economic importance for several reasons. First, the traditional accountability mechanism created by competition could take more relevance when shaping the behavior of politicians in countries with weak institutions or with corruption problems. Second, in line with Padovano and Ricciuti (2010), the effects of political competition could be different at different levels of government. Political competition could be more relevant as accountability mechanism in local governments (as compared to the central ones) because of lower voters' information costs and a lower salience of ideological issues (Casey, 2015). Third, according to Key et al (1950), truly competitive environment could provide most effective representative mechanism to political parties. Finally, understanding how political competition interacts with another economic relevant variables also has implications on the design of public policies and institutions.

This chapter has focused on the study of the effects of political competition in development outcomes in the context of El Salvador. I use several tools in order to do so. First, I construct a theoretical model which is an extension of the Holmstrom's career concerns model. The model not only predicts that political competition impacts positively economic outcomes, but that this impact is great in places with better realizations of income shocks. This is my first contribution to the theoretical literature. Second, I use rigorous empirical evidence implying causal effects of political competition on economic performance. In particular, I work with an IV methodology to address endogeneity issues and correctly assess the robustness of my results. I use my own historical dataset to construct my instrumental variable: the interaction between the electoral support for a new political party and the previous political ideology of Salvadoran municipalities. I argue that the extent at which

this political party introduced political competition depended on the historical ideological affinity of these regions. Third, I empirically test one of the most important theoretical predictions of my model, that the effect's magnitude of political competition on economic development depends on income shocks received by municipalities. Finally, I study the impact of political competition on fiscal outcomes over the political cycle. I show that in regions with more political competition, the probability of borrowing increases in election periods.

It is not enough to understand the consequences of political competition. If this variable has impacts on economic development, it could be also important to study the causes of political competition. I already study the effect of the plausibly exogenous entry of a political party on political competition in the case of El Salvador (i.e. the first stage of the empirical strategy of my first chapter) and show that there are factors that affect the extent of this variable. In this line, in my chapter, I study the importance of other variables on political competition. In particular, I explore here the causal effect of the population size (or electorate size) on how politicians compete. So far, the literature has focused on understanding how changes in the size of the electorate (such as the inclusion of a new group of voters) affect economic outcomes (i.e. Husted & Kenny 1997; Lott & Kenny 1999; Miller 2008), but it has not been studied if the size of the electorate itself affects electoral competition, which may be a potential mechanism to explain the effects found in the papers that relate electorate size and economic outcomes.

I constructed a large administrative data from Brazil to test this idea. I use an IV methodology to establish a causal effect of population size on political competition. In order to do this, I exploit historical determinants of the current population size of Brazilian regions as my source of exogenous variation. In fact, my instrumental variable is constructed using the population size of municipalities at the end of the XIX century interacted with a dummy variable indicating if a municipality is a former municipality or if it was created after the XIX century. I argue that it will be a stronger relation between the old population size and the current population size of the former municipalities than that of new municipalities, because the latter ones were generally made up by the population at the periphery territory of the first ones (not necessarily representing the real size of the former municipality). My results indicate the existence of positive causal effects of population size on competition.

This thesis helps us to understand the dynamics of political competition. The provided mechanisms could help not only in the formulation of strategies of politicians, but also in the correct formulation of public policies related to this variable once the politicians are in office.

Chapter 1

When politicians care about their people: “Electoral Competition and Economic Development”

Abstract

I examine the effect of political competition on economic development. I provide theoretical and empirical evidence that higher political competition increases economic growth (as proxied by satellite images of light density at night) and that this effect’s magnitude depends on monetary transfers received by regions. I exploit a quasi-experiment related to the entry of a political party in the aftermath of a civil war episode in El Salvador as a source of variation to infer causality from political competition to economic growth. My results hold sizable when I use other development outcomes. Finally, I measure that places with more political competition are more likely to strategically borrow according to the political cycle.

Keywords: Political Competition, Development, Economic Growth, Education, Health, Debt, Regional Government

JEL Codes: D72, H41, H74, H75, I1, I2

1.1 Introduction

Neoclassical theory posits that competition should improve outcomes and this could very well carry to political competition (Becker, 1958; Stigler, 1972; and Wittman, 1989). The empirical evidence of Besley et al. (2010) and Alfano & Baraldi (2015) show this is the case for developed countries (US and Italy, respectively). However, it is not obvious that political competition must necessarily lead to more growth since political competition can also lead to more populism, clientelism (Bardhan & Yang, 2004), and political instability (Acemoglu & Robinson, 2006), which could depress economic performance. This is likely to be stronger

for developing countries. In fact, one point of criticism to previous empirical work is that their results have ignored the possibility that the existing institutional underpinnings could play an important role in affecting the whole process (Dash & Mukherjee, 2015). Thus, the positive effect of political competition on economic performance found in developed countries (with strong institutions) does not have to necessarily hold for low-income countries (without strong institutions)¹. In this paper I formally test this hypothesis for the case of El Salvador using exogenous variation in political competition.

The case of El Salvador is interesting for many reasons. This Central American country ended a long civil war in 1992, concluding it with transcendent changes in its electoral system that, later, implied big transformations in the political competition. Although there are many political parties in El Salvador, the electorate is practically shared between two dominant parties. The left-wing, created after the civil war (FMLN, by its acronym in Spanish), currently has near 35% of national votes, but its political support varies between 3% and 98% across regions. The right-wing party (Arena), on the other hand, has almost 40% of all electorate and its political support varies between 1% and 85% across regions. The rest of the votes are shared by small parties, generally characterized with more neutral ideologies. Therefore, the electoral competition across regions in this country is essentially determined by the two big political parties, similarly to other older democracies like the US.

I present a theoretical model which shares features of Holmstrom's career concerns model (Holmstrom, 1999) and the Besley et al. (2010) political model. This model assumes that there is imperfect information regarding the quality of politicians. This, as in a typical career concerns framework, implies that politicians have incentives to send signals regarding their quality, but that this is more relevant when there are more swing voters. Thus, more competition would generate better behaved politicians which would generate more growth. In the model, I also include an additional attribute represented by an exogenous income shock received by the regions². This ingredient provides an interesting mechanism: more resources lead to relaxing budget constraints, so politicians have more leeway to respond to political competition, e.g., with investment projects to boost growth. In effect, the model not only predicts that political competition impacts economic outcomes positively, but that this impact is greater in places with better realizations of income shocks.

Having elaborated a simple framework relating to political competition and growth, I then turn to its empirical evaluation. I face two challenges in this section. First, as it is common in all developing countries, there are few measures of economic activity at the municipal level. Second, there are endogeneity issues in a naïve OLS estimation be-

¹In Acemoglu et al. (2001) is given the causal link between the strength of State Institutions and the economic development of countries

²In the Salvadoran context, this could be the Municipal Development Fund (FODES, by its acronym in Spanish), which is a monetary transfer from the Executive Power to the municipalities.

tween competition and economic growth. To address the first problem, I propose to use light density at night data reported by the NASA's "Defense Meteorological Satellite Program's Operational Linescan System (DMSP-OLS)" as a proxy for economic development. I strongly argue that this variable proxies well for economic development in Salvadoran municipalities, showing some exercises as Michalopoulos & Papaionnou (2011) did for African countries and regions. This idea is also consistent with Henderson et al. (2009), which show a strong correlation (intra-country) between the density of light and GDP. Even more interesting, Elvidge et al. (1997) show a strong correlation between the density of light at night and variables such as the provision of public goods, poverty rates and access to electricity. Moreover, they find that this correlation is even more important for low-income countries. As I will show below, the lack of a variable like this has restricted the analysis of some studies in developing countries to the use of a lower political-territorial division level as unit of measurement (using the states and not the municipalities of the countries, for example).

To address the second problem, I exploit the interaction of the FMLN vote share in 1994 in different areas of El Salvador with the predominant political ideology prior to the civil war (in a nonlinear specification), as a potentially exogenous determinant of political competition. I use this interaction because it is plausible that more electoral support to the FMLN in historically left-wing municipalities could harm the political competition, and could boost it in the right-wing ones³. I show that assignation of this interacted instrument is as good as random because it is not correlated with previous outcomes and its effects on current outcomes is robust when controlling for some plausible predetermined correlates. In particular, I strongly document that the first component of my instrument, the assignation of the FMLN electoral support across the country in 1994, only depended on the regional influence of socialist leaders (commonly religious leaders that embraced the Liberation Theology) who accidentally (or quasi-randomly) came to certain places and not to other ones⁴. I also show that my instrument has no effect on political competition prior to the institutionalization of the FMLN as political party in 1994, but it has a positive and strong effect now. This gives more credibility to the exclusion restriction.

In order to give more credibility to my results using the light density at night as my proxy for economic growth (or public good provision), I estimate the effect of political competition

³Given the great number of municipalities identified as right-wing previous to the war, as I will present in table 1, it is also plausible to think that in the second case, the FMLN effect could be positive up to some cutoff, in where its electoral support is so high that it begins to decrease the political competition. This is the reason why the interaction used as an instrument in the estimations will be specified in a nonlinear form.

⁴In this line, one of the two main examples that I present is the case of two similar neighbor municipalities in Morazán. The difference between these two regions is that to one of them has had the presence of a very influential socialist priest in the 70's. Now, this region exceeded by more than three times the neighbor's electoral support to the FMLN.

on other development outcomes related to health, education and public safety and show similar results. Furthermore, I give novel interaction effects of political competition on the above mentioned outcomes as I will explain later.

I estimate the effect of the political competition (measured as electoral margin) on economic growth in a cross-section of municipalities, using the last electoral period in El Salvador (2009-2012). I find that once I instrument for the political competition in different municipalities, an increment in 1% of political competition rises annual growth by 0.25% (approximately 0.75% in the full electoral period). The results, using my alternative outcomes to validate my main proxy of economic development, go in the same direction (but in different magnitudes). The results are also robust to adding a variety of controls.

As predicted by the model, the data also gives some evidence of the existence of interaction effects of political competition with exogenous income shocks. Municipalities that receive relatively little central funds transfers, do not react (or do react weakly) to political competition, while in municipalities where large amounts of financial resources are received, political competition has a strong effect on economic growth (and on the other alternative outcomes). This is consistent with my theoretical framework.

How is economic growth financed? To answer this I explore the effect of political competition on the administration of municipal finances. As expected, there is no effect neither on the central government funds received by the municipalities nor on the tax revenues (because both can be only modified by the Salvadoran Parliament), but there is a positive and strong effect on the probability of taking loans and, more weakly, on increasing revenues from municipality fees (both fixed by the local government of the municipality). I also find that the effect on the probability of borrowing depends on the political cycle.

I contribute to the following streams of literature. First, I contribute to the empirical literature examining the link between political competition and growth in a developing country context. However, none of this provides a causal effect of political competition on growth. For example, Ghosh (2010), using a panel data analysis for Indian states (which is the lowest political-territorial division level), explores the impact of political competition on state per capita income and growth, finding positive effects. However, this work uses a non-typical measure for political competition (the Herfindahl-Hirschman Index, a typical measure for market concentration) and this variable is not treated as endogenous. Dash & Mukherjee (2015), do a similar exercise using a panel data analysis, but this time examining the link between political competition and the Human Development Index (HDI) of the Indian states. They also find positive effects of political competition. Although these authors use a more accepted measure of political competition, they do not address endogeneity concerns.

Second, I contribute to the empirical literature that estimates a causal effect of political competition on economic growth. To my knowledge, there are only two works (in two coun-

tries) exploring a causal effect of political competition on economic performance, and both in developed countries. Besley et al. (2006, 2010) and Padovano & Ricciuti (2009) both exploit an exogenous federal government reform as a source of variation for political competition. However, these authors study countries with strong institutions, so I contribute to this stream of the literature giving a causal effect on a developing country context, which could give a better understanding of this effect in the basis of weak institutions, where adverse effects of political competition are more plausible.

Third, I also contribute to the theoretical literature that models the effect of political competition on economic performance. Besley et al. (2006, 2010) present a model in which politicians make promises about the policies that they will implement if they win the elections, and the electorate believes them. However, the assumption that politicians make credible promises is strong. I construct a theoretical model taking some ingredients of the Besley et al. (2006) model, and adapting them to a retrospective theoretical model, in which the electorate makes decisions according to the past performance of the politician, not according to promises. This model is more consistent with the idea of political competition as a mechanism of accountability to politicians, in where the past actions of politicians account to the electorate.

Finally, I contribute to the stream of literature in which the world of a median voter is ruled out (Gouveia & Masia, 1998; Brunner & Ross, 2010; Portmann & Stadelmann, 2013; among other works well detailed in Padovano, 2013). In my model, political offers matter. The electorate makes decisions according to the previous observed outcomes as a proxy of the future outcomes, so the policies implemented will not necessarily reflect the preferences of the median voter.

The paper is organized as follows. Section 2 briefly presents a theoretical model for framing the empirical analyses of the paper. Section 3 presents the data used in this paper. Section 4 describes the identification strategy. Section 5 presents the results of reduced form regressions using data on economic outcomes before and after the Salvadoran civil war. Section 6 presents estimates of political competition on development outcomes using a cross-section of the 2009-2012 electoral period. Section 7 presents estimates of interaction effects. Section 8 explores how political competition affects the fiscal decision of municipalities, and section 9 briefly concludes.

1.2 Theoretical Framework

In this section I develop a model that is an extension of the Holmstrom's career concerns model (Holmstrom, 1999). I include some ingredients of the Besley's political competition model (2010) in order to build a political competition indicator, then I adapt this indicator in a context where decisive voters (or swing voters) take into account the past to make decisions that will affect their future outcomes.

1.2.1 Setup

Consider a context of two periods: $t = 1, 2$. There are three types of voters: Leftists, Rightists, and Independents, denoted by $P \in \{L, R, 0\}$. Partisan voters (leftist and rightists) make up a fraction $1 - \sigma$ of the population. Only Leftists and Rightists are organized in parties, which are denoted by $p \in \{L, R\}$. Let $\delta(P, p)$ be the utility gain of a partisan voter P from having the political party p in office. Partisan types L and R will prefer their respective party because of noneconomic issues: they will always vote for their preferred party. So we could assume $\delta(L, R) = \delta(R, L) = 0$ and $\delta(R, R) = \delta(L, L) = 1$.

Of these committed voters, a fraction $(1 + \lambda)/2$ prefers party R (so, a fraction $(1 - \lambda)/2$ prefers party L). The sign of λ can be positive or negative, but to fix ideas in the model presentation we could let the Rightists have the edge among committed voters (this is, $\lambda > 0$). Independent voters ($P = 0$) vote primarily on economic issues and become swing voters. In the remainder of the model, we will assume that the Leftist party is the incumbent party (it could be the Rightist party as well).

For independent voters, the economic payoff of having party p in office depends on the public good (g_t) that it offers:

$$U_t = y(1 - \tau) + g_t + \gamma_t \quad (1.1)$$

Where y is the income of the independent voter and, for simplicity, τ is a fixed tax (to make sure that the only problem is how the tax revenue is spent). Moreover, γ_t is an aggregate popularity shock in favour of the Incumbent Party, and we will assume that this is realized after the incumbent finished his first period (in $t = 2$), so $\gamma_1 = 0$. Also, we will assume that politicians only know the distribution of γ_t , and not its realization.

We will assume that the technology for public good provision takes the form:

$$g_t = \eta(\tau\bar{y} - r_t) \quad (1.2)$$

Where \bar{y} is the average income and r_t is the rent that the incumbent politician extracts. We will assume that the politician could extract up to \bar{r} , and in the special case of the Incumbent politician, if he extracts $r_t = r$ in the first period and he is re-elected, he must extract at most r in the following period⁵. The parameter η will represent “help” that the Central Government gives to the Local Government. This comes to increase the efficiency in how politicians provide the public goods with the available resources. This variable will not depend on the government preferences; it will be exogenously determined by nature

⁵We will suppose that there is a punishment (a high cost) of extracting a higher rent in the second period if the Incumbent is re-elected. Although swing voters do not know the size of r_t a priori, if they observe that $g_{t+1} < g_t$, then they will know for sure that $r_{t+1} > r_t$, and because we also can suppose that they hate unjust enrichment, they will establish a punishment in order to avoid this behaviour.

every time that a new politician starts to govern the municipality⁶. Let us assume that it is drawn uniformly from the interval $[1 - 1/2\xi, 1 + 1/2\xi]$. We adopt the simplifying assumption of the Holmstrom model, that there is symmetric information, so both the politician and the voters are uncertain about η with the same prior.

The utility of the incumbent politician in the two period model is:

$$v_I = r_1 + P_I\beta(R + r_2) \quad (1.3)$$

With $0 < \beta < 1$ as the discount factor, and R is interpreted as non-pecuniary grants from being in power and P_I is the probability to win the re-election.

The timing of events could be as follows:

- Exogenous history events determines σ, λ , crucial parameters to define our competition index.
- Nature determines η .
- Now, knowing η , the politician on power chooses $r_1 = r$.
- Observing g_1 (but not r_1), voters decide whether to keep the politician. If they elect a new politician, he is drawn randomly from the same distribution. At this time, nature determines γ_2 that will affect the second period utility of the voters.
- The politician in power implements g_2 .

Given this structure, the equilibrium could be determined as follows.

1.2.2 Equilibrium

In the second period, the politician will set the maximum r_2 as he can⁷. So, the public good will be:

$$g_2 = \eta(\tau\bar{y} - r_2)$$

If the swing voters appoint a new politician, he will have $E(\eta) = 1$, so the expected utility of appointing a new politician for the voters is:

$$U_2^N = y(1 - \tau) + (E(\eta))(\tau\bar{y} - \bar{r}) = y(1 - \tau) + 1 \cdot (\tau\bar{y} - \bar{r}) \quad (1.4)$$

And the utility of keeping the incumbent would be:

$$U_2^I = y(1 - \tau) + \tilde{\eta}(\tau\bar{y} - r) + \gamma_2 \quad (1.5)$$

⁶For example, in El Salvador there is a monetary transfer that the Central Government gives to municipalities in order to improve their development through local public investment. This transfer is set in function of variables like the extension of the territory and the population size in 1992 on each municipality

⁷This could be a top r for the challenging politician (\bar{r}), and for the past assumption for the incumbent, $r_2 = r_1 = r$

Where $\tilde{\eta}$ is their posterior about the “help” that Central Government gave to the Incumbent politician, and γ_2 the aggregated popularity shock.

Now suppose that swing voters know that the politician will choose $r_1 = \tilde{r}$ amounts of rents for himself. Then they can estimate

$$\tilde{\eta} = \frac{g_1}{\tau\bar{y} - \tilde{r}} \quad (1.6)$$

Thus, using equations (1.4) and (1.5), we can obtain the condition in which a swing-voter casts her ballot for the Incumbent party. This is, when the voter’s utility of keeping the Incumbent is greater than the expected utility of appointing a new politician.

Condition 1 *A swing-voter casts her ballot for the Incumbent party whenever:*

$$\tilde{\eta}(\tau\bar{y} - r) + \gamma_2 \geq \tau\bar{y} - \tilde{r}$$

The problem is that \tilde{r} is an equilibrium choice by the politician. He will try to make this choice in order to ensure that he remains in power if this is beneficial for him. But, first, we will look at the probability that the swing voters vote in favor of the incumbent politician and, after, the probability that the incumbent keeps the power. Let q_I be the probability that a swing-voter casts her ballot for the incumbent party. This is:

$$q_I = \text{Prob}[\tilde{\eta}(\tau y - r) + \gamma_2 \geq \tau\bar{y} - \tilde{r}] \quad (1.7)$$

Taking into account the η distribution, we can reduce the equation (1.7) to result 1, which dictates the probability that a swing-voter casts her ballot for the incumbent party.

Result 1 *If Condition 1 holds and η is uniform on $[1 - 1/2\xi, 1 + 1/2\xi]$, the probability that a swing-voter casts her ballot for the incumbent party is given by:*

$$q_I = 1/2 + \xi \left[1 + \frac{(\gamma_2 - (\tau\bar{y} - \tilde{r}))(\tau y - \tilde{r})}{(\tau y - r)^2} \right]$$

Now, using all the parameterization, we can obtain the condition for an Incumbent electoral victory. Assuming an interior solution, it could be expressed as the following.

Condition 2 *There will be a Incumbent electoral victory if and only if:*

$$\sigma \left(\frac{1}{2} + \xi \left[1 + \frac{(\gamma_2 - (\tau\bar{y} - \tilde{r}))(\tau y - \tilde{r})}{(\tau y - r)^2} \right] \right) + (1 - \sigma) \left(\frac{1 - \lambda}{2} \right) \geq \frac{1}{2}$$

Alternatively, doing some math, Condition 2 can be rewritten as

$$\gamma_2 \geq -\frac{(\kappa + \xi)(\tau y - r)^2}{\xi(\tau y - \tilde{r})} + \tau \bar{y} - \bar{r}, \quad (1.8)$$

where $\kappa = -\frac{1-\sigma}{\sigma} \cdot \frac{\lambda}{2}$, and it will be our indicator of the municipality political competition⁸. We can see from this indicator that an increase in the value of λ (the margin between the two kinds of partisan voters), is translated in lower levels of competition, as we would expect. Also, a greater share of swing voters (σ) is associated to a greater level of competition.

From the Setup we have that politicians know the distribution of γ_t . So, to further simplify the algebra, let γ_2 be uniform on $[-1/2\theta, 1/2\theta]$. In this case, the probability of a Incumbent win simplifies to:

$$P_I = Prob[\gamma_2 \geq -\frac{(\kappa + \xi)(\tau y - r)^2}{\xi(\tau y - \tilde{r})} + \tau \bar{y} - \bar{r}] \quad (1.9)$$

Applying the distribution properties of γ_2 to equation (1.9), we obtain the result 2.

Result 2 *If Condition 2 holds and γ_2 is uniform on $[-1/2\theta, 1/2\theta]$, the probability of a Incumbent win is given by:*

$$P_I = \frac{1}{2} + \theta \left[\frac{(\kappa + \xi)(\tau y - r)^2}{\xi(\tau y - \tilde{r})} - (\tau \bar{y} - \bar{r}) \right]$$

Now, the incumbent politician will choose r to maximize (1.3), i.e.:

$$\max_r v_I = r + \left(\frac{1}{2} + \theta \left[\frac{(\kappa + \xi)(\tau y - r)^2}{\xi(\tau y - \tilde{r})} - (\tau \bar{y} - \bar{r}) \right] \right) \beta(R + r)$$

Where the first-order condition is:

$$1 + \beta \left(\frac{1}{2} + \theta \left[\frac{(\kappa + \xi)(\tau y - r)^2}{\xi(\tau y - \tilde{r})} - (\tau \bar{y} - \bar{r}) \right] \right) + \beta(R + r) (2\theta(\kappa + \xi) \frac{\tau y - r}{\xi(\tau y - \tilde{r})}) \cdot (-1) = 0 \quad (1.10)$$

Following Acemoglu (in his Political Economy Lecture Notes), equation (1.10) defines a best-response $r(\tilde{r})$ by the incumbent. When swing voters expect them to play \tilde{r} , he would play $r(\tilde{r})$. So, the equilibrium has to be a fixed point, $r(\tilde{r}) = \tilde{r}$. Substituting this into equation (1.10), we obtain the equation that defines the equilibrium.

Proposition 1 *In equilibrium, the incumbent politician extracts the rent given by:*

$$r = \frac{\alpha}{\kappa + \xi} + \frac{1}{3}\tau \bar{y} - \frac{2}{3}R$$

Where α is a positive constant or a combination of the given parameters ($\alpha = \frac{1}{3\beta\theta} + \frac{1}{6\theta} + \frac{\tau \bar{y} - \bar{r}}{3}$). And the politician keeps power with the probability given by P_I .

⁸this indicator is some kind of similar to this shown in Besley et al. (2010)

From the Proposition 1, we can represent this equilibrium in terms of the public good provision using the equation (1.2). This is:

$$g_1 = \left(\frac{2}{3}(R + \tau\bar{y}) - \frac{\alpha}{\kappa + \xi}\right)\eta \quad (1.11)$$

This last term allows us to study the effect of political competition on economic outcomes. These comparative static exercises are closely related to the empirical analysis in this paper, which uses a potentially valid source of exogenous variation of κ .

Corollary 1 *In equilibrium, for a given η , an increase in κ implies a great level in g_1 , the provision of public goods. The same implication is true with bigger levels of R , the non-pecuniary grants of being in power, and $\tau\bar{y}$, the fiscal collection.*

Although the Corollary 1 gives more than one prediction, the limitation of our data only allows us to test robustly the effect of political competition. However, it would be easy to see some correlations between tax collection and the provision of public goods.

Finally, Proposition 1 implicitly states that the response of the public good provision to an increase in the political competition κ depends on how big the Central Government help is. Corollary 2 states this result.

Corollary 2 *In equilibrium, the higher the Central Government help (η) is, the higher is the effect of political competition (κ) on the provision of public goods. The same is true for the non-pecuniary grants of being in power and for the fiscal collection.*

The predictions of Corollary 2 are quite intuitive. It could be expected that when politicians receive more financial aid to improve the provision of public goods, whether in terms of efficiency or quantity, politicians will have more leeway to respond to political competition. With this, we will test empirically the interaction effect predicted on political competition too.

1.3 Data

The starting point for collecting data for this work lies at the base of electoral statistics of the Supreme Electoral Tribunal (TSE) of El Salvador, hosted on the website www.tse.gob.sv. The data is presented at both national and municipal level, and it has the number of votes obtained by each political party in each of the 262 municipalities since 1994. In addition, the winner is presented as the party that won with simple majority. This dataset serves to estimate the measure of political competition in this work, which, as usual, is defined as the electoral advantage (or difference in votes) of the winner over the strongest opponent.

It should be noted that these datasets are very limited in the sense that the TSE has no variables available to the public such as the names of the candidates who competed in each

of the elections, and in many cases the name of the winning candidate at the municipal level is omitted. In some way, this restricts the analysis to investigate other possible effects of political competition in other variables of interest, such as the quality of the individual elected as mayor.

On the other hand, since no geocoded high resolution measures about the Salvadoran economic development at the municipal level are available (most likely because of the difficulty and costs involved), satellite data about the density of light at night is going to be used as a proxy for municipal economic activity (in line with Michalopoulos & Papaionnou (2014) and Henderson et al. (2009)).

The data on the density of light comes from the images reported by the “Defense Meteorological Satellite Program’s Operational Linescan System (DMSP-OLS)”, which are captured at night (between 8 PM and 9:30 PM) at a height of 830 km. The measure is a six bits digital number (0 -63) calculated for each “30-second output pixel” (approximately 0.86 square kilometers in the Equator) that is averaged with respect to the overlapping input pixels and with all of the valid nights in during the year. In this paper, the density of light is built at the municipal level averaging the pixels that lie within each of the boundaries of the country’s political division corresponding to the respective municipalities, which are georeferenced using the computer program ArcGIS.

In works such as Michalopoulos and Papaioannou (2014), Henderson et al. (2009), and Elvidge et al. (1997), it has been shown that the density of light at night does its job as a proxy of economic activity very well. The first one shows a positive correlation between the density of light at night and the GDP per capita in African countries, and a negative correlation with infant mortality to various African regions. Henderson et al. (2009), meanwhile, shows a strong correlation (intra-country) between the density of light and GDP. In the last 2 mentioned works, a strong correlation between the density of light at night and variables such as the provision of public goods, poverty rates and access to electricity is shown. This correlation is even more important for low-income countries (which comes to be the case of El Salvador).

Educational, health and security outcomes like morbidity attentions, grade repetition rates and murder rates, has been obtained in from the web pages of the Salvadoran public entities: Ministerio de Educación, Ministerio de Salud and Corte Suprema de Justicia. Some of this data was solicited to public servants of the respective Information Access Office wing.

To give more strength to the argument that light density at night does a good job as a proxy of economic activity in Salvadoran regions, figure 1 examines the relationship between the density of light at night and economic development (measured as Income and Income Per Capita) for 50 municipalities in El Salvador⁹. The R^2 is equal to 0.67 when the light at night is compared with the average municipality income, and it is 0.37 adjusting

⁹The 50 self-represented in the Multipurpose Household Survey from 2009.

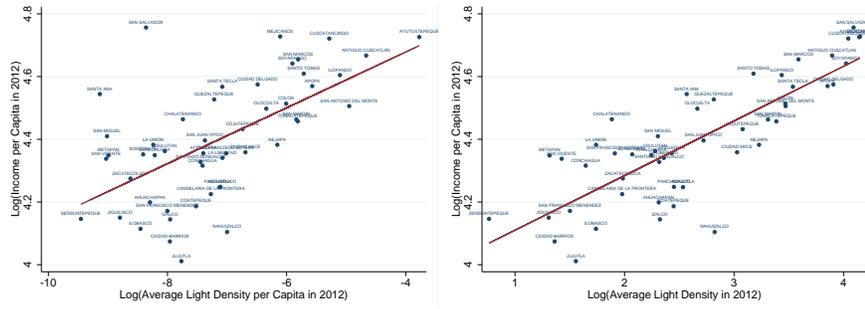


Figure 1.1: Light density at night vs. Income PC: El Salvador

the light at night by the municipality population. Clearly there is a positive correlation between the light density at night and income in Salvadoran regions, and this relationship is stronger not controlling by population (even stronger than that found by Michalopoulos and Papaioannou (2011) in African countries).

Table 1 presents the variables used, the source where each variable was collected, and the descriptive statistics of each variable. It is important to note the difference between the growth of 1992-1994 and 2009-2012. The reason for this is straightforward; the years 1992-1994 included the first electoral period after the civil war in El Salvador (synonym of high investment rates), while the 2009-2012 period covers the negative growth rates following the International Financial Crisis originated in the US in 2008. Another important observation is the high percentage of municipalities with rightist mayors before the Salvadoran civil war. Because I use this variable in order to build my instrument, it is worth mentioning that municipalities with leftist mayors will make a great effort in the identification strategy.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max	Source
Light Growth in 2009-2012	261	-0.01	0.01	0.30	-1.24	1.82	DMSP-OLS
Medical disease visits growth in 2009-2012	262	-0.08	-0.11	0.42	-0.86	4.41	MINSAL
Grade repetition rate growth in 2009-2012	262	0.01	0.01	0.02	-0.08	0.09	MINED
Homicide rate growth in 2009-2012	262	-0.30	-0.28	0.73	-3.43	1.95	FGR
Rightist municipalities in 1974	260	0.92	1.00	0.27	0.00	1.00	DIARIO OFICIAL
Log(Altitude of municipality)	261	6.68	6.73	0.65	3.04	7.74	http://www.diva-gis.org/
Parishes per 10K inhabs. in 1970	261	0.83	0.38	1.27	0.00	11.33	III ANUARIO ECLESIASTICO
Log(Population in 1960)	261	8.68	8.57	0.90	6.06	12.45	III CENSO NACIONAL DE POBLACION
Light Growth in 1992-1994	261	0.16	0.13	0.27	-0.98	1.92	DMSP-OLS
Political competition in 2009	262	-0.13	-0.10	0.14	-0.98	0.00	TSE
FMLN Votes Share 1994	262	0.17	0.14	0.13	0.00	0.87	TSE
FODES received in 2009-2012 (USD\$)	262	2905578	2465574	1706936	799992	11200000	ISDEM
FODES received in 2009-2012 pc (USD\$)	262	273.74	243.30	169.40	24.01	1335.16	ISDEM
Growth of FODES in 2009-2012	262	0.28	0.28	0.00	0.28	0.28	ISDEM
Growth of Municip. Taxes in 2009-2012	259	0.27	0.18	0.84	-3.70	3.28	MINISTERIO DE HACIENDA
Municipalities with Debt in 2009-2012	262	0.58	1.00	0.50	0.00	1.00	MINISTERIO DE HACIENDA
Growth of Municip. Fees in 2009-2012	262	0.40	0.35	0.47	-1.04	1.99	MINISTERIO DE HACIENDA

Note: Detailed definitions of each variable appear in the main text

1.4 Empirical Strategy

One major challenge for an empirical analysis of the relationship between electoral competition and development outcomes is the potential endogeneity of the electoral competition. In this section, I argue that the interaction of the former party FMLN vote share in 1994 and the previous to the civil war ideology allows me to identify the exogenous variation in the political competition in different municipalities.

I argue that simple OLS relation between political competition and development outcomes will produce downward biased estimates of the causal effect of the municipal political competition on development outcomes. The evidence shown in this paper goes in accordance with this idea, although the reasons may be many. One potential reason is that if Central Government tends to give more economic/financial help to local governments related to its party (municipalities with large support to the FMLN) in order to pay favors for the support (Lussier, 2003), a decrease would be expected in the effect of political competition over economic growth (by the implication of a dominant party that receives external help). Another potential reason is that political parties' elites could prefer to maintain control in municipalities with better economic performance, because these municipalities are more prone to growth, and this may be depressing political competition (reverse causality). Alternatively, OLS estimates could be biased upward if political competition responds to some unobserved characteristic (to the econometricians) of the municipality that has a positive effect on economic development.

My identification strategy exploits the interaction of the FMLN vote share in 1994 and previous to the civil war ideology in order to identify the exogenous variation in the political competition in an area, after controlling for parishes per capita, the (log of) territory latitude and the ideological historical preference of the municipalities for their mayors (the reasons for controlling by these variables are described below). The basic motivation for this identification strategy is straightforward. On the one hand, there are direct effects of the historical support for an important political party in the electoral competition, especially when this is a major political party. Also, as I will present later, the creation of the FMLN brought with itself a structural change in the electoral system of El Salvador with the reforming of some State Institutions, which implied big changes in the basis of electoral competition promotion.

Moreover, it is argued that the magnitude of the effect introduced by this political party in the electoral competition depends on if the municipality was previously characterized as leftist or rightist. Given that the FMLN entered as a new political force in 1994, it is expected that its electoral support positively affects the electoral competition in the historically more rightist municipalities. Also, continuing with this logic, it is expected an opposite effect on the historically leftist municipalities: more electoral support to the FMLN on historically leftist municipalities would harm the competition. In the first case, it

is plausible to think that the effect could be positive up to some cutoff, in which the FMLN electoral support is so high that it begins to decrease the competition. So, the interaction used as instrument in the estimations will be specified in a nonlinear form.

Why do I use the FMLN support and not another political party? The political support to the FMLN became so crucial because this leftist movement achieved something that no political party achieved before in all Salvadoran history: after competing for the political power in the fields and city streets via guns, it turned out to compete in the polls via votes. So, although there were leftist political parties involved in the electoral system before the civil war, the few resources they had and the repression that the military government exerted, prevented the strengthening of these movements (CEM & CIEP, 2009). The only one that reached to establish itself as a political force opposing the military government and winning the presidency in the 80's was the PDC (Partido Demócrata Cristiano). However, it was lately infiltrated by individuals related to military government and, at the end, saw its main leader in exile. All these events, combined with a higher support of the USSR via the Sandinist Government in Nicaragua to the leftist movements in El Salvador, were accumulated to the point that leftist people decided to consolidate a single guerrilla movement (the FMLN) and fight for the political power via war (Tejada, 2009). This armed conflict started in 1980 and finished in 1992 with the Peace Accords, after which the FMLN became a political party.

In addition to the creation of the FMLN as one of the major political parties after the civil war, there was a fundamental change in the Salvadoran Electoral System: an independent government agency responsible for the country's elections was created as the FMLN demanded. The extinct Central Election Council (known in Spanish for its acronym CCE) was responsible for the Salvadoran Electoral System before 1994, but it had lost credibility by being involved in some fraudulent cases and for not being independent of the central government (Turcios, 1997), so one condition to signing peace accords by the FMLN was the abolition of this entity and the creation of a new independent one: The Supreme Electoral Court (known in Spanish for its acronym TSE). Another condition imposed by the leftist party was the dissolution of the 'Guardia Nacional' (National Guard), a military government entity in charge of public security, accused of repressing and infringing people's Human Rights. This institution was substituted by the Civil National Police (known in Spanish for its acronym PNC), conformed by civilians. Overall, the idea of introducing all these changes was to create the basis for free competition and without state repression at the polls in the 1994 elections (the first elections in which the FMLN participated).

The electoral support to the FMLN varied widely across Salvadoran municipalities in these elections, with a minimum vote share of 0% and a maximum of 87% in the mayor elections. To answer what determined this wide variation is the goal of the remainder of this section.

In the first place, it is valid to ask if the main determinant of the electoral support to the FMLN was the presence of guerrilla groups across Salvadoran regions. According to an interview with the son of a former guerrilla leader, Mario Meléndez¹⁰, there were some determinant factors in how the guerrilla was established across the country's regions, like features of the terrain (those with mountains were more attractive), the historical support of people to the leftist cause and the intensity of the Catholic Church's influence with the liberation theology. Lately, it could be expected that this support to the guerrilla in each municipality was transformed into electoral support to the FMLN in 1994. I show some correlations in the appendix table A1, in which the dependent variable is only strongly correlated to the municipalities' ideology previous to the war (measured by a dummy equal to 1 if the municipality elected a rightist mayor in 1974). However, once I include these potentials determinants as controls in my next section's estimations I find that the instrument continues doing a good job.

Moreover, given that I find that, conditional on the geographic, political and religious characteristics of the municipalities, the constructed instrument is not correlated with other previous potential determinant outcomes, like the historical growth of municipalities or the previous political competition, it seems that its assignation is as good as random. But, where does this random assignment come from? I argue that the assignment came from "accidental" arrival of leftist (communists) leaders to certain regions in El Salvador, and that the influence of these leaders was the cause that raised the electoral support of these places to the FMLN.

One of the most emblematic cases regarding this argument is the (quasi random) arrival of the revolutionary leader Miguel Ventura to the north of Morazán in 1973 (Rubio & Balsebre, 2009). At present, the electoral support to the FMLN in this region is strong and unconditional.

Ventura came to the town of Torola as a father of the Catholic Church. According to an interview with him, his assignment to that place was not by his own choice, but by decision of the bishop of the diocese of San Miguel. This decision was not based on economic, social or political characteristics of the region to which he was assigned, but on the fact that the bishop wanted to isolate the momentum of the revolutionary ideas of the leader. "The aim of the bishop to send me to Torola was to isolate me, and perhaps banishing me in a very small country. According to the mentality of this bishop, ideas and beliefs about the structural changes needed in El Salvador could be eliminated or blocked by geographical exile", said Ventura in an interview with me.

However, it is plausible to think that an isolated region could have certain characteristics related to a political ideology, even without the arrival of a leftist leader. However, as I will show later, something that refutes this idea is that, when comparing two neighboring

¹⁰An former guerrilla leader who commanded the destruction of the Salvadoran Golden Gate

municipalities, similar in geographical, economic and social characteristics, but not in the influence received by Ventura, I find the municipality within the jurisdiction of Ventura developed a strong electoral support to the FMLN, while the electoral support of the other municipality has remained null.

The two municipalities mentioned above are Meanguera and Oscicala, two neighboring regions just separated by the Torola River. Hernández (2014) emphasizes how the influence of Catholic Social Teaching (through the Basic Ecclesial Communities led by Ventura in Morazán) reached Meanguera and not Oscicala. In fact, this author describes Oscicala as a historically conservative and conformist municipality regarding the election of their local representatives, where the people do not track the good or bad performance of elected mayors. Otherwise, he describes Meanguera as active in such political processes, attributing this to the influence of Ventura (through the CEB) as one of the most important determinants.

In terms of electoral support to the FMLN in the 1994 elections (the first political elections in which the FMLN participated), the FMLN vote's share in Meanguera was 61%, while in Oscicala was 0% (not a single vote!). On the other hand, the main rightist party won 15% of votes in Meanguera, while in Oscicala 66%. The same pattern could be found comparing other municipalities adjacent to the Ventura's parish jurisdiction, or doing the same analysis with the influence of other important leaders as in Tecoluca, Chalatenango and San Salvador, regions with great historical electoral support to the FMLN.

So, I exploit the exogenous variation generated by these events using the FMLN vote share in 1994 interacted with the ideology previous to the civil war as the main instrument for political competition in different areas after the war period. The motivation to use this interaction, as before mentioned, is straightforward too. It is expected that the influence of the leftist leaders will affect the political competition (through electoral support to the FMLN) of rightist municipalities in a different way that it would do it in the leftist ones: If there were so much rightist people in a municipality previous to the war, the introduction of a leftist leader would generate more competition. In the opposite case, leftist municipalities would see its competition contracted with the introduction of more leftist influence. My specifications, as mentioned previously, include nonlinear functions. The next section empirically studies the validity of this identification strategy.

1.5 Main Results

In this section, I present the results of regressions using information on economic growth from a cross-section of municipalities in the last electoral period. This approach has some advantages. First, I have detailed information on the degree of political competition in the municipalities where political parties compete. Second, I have a more direct measure of development outcomes (like health, educational and public safety variables), which allows me to estimate more precisely the effect of political competition on economic development.

Third, I am able to study whether the interaction effects predicted by the model are supported by the data. Thus, I estimate the impact of electoral competition on economic growth by running a regression of the form:

$$growth_i = \beta_1 \chi_i + Y_i' \beta_2 + M_i' \beta_3 + r_i + \epsilon_i \quad (1.12)$$

Where $growth_i$ is the economic growth¹¹ of municipality i (in the 2009-2012 electoral period), χ_i is our measure of political competition, Y_i is a vector including the religious, political and geographic controls mentioned above (previous to the war political ideology, maximum altitude and parishes per capita of municipalities), M_i is a vector including exogenous or historical variables (political participation of FMLN in 1994, (log of) population in 1960 or urbanization rate in 1960), r_i are regional fixed effects and ϵ_{1i} is the municipality-specific error term.

In line with the model presented in Section 2, I use the electoral winning margin in the recent elections as my measure of political competition (χ_i) at the municipality level. I estimate the last equation using the FMLN vote share in 1994 interacted with the previous to the civil war ideology of municipalities in a nonlinear form as my instrument for χ_i . In fact, the first stage of my identification strategy is given by:

$$\chi_i = Municip_ideology_70's_i \cdot f(FMLN_votes_share1994_i) + Y_i' \gamma_1 + M_i' \gamma_2 + r_i + \mu_i \quad (1.13)$$

Where, by the arguments exposed in the previous section, I assume a quadratic functional form for $f(\cdot)$. The variable $Municip_ideology_70's_i$ is a dummy that is equal 1 if the municipality had a rightist mayor previous to the Salvadoran war, and 0 in another case, $FMLN_votes_share1994_i$ is the electoral support to the FMLN in its first elections measured by the vote share that this political party obtained in every municipality i , and μ is the error term. The other vector variables are the same as in the second stage.

1.5.1 Economic growth regressions

OLS estimates

I first estimate equation (2.1) using the complete sample of municipalities in the 2009-2012 electoral period dataset. Table 2 presents OLS estimates. In this table, I first present a parsimonious representation of the regression without including controls. Next, I include municipality-level controls.

The OLS estimates in table 2 are always stable, positive and significant with the inclusion of a variety of controls. These results shed some light of the positive relation between

¹¹Or the growth of public goods outcomes, like education, health, and public safety outcomes.

Table 2: Growth vs competition (OLS regressions)
 Dependent variable: Growth (Light density)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Polit. Compet.	0.27** (0.11)	0.27** (0.13)	0.26** (0.11)	0.27** (0.11)	0.28** (0.11)	0.26** (0.12)	0.22* (0.13)	0.24* (0.13)
FMLN 1994		-0.02 (0.16)					-0.06 (0.17)	-0.07 (0.18)
Pre-Ideology			0.01 (0.04)				0.02 (0.05)	0.07 (0.05)
Log(Altitude of municipality)				0.07*** (0.02)			0* (0.00)	0.00 (0.00)
Parishes/10k inhab.					0.00 (0.01)		0.00 (0.01)	-0.01 (0.01)
Log(Population 1960)						0.02 (0.02)	0.01 (0.02)	0.01 (0.02)
Regional FE	No	No	No	No	No	No	No	Yes
R2	0.0158	0.0165	0.0147	0.0382	0.0167	0.0194	0.0264	0.1297
Obs	259	259	259	259	259	259	259	259

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

political competition and economic growth (or public good provision). The coefficient for the political competition variable suggest that an increase of one percent in the electoral competition (margin) in a municipality is associated with an increase in economic (light) growth of between 0.22 % and 0.28 % (these numbers encompass the three year -electoral period duration- growth, so it is equal to an annual growth between 0.07% and 9%).

All point estimates for other variables included in the regression are near zero, and none is statistically significant (except for altitude). This indicates, for example, that neither political-ideological characteristics nor religious features of municipalities influence economic growth. The same is true with demographic characteristics like the population size of the municipalities.

As I previously mentioned, I expect the OLS estimates to be downward biased for two main reasons. First, if Central Government tends to give more economic/financial help to local governments related to its party (municipalities with large support to the FMLN) in order to pay favors for the support (Lussier, 2003), a decrease would be expected in the effect of political competition over economic growth (by the implication of a dominant party in the place that receives external help). Second, if elite political parties prefer to maintain control in municipalities with better economic performance, this may depress political competition (reverse causality). In order to address this problem I then proceed to use the IV empirical strategy.

IV estimates: First Stage

To validate the identification strategy discussed in the previous section, first, I need to show that my instrument (the FMLN vote share in 1994 interacted with the ideology previous to the civil war in a nonlinear form) is strongly related to political competition after the

Table 3: Municipal level regressions electoral competition
Electoral win margin as dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)
Rightist municip.*FMLN Votes '94	1.74*** (0.61)	1.73*** (0.61)	1.76*** (0.61)	1.64*** (0.57)	1.67*** (0.58)	1.74*** (0.56)
Rightist municip.*FMLN Votes '94^2	-1.2*** (0.25)	-1.19*** (0.25)	-1.22*** (0.26)	-1.07*** (0.26)	-1.1*** (0.27)	-1.14*** (0.27)
FMLN Votes Share 1994	-1.23** (0.59)	-1.22** (0.59)	-1.25** (0.60)	-1.21** (0.56)	-1.24** (0.56)	-1.27** (0.54)
Rightist municipalities in 1974	-0.32** (0.16)	-0.31** (0.16)	-0.32** (0.16)	-0.29** (0.15)	-0.29* (0.15)	-0.3** (0.14)
Log(Altitude of municipality)		0.01 (0.01)			0.00 (0.01)	0.00 (0.01)
Parishes/10k inhab.			0.01 (0.01)		0.01 (0.01)	0.00 (0.00)
Log(Population in 1960)				0.02** (0.01)	0.02** (0.01)	0.02* (0.01)
Regional Fixed Effects	No	No	No	No	No	Yes
R2	0.2117	0.2127	0.2157	0.2316	0.2383	0.2512
Obs	259	259	259	259	259	259

*, **, ***, significant at 10%, 5% and 1%
Robust Standard Errors in parenthesis

creation of the FMLN, and, second, it is not related to previous political competition, neither to previous economic outcomes. This will give support to the argument that the arrival of the FMLN across Salvadoran regions was as good as random, and that it actually introduced changes in the political competition of the municipalities of the country.

So, I turn to estimate equation (2.2), where my instrument is represented by the following term $\text{Municip_ideology_70's} * f(\text{FMLN_votes_share1994})$. The functional form of $f(\cdot)$ I have argued that it is quadratic. The results are shown in Table 3, where the first two rows contain my excluded instruments (the interactions). Furthermore, I use the $\text{FMLN_votes_share1994}$ and the dummy $\text{Municip_ideology_70's}$ as included instruments in all my specifications to control by political ideology strength, as I will argue ahead. I show in every column of Table 3 that there is a strong relation between my instruments and political competition; the coefficients of my excluded instruments remain stable with the inclusions of the controls used in the previous estimations (columns 1 to 5), and also with the inclusion of regional fixed effects (column 6).

In the other hand, I test if the instrument is related to electoral competition before the creation of FMLN as political party (before the end of the war). In column (1) of Table 4 I present evidence that there is no effect of the instrument on the political competition previous to the end of the war. I also test if the instrument is related to previous (to the creation of the FMLN) economic outcomes, using two proxies for economic growth in two different previous periods. Column (2) uses the growth of light density at night in the last

Table 4: Municipal level regressions between the instruments and other outcomes
Multiple outcomes as dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)
	Polit. Compet. 1991	Light growth 1991-94	Urba. Rate growth 1930-60	Log (Agrarian workers pc 1970)	FMLN winnig probability in 2009	FMLN votes share in 2009
Rightist municip.*FMLN Votes '94	0.02 (0.31)	0.40 (0.62)	-0.31 (1.97)	-0.21 (1.21)	-0.88 (1.07)	-0.22 (.30)
Rightist municip.*FMLN Votes '94 ²	-0.20 (0.28)	-0.10 (0.46)	-0.33 (1.44)	0.23 (0.89)	0.48 (.79)	0.05 (.22)
FMLN Votes Share 1994	0.15 (0.23)	-0.56 (0.54)	0.71 (1.70)	-0.13 (1.05)	1.66* (.93)	0.87*** (.26)
Rightist municipalities in 1974	-0.00 (0.08)	-0.11 (0.17)	0.17 (0.55)	0.32 (0.34)	0.04 (.30)	-0.06 (.08)
Log(Altitude of municipality)	0.00 (0.02)	-0.03 (0.03)	-0.02 (0.09)	0.01 (0.06)	-0.02 (.05)	-0.02 (.01)
Parishes/10k inhab.	0.01 (0.01)	0.00 (0.01)	-0.01 (0.04)	-0.01 (0.03)	0.01 (.02)	-0.01 (.01)
Log(Population in 1960)	0.01 (0.01)	0.03 (0.02)	-0.04 (0.06)	0.77*** (0.04)	0.04 (.03)	0.02** (.01)
Regional Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.03	0.04	0.24	0.65	0.170	0.430
Obs	259	259	259	258	259	259

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

electoral period without the participation of the FMLN as a political party, and column (3) uses the urbanization rate growth in the period 1930-1960. It can be seen that the instrument is not correlated with any of these variables. Additionally, column (4) uses as a dependent variable the (log of) number of agrarian workers per capita at municipal level as a proxy of economic activity in 1970, when the Agricultural sector represented near 40% of GDP. Again, there is no correlation between the instrument and this variable.

One potential additional concern for my identification strategy is that my instrument may have affected economic outcomes through other channels than political competition. In this context, I study whether the political ideology (leftist or rightist) of the municipalities' mayors is correlated with my instrument. If this is the case, then an alternative explanation may be that the determinant of the growth of the municipality is explained by the political affiliation of governors. Using the FMLN's winning probability as a proxy of the municipality ideology, in the last two columns of table 4 I demonstrate that this variable is only (strongly) correlated with the electoral support that this political party had in its first political elections. Column (5) uses as dependent variable a dummy that is equal to 1 if the FMLN won the election in the 2009-2012 electoral period, and 0 in another case. Column (6) uses the electoral support (vote share) that the FMLN obtained in the same electoral period.

IV estimates: Second Stage

Table 5 presents IV estimates using the FMLN vote share in 1994 interacted with the ideology previous to the civil war in a nonlinear form as my instruments for political competition. As in the OLS estimations, I first present a parsimonious representation of the regression without including controls, and next I include municipality-level controls¹².

The IV estimates are larger than the OLS estimates as previously suggested. The IV estimates are always stable, positive and significant. These results corroborate that the effects of political competition on economic growth (or public good provision) are economically relevant, even more than the first suggestion of the OLS estimates. The coefficients in the first row imply that an increase of one percent in the electoral competition (margin) in a municipality causes an increase in economic growth ranging between 0.70% and 0.86% (equivalent to an annual growth of 0.23% to 0.29%).

The estimates of the effect of electoral competition on economic (light) growth are quite different to those found in previous studies for developed countries. In the US, Besley et al. (2010) found that an increase of 10% in political competition implies an increase of 0.5% in the annual economic growth, meanwhile Padovano & Ricciuti (2009) found that this increase in economic growth is near to 0.2%. These two estimates are very similar if I compare them to our coefficient of the last column of table 5, which indicates that an increase of 10% in political competition implies an increase of 2.3% in the annual economic growth of municipalities, more than four times the effect found in the US.

These results are in line with the idea presented in section 1: we could expect different results in countries with weaker institutions like El Salvador. Moreover, a greater coefficient in this developing country is consistent with the rationale that political competition could play a more important role as an accountability mechanism to the politicians when the judicial system is as poor as the country. So, in the US or Italy, more strong judicial institutions may bring down the relevance of political competition as an accountability mechanism and this could explain this difference.

To give more robustness to my IV results, I include additional controls to the equation (2.1) in table A2. The variables included are past economic growth, past (log of) light density and economic growth of neighbors (in an effort to control by some “overglow” effect, as suggested by Abraham et al., 2014). As we can see, the political competition coefficient remains stable along with the inclusion of all these variables. In column (1) I control by the economic growth in the recently prior electoral period (this coefficient has the expected

¹²In table A3 I include as control the quadratic form of the FMLN vote share in 1994, obtaining similar qualitative results in the Second Stage, but with a weaker First Stage. So I proceed to use my parsimonious specification without the inclusion of this term, arguing that the Sargan-Hansen test supports my specifications in Table 5.

Table 5: Growth vs competition (IV regressions)
 Dependent variable: Growth (Light density)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Second Stage						
Polit. Compet.	0.88*** (0.32)	0.81** (0.32)	0.88*** (0.32)	0.88** (0.36)	0.84** (0.36)	0.7** (0.35)
FMLN 1994	0.13 (0.20)	0.08 (0.20)	0.14 (0.21)	0.14 (0.22)	0.09 (0.22)	0.05 (0.22)
Pre-Ideology	-0.02 (0.05)	0 (0.05)	-0.02 (0.05)	-0.02 (0.05)	-0.01 (0.05)	0.04 (0.05)
Log(Altitude of municipality)		0.06** (0.03)			0.06** (0.03)	0.03 (0.03)
Parishes/10k inhab.			0 (0.01)		0 (0.01)	-0.02 (0.01)
Log(Population in 1960)				0 (0.03)	-0.01 (0.03)	0 (0.03)
Regional FE	No	No	No	No	No	Yes
Panel B: First Stage						
F-Stat. Exclud.	13.302	13.24	12.662	10.673	10.075	11.206
Sargan Stat. (p_val)	0.3386	0.3176	0.3387	0.3242	0.2867	0.4488
Obs	259	259	259	259	259	259

All regressions include all the controls used in table 4

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

sign), and I have a similar result when controlling by economic growth in an older electoral period. In Column (2) I control by an initial level of economic performance (log of light density in 2009), although not statistically significant, the sign obtained here goes against the convergence theory: Municipalities with more level of economic activity (measured by the light density) are growing more. My coefficient for the political competition also remains stable when I control for the neighbors growth in column (3). Finally, in column (4) I include all these variables at the same time, but the coefficient practically does not change. Overall, these results give more robustness to the ones in table 5.

Finally, as I previously introduced in the above subsection, one concern in my estimations is that my instrument affects economic growth via another channel rather than political competition. For example, it could be thought that my instrument affects the political ideology, and, at the same time, this political ideology affects the way in how politicians implement economic policies, observing different growth outcomes in different municipalities according to its ideology. I give more evidence that this is not the case in Table A4, in which I use the winning probability of FMLN as a proxy of the municipality ideology in the present. In column (1) I present the main result obtained in Table (5), and in column (2) I instrument the winning probability of FMLN with the same instruments. The coefficient of interest is not statistically significant, and the magnitude of the point estimate is because

the high correlation between this variable and the electoral support (or winning probability of FMLN in its first elections on 1994). When I exclude the FMLN electoral support in 1994 in column (3) in order to overcome this problem, the coefficient remains statistically insignificant and the point estimate falls to near zero. Furthermore, I show in Panel B that the only variable strongly explaining the actual political ideology of municipalities, is the FMLN electoral support in 1994 (as in Table 4).

In column (4), in a last intent to demonstrate that my identification strategy meets the exclusion restriction, I use the last result given by column (3) to instrument the actual political ideology of municipalities, and I use my interacted instrument (FMLN electoral support in 1994 and previous to the war ideology of municipalities in a nonlinear specification) to instrument the actual political competition. I find that the political competition coefficient remains practically similar and, again, the coefficient of the political ideology is not statistically significant and the point estimate is near zero.

1.5.2 Education, health and security outcomes regressions

In this subsection I estimate the impact of political competition in other outcomes of the municipality, in where the mayors have an important role providing public goods to improve them. The main variables included are related to public safety, education and health outcomes. I just proceed to show the IV estimates in table 6, although the general analysis against the OLS estimates remains similar.

In column (1) I present the same result obtained in column (6) of table 5, using the light density growth as a proxy of economic activity (or public good provision). Column (2), on the other hand, uses the homicide rate growth (in the 2009-2012 electoral period) as the dependent variable. The coefficient indicates that an increase of 10% in political competition, reduces in 6% the annual homicide rate of municipalities. Columns (3) and (4) uses the growth of children morbidity visits and the growth of the grade repetition rate in the same electoral period (2009-2012), respectively. The estimates have the expected sign, in the way that more political competition is associated with a decrease in morbidity levels and with a decrease of bad educational results, however, these estimates are less precise than the first ones.

The reason why just some coefficients are significant could be related to the importance or ranking that the local government gives to the provision of some public goods versus other ones, given the financial resources of the municipality. For example, violence is one of the most relevant problems in El Salvador, and one of the major topics ever discussed in the electoral campaigns. Also, public infrastructure (like roads, public markets and illumination at night, this last one related to the first problem too) is another leading issue

Table 6: Security, education, health and competition
 Dependent variables: Growth of light, homicide rate, children medical disease visits and grade repetition rate

	(1)	(2)	(3)	(4)
	Light-growth	Homicide rate	Children medical disease visits	Grade repetition rate
I. Second Stage				
Polit. Compet.	0.70**	-1.8*	-0.31	-0.02
	(.31)	(.92)	(.40)	(.04)
FMLN 1994	0.06	-0.49	-0.16	0.00
	(.20)	(.44)	(.20)	(.01)
Pre-Ideology	0.04	0.07	0.00	0.00
	(.05)	(.18)	(.09)	(.01)
Log(Altitude of municipality)	0.00	0.02	-0.03	0.00
	(.00)	(.07)	(.04)	(.00)
Parishes/10k inhab.	-0.02	0.06*	0.02	0
	(.01)	(.03)	(.02)	(.00)
Log(Population 1960)	0.00	-0.02	0.07*	0.00
	(.00)	(.06)	(.04)	(.00)
Regional FE	Yes	Yes	Yes	Yes
II. First Stage				
F-Stat. Exclud.	11.21	11.21	11.21	11.21
Sargan Stat. (p_value)	0.45	0.31	0.48	0.32
Obs	259	259	259	259

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

for the mayors, and it is plausible to think that the light density at night is more related to these kind of outcomes than those related to education or health.

Given this, and according to Corollary 2, I argument that it is only when local governments have a more relaxed budget constrain when they react more to political competition, in the way that politicians have more leeway to respond to this accountability mechanism, e.g., with greater investment in public projects related to development areas different to public safety or public infrastructure. I test this prediction in the following subsection.

1.5.3 Estimating interaction effects

In this subsection, I expand the previous analysis by studying one implication of the model in section 2, that there should be interaction effects. This is, municipalities response to exogenous changes in electoral competition depends on how much financial resources they receive from the Central Government. Corollary 2 predicts that the effect of political competition on the public good provision is smaller for municipalities that have low levels of external monetary transfers. If this is the case, local government could meet minimum budget constraints more easily, and it could be expected to see weak (or non) effects of political competition on economic outcomes (as in table 6). I test this prediction against the data using a proxy for financial external help received from the Central Government by the Local Government. I interpret these characteristics as the degree of softness of the municipality's budget constraints.

Table 7: Growth, education, health and competition
 Dependent variables: Growth of light, children medical disease visits, grade repetition rate and homicide rate

Growth of:	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	Light density at night		Homicide rate		Children medical disease visits		Grade repetition rate									
	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES
I. Second Stage																
Polit. Compet.	1.31**	0.55*	-2.96**	-0.82	-3.42***	0.25	-0.07***	0.01								
	(.52)	(0.30)	(1.30)	(.75)	(.87)	(0.25)	(.03)	(.05)								
FMLN 1994	0.21	0.01	-1.69**	0.27	0.46	-0.10	-0.02*	0.01								
	(.31)	(0.25)	(.70)	(.50)	(.43)	(0.18)	(.01)	(.02)								
Pre-Ideology	0.07	-0.09	-0.10	0.06	0.04	-0.09	-0.01*	-0.01								
	(.07)	(0.09)	(.20)	(.29)	(.13)	(0.10)	(.00)	(.02)								
Log(Altitude of municipality)	0	0.03	-0.05	0.02	-0.13*	0.00	0*	0.00								
	(.00)	(0.05)	(.10)	(.12)	(.07)	(0.05)	(.00)	(.00)								
Parishes/10k inhab.	-0.02	-0.02	0.08	0.03	0.16*	-0.01	0.00	0.00								
	(.03)	(0.01)	(.08)	(.03)	(.09)	(0.01)	(.00)	(.00)								
Log(Population 1960)	0	-0.02	0.02	-0.08	0.11*	0.01	0.00	0.00								
	(.00)	(0.06)	(.09)	(.12)	(.06)	(0.06)	(.00)	(.01)								
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes								
II. First Stage																
F-Stat. Exclud.	15.09	54.27	15.09	54.27	15.09	54.27	15.09	54.27								
Sargan Stat. (p_val)	0.6309	0.6034	0.6442	0.106	0.1143	0.3363	0.2194	0.1756								
Obs	130	129	130	129	130	129	130	129								

*, **, ***, significant at 10%, 5% and 1%
 Robust Standard Errors in parenthesis

Using this proxy, I study whether differences in these variable affects the response of municipalities to political competition. To do so, I split the sample in municipalities that received FODES (Central Government unconditional transfers) above and below the median. As introduced at the end of section 6, I expect the effect of political competition to be larger in the samples in which FODES are relatively big. I explore this in table 7

Table 7 uses the same variables as in table 6, but with two samples divided by the median FODES. I find that in the sample of municipalities with a FODES above the median, the effect of political competition on light, safety, health and education outcomes is economically and statistically significant¹³. But in the sample with low FODES, this coefficient is lower or near to zero. Hence, at first impression, these results give suggestive evidence of interaction effects¹⁴.

To control for potential selection bias in my previous estimates, I use the territorial size of municipalities to identify the variation in the FODES received by local governments. The “Ley de creación del FODES”, implemented in 1988 and last modified in 2014, established the size of the territorial extension of municipalities as one of the main determinants of the resources received by local governments from the central government. So, I study the effects

¹³The variables that were not statistically significant at the conventional levels in the previous section, they are now significant in the sample of municipalities with FODES above the median.

¹⁴Coefficients remain stable when I control for light growth in an additional effort to isolate potential income effects in Table A5 (results must be interpreted with caution because of growth endogeneity).

Table 8: Proxies for FODES received in Municipalities
 Marginal Probit Estimates
 Dependent variable: 1(municipality FODES>median)

	(1)	(2)
Log(Municipality Surface in km2)	1.27*** (0.15)	0.72*** (0.20)
FMLN 1994		-2.19* (1.23)
Pre-Ideology		-0.23 (0.62)
Log(Altitude of municipality)		-0.60*** (0.21)
Parishes/10k inhab.		0.06 (0.12)
Log(Population 1960)		1.84*** (0.28)
N	247	245
Pseudo R2	0.3526	0.5412

*, **, ***, significant at 10%, 5% and 1%
 Robust Standard Errors in parenthesis

of the territorial extension of municipalities on my proxy for the degree of softness of the municipality budget constraints in the context of a selection model of the form:

$$P_i = 1(\theta \text{territorykm}2_i + Y_i' \vartheta_3 + M_i' \vartheta_4 + r_i + \varepsilon_i) \quad (1.14)$$

Where P_i is an indicator function that takes a value of one if the municipality has a FODES transfer above the median, and $\text{territorykm}2_i$ is the (log of) the territorial extension of the municipalities in squared kilometers. I exclude this variable from equation (2.1) and include each variable separately, as well as the estimated inverse of the Mills ratio in equation (2.1). Table 8 presents my marginal probit estimates of equation (1.14), indicating in the first row that the territorial extension of municipalities play a important role in determining receiving more or less FODES.

Table 9 presents estimated interaction effects including selection correction. To make it easier to compare, the first 4 columns of table 9 include the same coefficients as in table 7, and in the last 4 columns I present the results with the selection correction. All regressions include the usual controls, but I omitted the coefficients to save space. Panel A includes the sample of municipalities receiving FODES above the median, and panel B includes municipalities below the median. Results in both cases are qualitatively similar. The coefficient of the Mills ratio is low and not statistically significant, giving evidence that the selection bias is not a big problem in these estimations.

Finally, in table 10 I present some exercises testing the equality of the coefficients of political competition on each subsample for the four outcomes considered. In columns (1),

Table 9: Growth, health, education and crime vs competition by central funds

Dependent variable: Growth (Light density)							
I. Second stage estimates without selection correction				II. Second stage estimates with selection correction			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Light at night	Homicide rate	Diseases atent.	Gr. Repetition	Light at night	Homicide rate	Diseases atent.	Gr. Repetition
Panel A: Municipalities With Above-Median FODES							
Competition	1.31**	-2.96**	-3.42***	-0.07***	1.34***	-2.70**	-3.34***
	(.52)	(1.30)	(.87)	(.03)	(.52)	(1.21)	(.82)
Mills ratio					0.02	-0.01	-0.10
					(.06)	(.22)	(.14)
N	130	130	130	130	130	130	130
Panel B: Municipalities With Below-Median FODES							
Competition	.55*	-0.82	0.25	0.01	.61*	-0.95	0.35
	(.30)	(.75)	(.25)	(.05)	(.32)	(.78)	(.30)
Mills ratio					0.00	0.00	0.00
					(.00)	(.00)	(.00)
N	129	129	129	129	129	129	129

*, **, ***, significant at 10%, 5% and 1%
 Robust Standard Errors in parenthesis
 All regressions include controls and fixed regional effects used in previous results.

(2) (3) I present these coefficients of each subsample and the differences between them, respectively. In column (4) I present the p_value of the test whether these differences are distinct from zero (a two-tailed test). Although I have low p-values (in squared brackets) for each difference in this column, I can not reject at the conventional levels for each variable that the difference between the coefficients of each subsamples is different from zero. However, assuming that the effect in the sample of municipalities with FODES above the median goes only in one direction in relation to municipalities with FODES below the median (this is, the effect of political competition is always greater in municipalities with big FODES than in municipalities with low FODES), I can run a one-tailed test. By doing this, I find that each of the differences between the coefficients of the two samples are statistical different at the conventional level (with p-values below 0.1).

Furthermore, in column (6) I show that, jointly, all coefficients' differences are different from zero (by testing the respective joint null hypothesis that the vector of the differences are distinct from the zero vector).

Table 10: Growth, health, education and crime vs competition by central funds
 Multiple growth outcomes coefficient and their differences between FODES samples

	Sample with:		Difference between coef.	P_value:		
	>50% FODES	<50% FODES		Two-tailed test	One-tailed test	H0: All Differences=0
Dependent variable:						
Light at night	1.31	0.55	0.76	[0.20]	[0.10]	[0.001]
	(.52)	(.30)	(0.60)			
Homicide rate	-2.96	-0.82	-2.14			
	(1.30)	(.75)	(1.50)			
Child Diseases atent.	-3.42	0.25	-3.66	[0.00]	[0.00]	
	(.87)	(.25)	(0.90)			
Grade Repet. Rate	-0.07	0.01	-0.09	[0.09]	[0.05]	
	(.03)	(.05)	(0.05)			
Obs.	130	129	-	-	-	-

Robust Standard Errors in parenthesis
 P_values in squared brackets

Overall, these results provide evidence that the proxy for the bindingness of the budget constraint affect the degree of response of municipalities to political competition, as predicted by the model, and support the existence of heterogeneous effects of political competition on municipalities. These results are hard to reconcile with alternative explanations for the positive effects of political competition.

1.6 The fiscal effects of political competition

Municipalities could not affect the FODES that they receive from the Central Government because it is fixed by Parliamentary Laws on exogenous municipalities characteristics, like the ones previously discussed. Here I explore the effects of political competition on other fiscal variables at the municipal level, in order to answer the question: Does political competition affect the way in how mayors obtain their financial resources? I study this in table 11.

Table 11: Municipality incomes and competition
Dependent variables: Growth of income taxes, income fees, FODES and Prob. Of borrowing

	(1)	(2)	(3)	(4)
	Prob. of borrow	Fees revenues	Tax revenues	FODES
I. Second Stage				
Polit. Compet.	1.29***	0.70	0.10	0.00
	(0.45)	(0.53)	(0.87)	(0.00)
II. First Stage				
F-Stat. Exclud.	11.21	11.21	11.14	11.21
Sargan Stat. (p_value)	0.47	0.22	0.54	0.27
Obs	259	259	256	259

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

All regressions include controls and fixed regional effects used in previous results. Not reported to save space.

In table 11, columns (1) and (2) include two variables that could be modifiable by mayors, and column (3) and (4) include another two variables that could not be altered by them. I expect to see zero effects in the last ones. Column (1) includes as dependent variable the probability of borrowing of the municipality, represented by a dummy that is equal to 1 if the mayor made a loan in its electoral period, and 0 in another case. I find a positive and significant effect of political competition on this probability of borrowing, giving evidence that mayors tend to search for money in competitive contexts. A less precise effect on municipal fees growth (column 2) is found, indicating that this is not the main funding source for more competitive municipalities. This difference between these two variables is potentially explained by the fact that the second variable affects directly to the electorate (translated to a political cost in the next election). As expected, I find no effects of political competition on FODES growth (column 4) neither on tax growth (column 3),

both established by the Salvadoran parliament. Both variables are different from the first two variables in the way that they are not able to be manipulated by the municipality.

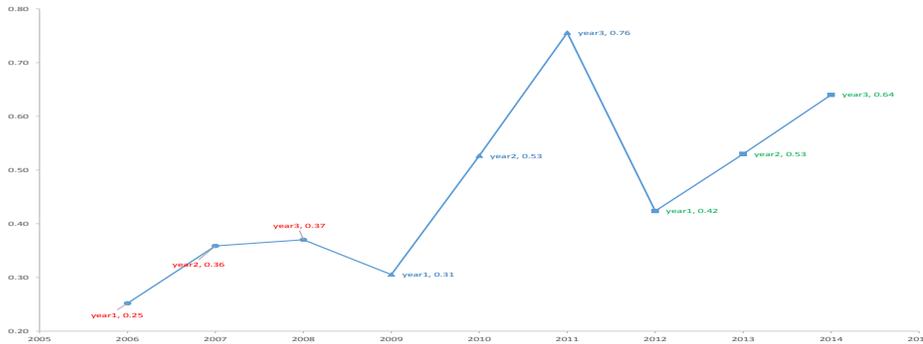


Figure 1.2: Municipal borrowing probability by political cycle year

Once I found that political competition affects the probability of borrowing in municipalities, it is valid to think whether the magnitude of this effect is the same along the 3-year electoral period of mayors. In figure 1.2, for example, I show that the fraction of municipalities incurring in some kind of financial obligation or debt increases monotonically as the next election date approaches, and this falls back again in the beginning of the new election period¹⁵. Particularly, this pattern is more evident in the 2009-2012 electoral period, years of the boom of a particular borrowing facility called ‘Titularizaciones’¹⁶. The boom was so high, that in 2013 the FMLN promoted in Parliament a bill that sought to impose limits on this type of debt (Mejía, 2013).

Having established that mayors borrow more in years closer to the elections, I explore in table 12 if mayors react more (with borrowing) to political competition according to the political cycle. Column (1) only includes the period of study of this paper (2009-2012), that coincides with the period of the boom of ‘Titularizaciones’. The political competition variable is interacted with dummies that represent years (establishing the first year as basis), and I find that in the second and third year, the probability of borrowing is higher than in the first year. Moreover, the effect on the probability of borrowing in the first year is negative, possibly indicating a strategic behavior of mayors in competitive municipalities:

¹⁵The differences between the ratios of the first and the last year in any electoral period are statistically significant.

¹⁶The ‘Titularización’ (Securitization in english) is a financial instrument through which public institutions can acquire debt giving as collateral assets or future income.

Table 12: Competition vs Municipality debt
 Dependent variable: Prob. Of borrowing

	Period of interest: 2009-2012	Last 2 periods: 2009- 2015	All periods: 2006- 2015
I. Second Stage Estimates			
Polit. Compet.	-1.11*	-0.27	-0.08
	(.59)	(.39)	(.29)
Polit. Compet. *2nd year	1.46*	0.34	0.25
	(.79)	(.56)	(.42)
Polit. Compet. * 3rd year	1.77**	.84*	0.49
	(.72)	(.51)	(.40)
II. First Stage			
F-Stat. Exclud.	20.65	43.99	69.05
Sargan Stat. (p_val)	0.7243	0.965	0.8195
Obs	777	777	777

Regular controls, regional and time fixed effects are included in all regressions. First year is set as base.

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

They tend to borrow in the last year to finance public projects in order to leave a fresh memory of their work on the electorate.

Column (2) includes the following period (but the cycle effect of political competition is lowered), maybe because the tensions arisen between the Local Governments and the Central Government explained above with the boom of ‘Titularizaciones’, or maybe because ‘titularizaciones’ at this time were so mainstream that non-competitive municipalities started to adopt the same strategic behavior of competitive municipalities. Column (3) includes the period before this boom, and the effect is reduced even more for obvious reasons. But, regardless the statistical significance, a pattern is observed in each sample: The effect of political competition in the probability of borrowing increases in the years closer to the mayor elections.

1.7 Concluding Comments

The potential effects of political competition on economic outcomes has been discussed for a long time, but just recently has a formal answer tried to be provided to the question of what effects to expect. My study on the context of the Salvadoran electoral system, which has experimented big structural changes after the civil war in 1992, can help us to better understand the effects of political competition on economic outcomes. Previous research has been underpinned to the institutional context of developed countries used to calculate the effect or has been stymied by endogeneity problems in developing countries. I argue that the interaction of the electoral support to a political party created after the Salvadoran civil war and the previous political ideology across regions, allows me to identify the effects of political competition on economic, health, safety and educational outcomes.

I document that my instrument is not correlated with economic outcomes or neither to political competition in the past (pre-war or war period) and is correlated with economic outcomes and political competition outcomes in the present (post-war period).

I find that once I instrument for the the interaction of the electoral support to a political party created after the Salvadoran civil war and the previous political ideology across Salvadoran municipalities, an additional increase by 10% in the political competition (this is, a 10% reduction on the winning electoral margin) increases the annual economic growth (or growth of public good provision) by 2.3%. The magnitude of this effect is quantitatively higher than these ones found in previous works for the US and Italy (the only ones that used a valid identification strategy), providing some evidence that in the context of a country with more weak institutions, the political competition as a mechanism of accountability to politicians does a greater job than in countries that probably have a better Judicial Institutions. I found that my results are robust even controlling by past economic performance of municipalities.

My estimates of the effects of political competition on economic outcomes are greater for municipalities that face less binding budget constraints, measured using as a proxy the monetary transfer that Central Government gives to the Local ones. So, municipalities with more available resources to public investment react more to political competition, as predicted by the theoretical model presented in this paper. So, instead of reducing the autonomy of municipalities in the way they manage their funds (like trying to limit the borrowing), a better policy could be to increase the monetary transfers from the Central Government to the Local Governments.

Finally, I found that politicians tend to react to political competition with debt rather than with increasing municipal fees or taxes, and that this behavior follows a pattern according to a political cycle: Politicians react to political competition borrowing more in years closer to the following elections, possibly to finance public projects in order to leave fresher positive memories of their management to the electorate.

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Chapter 2

Does population size matter? Scale effects on political competition

Abstract

I empirically examine the effect of population size on political competition. Using population size in the 19th century interacted with newly created municipalities as a potentially exogenous sources of variation of current size, I present empirical evidence that areas with a larger electorate are more likely to have more competitive elections at the municipal level in Brazil. In terms of mechanisms to explain this result, I find that there is more competition in terms of electoral campaign expenses in those more populated municipalities. This, together with evidence on total and average costs per voter, suggests that more populated districts allow politicians to pay the fixed costs of setting up a campaign in a particular area, i. e., although the entry costs to compete in larger populations are more expensive, there is a gain of efficiency in relation to the smaller ones: “to buy” a vote ends up costing less in larger districts. Finally, when extending my analysis to presidential and legislative elections, I provide suggestive evidence that the locality or regionalism of electoral markets may foster the scale effects on electoral competition.

Keywords: Political Competition, Electoral Campaign, Regional Government, Population Size, Scale Effects.

JEL Codes: D72, H76, N96, O18, R23.

2.1 Introduction

The question of how the size of political jurisdictions affects political economy variables has attracted academic interest in the past. Nonetheless, studies of the effect of size on political competition are scarce. Indeed, the literature has mainly focused on the effects of changes

in the size of the electorate on public policy outcomes, such as size of government spending (Husted and Kenny, 1997), composition of such expenditures (Lott and Kenny, 1999; Miller, 2008), and electoral support for the implementation of public policies (Bechtel et al, 2016). On the other hand, to the best of my knowledge, the only work that has formally analyzed the effect of size on electoral competition is by Dahl and Tufte (1973). However, as they claim, the lack of data makes their work more suggestive than definitive (Lewis, 2011). In this paper, I provide novel empirical evidence of a causal effect of population size on political competition for the case of Brazil.

Why would the size of the population matter for political competition? The reasons may be several. First, if there are efficiency effects in electoral campaigns, political parties will allocate their resources to those places where every penny gives them more returns, for example, in terms of votes¹. Thus, if a larger constituency implies economies of scale for political parties, they may be encouraged to compete more in these places versus smaller ones. Second, in line with Alesina and Spolaore (2003), large populations could include more types of interest groups (or less homogeneous populations) than in small populations, which could lead to the creation of new political parties or could lead to the existing ones to adapt their policy platforms to this more heterogeneous electorate². Finally, a complementary reason to the first one is that a number of people in each electoral district could be synonymous of potential income. In this sense, if political parties receive a monetary payment for each obtained vote, they would also have a clear incentive to orient their electoral campaigns in those places where the expected monetary payment is greater. This is the case for the country analyzed in this paper: Brazil.

This South American country is interesting for many reasons. It is a country that has undergone great electoral changes since its first democratic steps in 1932, which have been transcendental in promoting or undermining of the political competition of the country. Although Brazil returned to have a civilian president in 1985, after a long period of dictatorships and military regimes, it was finally until 1990 when the population directly and democratically elected a president. This was a turning point, in which the political parties changed their behavior in the electoral processes. Now the citizenship would matter again, and getting the most votes would be one of the main targets. From here, new political strategies were formulated so as to make use of electoral resources in the most efficient way. All this, combined with the constant reforms made by the Brazilian Electoral Justice to regulate the financial funding of political parties, have laid the foundations for a more competitive environment in the country³.

¹Colantoni, Levesque & Ordeshook (1975) and Brams & Davis (1974) provides theoretical evidence this is the case for the US presidential elections on the probability of winning.

²Although I do not directly test this hypothesis, I find that when controlling in my specifications by the number of contending candidates by municipality, my results remain similar.

³However, in line with Dolandeli (2015), although there is great progress in the development of Brazil's electoral system, it is still susceptible to anti-competitive practices by political parties.

I analyze the causal effect of the population size on political competition of the 2004 mayor's elections in Brazilian municipalities. Clearly, any empirical attempt to evaluate whether population size impacts political competition confronts the identification challenge of the endogeneity of the former variable (Bazzi & Clemens, 2010). In order to overcome this problem, I use an instrumental variables approach, in which I exploit the interaction between the population at the end of the 19th century and an indicative variable if the municipality was created in the 20th century as a potential source of exogenous variation for current population. I use this instrument because it is plausible to think that the historical settlement patterns explain the current settlement across the municipalities of Brazil (McCaa, 1997). However, the interaction of the instrument allows that the relationship between the ancient and the current settlement may be different depending on the territorial unit analyzed. In fact, I find that the relationship between the old and the present municipalities is stronger for the original municipalities of Brazil than for those that emerged after the nineteenth century⁴.

I use 2004 municipal election data because it contains disaggregated information of election campaign expenses at the municipal level. So, this allows me not just to analyze the political competition on votes, but to study mechanisms that could explain this result by exploring the behavior of political parties in the allocation of their budget over the municipalities within the country. I also use data for 2006 presidential and legislative elections, in order to extend my analysis to an electoral market that could be substantially different in the incentives that they provide to the contending politicians. I show that population size does matter for political competition. I find that an increase of 10% in the population size raises the political competition about 0.5% (implying a reduction of 0.3 standard deviations in the electoral win margin)⁵. My results remain robust controlling for a series of historical economic variables and other confounding factors, such as elevation, territorial area, distance to sea, light density at night, ratio of slave population, and immigration policies in the late 19th and early 20th century.

I also explore the effect of size on electoral campaign outcomes. I find that an increase in the population size raises not only the total campaign spending by political parties across Brazilian regions, but also the competition in this variable. This implies that the race between the politicians' spending in the electoral campaign tends to be closer (and less concentrated) in those regions with more population. In fact, an increase of 10% in the population size reduces the margin between the political parties campaign expenses by

⁴I argue that it will be a stronger relation between the old population size and the current population size of the former municipalities than that of new municipalities, because the later ones were generally made up by the population at the periphery territory of the first ones (not necessarily representing the real size of the former municipality).

⁵The political competition or the electoral margin is measured as the difference between the votes share of the larger political parties in each municipality.

.8%⁶. These results are in line with Casey (2015), who makes a first attempt to estimate a relationship between political competition (proxied as the differentials in the ethnic composition in Sierra Leone.) and campaign spending, finding a positive relationship. Finally, when extending my analysis to different electoral markets, I find that the effect over presidential elections is not so robust as in municipal elections and legislative elections. I argue that the main reason behind this result is because the locality of electoral markets plays an important role enhancing scale effects on political competition.

I contribute to the following streams of literature. First, I contribute to the literature on the effects of population size on political economy outcomes. To the best of my knowledge, there is no evidence that population size has a direct causal effect on political competition. In fact, my results may suggest that this is a potential mechanism behind the effects found in the previously mentioned papers that relate to electorate size and economic outcomes. An electoral district with more voters (and with more sectors or groups of interest within a population) could completely change the way in which politicians compete in comparison to a district with fewer voters, who would try to provide policy platforms that generate the greatest number of votes. For example, the introduction of the female vote cast in Lott and Kenny (1999) and Miller (2008), the approval of non-white voting rights reported in Kroth et al (2016), the elimination of voting taxes in the the work of Husted and Kenny (1997), or more educated voters (Besley et al 2006, 2010), would allow the entry of more (and different) agents to the electorate that, in the political model of Besley et al. (2010), would directly affect the variable “political competition” of the electoral system.

Second, I contribute to the literature on campaigning. Colantoni, Levesque & Ordeshook (1975) and Brams & Davis (1974) analyze how candidates should allocate campaign resources across regions to maximize their expected electoral vote. Although the rationale of both studies is different, they agree that there is a bias to allocate more resources in larger states⁷, which is in line with my empirical findings. Strömberg (2008) and Casey (2015), on the other hand, also discuss how campaign resources are allocated across regions, however, they focus on the effects of information availability to politicians and voters on campaign resources allocation.

Finally, my paper also relates to the parallel literatures on the optimal size of political districts in democracies (Dahl & Tufte, 1973, Oliver, 2000, Lassen & Serritzlew, 2011, Treisman, 2007, among others). Although I do not discuss issues of optimal population size⁸, I present empirical evidence that population size does matter for the quality of governments, taking into account that political competition is a mechanism of accountability for politi-

⁶This margin is measured in same way that the political competition index is measured, but using expenses instead of votes. I also use the HHI as a proxy of competition obtaining similar results.

⁷While the former authors propose a resource allocation proportional to the size of the electoral districts, the latter argue that the optimum is to do so disproportionately

⁸An idea that could be traced since ancient Greek philosophers Plato and Aristotle.

cians. Indeed, against the suggestive evidence provided by Dahl & Tufte (1973), I find that more populated areas are better off in terms of electoral competition.

The remainder of the paper is organized as follows. Section 2 briefly presents a description of the evolution of the electoral system in Brazil and the changes in the political-administrative divisions. Section 3 presents the data used in this paper and some descriptive statistics. Section 4 describes the identification strategy. Section 5 presents the main results of the effects of the size of population on political competition and, section 6, on other electoral outcomes. In section 7 extend the analysis to presidential and legislative elections, and section 8 briefly concludes.

2.2 Institutional and Historical Background

Brazil has the fourth largest electorate in the world (Dolandeli, 2015) and it is one of the most decentralized democratic countries (Finan & Ferraz, 2011). The process of decentralization dates from the colonial era, and although its causes are several, some ancient economic phenomena and predetermined geographic characteristics were the main determinants of the distribution of the population and local jurisdictions across the country. In this section, I address the main historical and current characteristics of the geographical and demographical context of Brazil relevant to my study. This will serve to introduce some important features of my identification strategy. Then, I briefly contextualize the evolution of the electoral system in Brazil in the last two decades, in order to have a big picture of how this system is currently regulated in terms of electoral campaigns and to understand its relevance to my investigation.

2.2.1 Geo-demographic Context

The political-administrative division of Brazil was historically been built from the time America began to be occupied by the Iberian nations. Currently, Brazil is a Federative Republic composed of 26 states plus the Federal District and more than 5500 municipalities. Its government system was adopted in 1889, with the proclamation of the Brazilian Republic, transforming the provinces into states (Andrade, 2003).

The first internal division of Brazil was created between 1534 and 1536, with 14 hereditary captaincies, added to the first captaincy of Fernão de Noronha. The captains who were in charge of these territories were financially responsible for the colonizing enterprise. Among their duties was the administrative function of the military government, since these individuals were the representatives of the royal power in that specific territory. In addition, they were responsible for providing public security for the land under their jurisdiction (Guerra, 2011). Additionally, the captaincies were financed in different ways, from the plot of exploited land to a percentage of the income tax paid to the Crown (Saldanha, 2001).

In 1549, when one captaincy returned under the rule and custody of the Crown (The Bay of All Saints), the King decided to use this event to establish the General Government of Brazil, emphasizing the intention to centralize the administration of the colony by the Crown. This was achieved until the middle of the eighteenth century, with the extinction of all hereditary military governments (Guerra, 2011).

Although Brazil's largest political-administrative divisions did not undergo major transformations, there were changes at a local level. Settler organizations (called "Campamentos" or Camps), as they developed economically, gained population contributions and they emancipated themselves from other older and more developed 'cores', assuming their own administration in matters of civil, military and religious order⁹. According to Martine and McGranahan (2010), the distribution and separation of these population centers along the Brazilian coast and towards the Amazon depended on the economic cycles experienced by the exploited products, depending, for example, on fluctuations in the international market. As these economic cycles started changing the geographic axis of production in the country, the creation of new towns and regional segmentation were triggered. Most of the labor force left behind after a given cycle ended eventually turned to subsistence agriculture, leading to the progressive growth of the "minifundios" or smallholdings (Martine and McGranahan, 2010).

With the declaration of Independence of Brazil, in 1822, there were no major changes in the country's administrative-political divisions. The old Royal Captaincies were transformed into Provinces of the Empire of Brazil, basically inheriting the geographical delimitations of the former. However, some Royal Captaincies merged to form a larger Captaincy, as was the case of the Bay Captaincy. After, with the proclamation of the Republic in 1889, the 20 provinces that counted as the Empire of Brazil became States, maintaining the same territorial boundaries. One reason motivating this new government system was to put a stop to the independence movements of the Brazilian regions by granting more political power to the regional politicians. The foundations for subdivisions within states were also issued, in particular for municipalities.

In 1872, there were about 600 municipalities in Brazil, a figure that has increased ten-fold to date. There is suggestive evidence that the main reasons for the emancipation of municipalities (creation of new ones) were geographic issues, which isolated populations within certain municipalities. Bremaeker (1993), for example, documents through a sample of surveys made to mayors of municipalities that were created during the 1980s, that the main reasons why municipalities 'split'¹⁰ was due to the costs of communication between

⁹The Camps, at first, were elevated to a division of Parrish. Then, the Parrish was elevated to the rank of Town when a municipal council was created and installed. Administrative terms did not vary much when a Town was elevated to a City.

¹⁰Referring to the emancipation of new municipalities. I will use the words split and emancipation interchangeably.

the towns and the municipalities' center, due to geographic characteristics. In fact, when analyzing the total splits of two early neighboring municipalities ¹¹- Rio Pardo and Grão Mogól - we can see in the left panel of figure 1, that the former municipality of Rio Pardo had more streams in its territory than Grão Mogól (specifically, measuring the length of all the rivers, Rio Pardo had 2.3 times the total length of the rivers of Grão Mogól). Over time, even when Rio Pardo had slightly less population than Grão Mogól, we can see in the right panel of figure 1 that the former municipality experienced more emancipations than the latter (28 versus 12 new municipalities), plausibly because of the cost of communication between the towns due to geographical features.

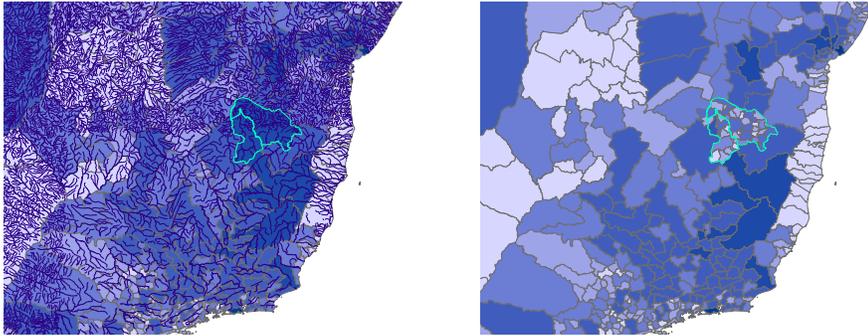


Figure 2.1: Early municipalities' total emancipations versus their geographical features

The above analysis is consistent with Hoxby's (2000) findings for the US counties¹². Indeed, when I analyze the correlation between the number of streams within the territory of the early municipalities of Brazil and the current size of population per municipality, I find that the more the geographical features are within a specific territory, the greater the administrative-political divisions and the smaller the population contained within them. Hoxby's (2000) argument is that those municipalities that had more accessibility through communication between different places did not need to create new administrative agencies of local governments in order to avoid these travel costs for their inhabitants, whereas those places of difficult access, required a new administrative agency for each population mass.

Bremaeker (1993) points out that these costs of communication between the isolated towns and their municipal centers (given mainly by geographic characteristics of the territory) were those that led to the emancipation of a large number of municipalities throughout the twentieth century. Other authors, such as Cigolini (1999) and Lima (2000), argue that

¹¹Which were similar in the total population in 1872, among other characteristics because of the geographical proximity

¹²Hoxby (2000) use the streams to identify natural differences in areas' propensity to have numerous school districts

the divisions were due to political strategies, taking advantage of timing in law changes that regulates the territorial division of municipalities¹³. The last reform of a constitutional law regarding the divisions of the municipalities was in 1988, where for the first time a municipality was considered as a federative entity (Meirelles, 1993). Since 1988, the Federative States are in charge of legislating the minimum requirements for the emancipations of new municipalities. Since then, more than 1,500 new municipalities have been created in Brazil.

2.2.2 Political Context

Since the creation of Brazil's first electoral code in 1932, the country's electoral system has undergone many changes. After a long period of dictatorships and military regimes, Brazil reinstated its democracy, with the Supreme Electoral Tribunal (TSE, for its acronym in Portuguese) being the institution in charge of its supervision. The present Brazilian election system was mainly established with the publication of the 1988 Constitution, and, since 1990, election frequency is every four years for executive and legislative powers¹⁴ (Moraes, 2012). All electoral dates and rules are determined by the TSE, an autonomous institution.

Among the functions assigned to the TSE, one is to regulate political parties' financing, regulations that have become conservative or liberal through time (depending on the active government regime), but which are still subject to criticism by the academic literature (Souza, 2009). Thus, although the TSE has improved in certain areas in order to strengthen the country's democracy, such as guaranteeing universal suffrage and increasing electoral participation through the use of electronic voting machines, problems of financial influence and abuse of economic power by political parties still persists (Souza, 2009). According to Sadek (1995), the struggle against these problems represents one of TSE's challenges, especially because of the difficulties in properly monitoring all of the politicians' financial reports.

Therefore, although there may be equality in access to voter participation, there is still a need to improve equality among political competitors, where each candidate is given a fair chance to participate in an election (Souza, 2009). This is one of the reasons that makes Brazilian electoral rules constantly subject to reforms; one of the most important reforms being a law enacted at the end of the last century. This law is "Lei No. 9,504 / 97", which, in order to provide more transparency to the politicians' financing sources, it obliges candidates who ran for whichever election to present their campaign expense accounts. In particular, according to articles 28 to 32 of this law, it is stipulated that "candidates, political parties, and financial committees shall be accountable to the Electoral Justice,

¹³In my estimations, in fact, I control for fixed effect time of the decade in which the new municipalities were created, since the number has not been uniform across the time

¹⁴Although the political cycle of Municipalities' mayors has the same duration at the presidential and municipal level, the starting point is not the same. There is a gap of two years.

within its sphere of competence (national, state or municipal) up to the thirtieth day after the end of the elections”. And, through the access to public information law in Brazil, any citizen of the country has the right to receive this information¹⁵. The availability in data is one of the fundamental reasons why this paper analyzes the 2004 elections.

2.3 Data

The data for this research comes from diverse sources of Brazilian organisms and other external sources. The electoral data was obtained from the statistics and electoral records of the TSE, available on its website <http://www.tse.jus.br>. The data are presented at both national and municipal levels, but the electoral results at the municipal level have been presented as of 1994, and the campaign expenses since 2004. This dataset serves to estimate the measure of political competition for this research, which, as usual, is defined as the electoral advantage of the politician with more votes over the strongest opponent. I use the registered electorate by municipality (and census population by municipality) to measure the size of the population within the district.

Additionally, I use data from the records of the Brazilian Institute of Geography and Statistics (IBGE, by its acronym in Portuguese). First, I use statistics from population censuses in the late nineteenth century. Specifically, in order to construct my instrument for the municipalities’ current population in Brazil, I use the 1872 census to estimate the population at the municipal level at that time, a census that took place more than half a century before Brazil’s first democratization steps. This will help to avoid problems of reverse causality regarding political competition towards the size of the population¹⁶.

I also use the IBGE database to build a dataset of municipalities that were created during the 20th century. At the end of the 19th century, Brazil had about 600 municipalities, a number that has increased to nearly 6000 at the end of the 20th century. The majority of emancipations, as documented in Brazilian government laws¹⁷, were generally due to exogenous causes, which involved communication or travel costs among the populations belonging to the same municipality. As previously mentioned, this is consistent with some previous findings, such as those on Hoxby (2000).

I use both the IBGE dataset and the Pesquisa Econômica Aplicada (IPEA) dataset to control for a variety of potential confounding variables in my estimations. On the other hand, since no geocoded high resolution measures are available regarding the current Brazilian economic development at the municipal level (most likely because of the difficulty and

¹⁵In fact, the TSE has this information in a digital format as of 2004 for municipal elections, and for the Presidential elections starting in 2002.

¹⁶It could be valid to think that those more (or less) competitive places, if at the same time are generating better (worse) economic results, as the literature suggests, it could encourage people’s migration towards them, and therefore, to increase population size.

¹⁷like the Art 8., Lei Complementar N° 1, De 9 De Novembro De 1967

costs involved in collecting this data or because it is very noisy in the developing countries), satellite data concerning the density of light at night is going to be used as a proxy for municipal economic activity (in line with Michalopoulos & Papaionnou (2010) and Henderson et al. (2009))¹⁸.

Table 1 presents the variables used, the source from where each variable was collected, and the descriptive statistics for each variable. It is important to note the high percentage of new municipalities, in line with the small number of municipalities in the early stages of Brazil as a country. Due to the fact that I use this variable in order to build my instrument, it is worth mentioning that early municipalities will make a great effort in the identification strategy. It is also worth mentioning that the ‘early settlements’ variable is a variable extracted from Ferraz et al (2016). It represents a dummy variable indicating if a municipality was subject to the state-sponsored settlement policy that attracted immigrants with higher levels of schooling to particular regions of Brazil in the late 19th and early 20th century. They represent just .5% of the total of current municipalities, but the 5.5% of the municipalities of 19th century.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max	Source
Political competition in 2004 (mayors)	5382	0.141	0.103	0.134	0.000	0.988	TSE
Political competition in 2006 (diputies)	5504	0.144	0.108	0.127	0.000	0.786	TSE
Political competition in 2006 (presidential)	5501	0.298	0.269	0.200	0.000	0.890	TSE
Log(Electorate in 2004)	5502	9.060	8.933	1.068	6.726	15.866	TSE and IPEA
Log(Electorate in 2006)	5502	9.060	8.933	1.068	6.726	15.866	TSE and IPEA
Mayor belongs to one of the 3 biggest polit. Parties (96)	5507	0.574	1.000	0.391	0.000	1.000	TSE
Log(Population at the end of the XIX century)	617	9.343	9.370	0.809	6.775	12.524	Population Census of 1872
Municipalities born in XX century	5509	0.888	1.000	0.316	0.000	1.000	IBGE
Log(Latitude of municipality)	5506	5.781	6.060	1.003	-0.022	7.373	http://www.diva-gis.org/
Log(Territorial area in KM2)	5508	6.009	5.996	1.790	-6.215	11.981	http://www.diva-gis.org/
Log(Distance to sea)	5509	5.317	5.523	1.187	1.031	7.897	http://www.diva-gis.org/
Ratio of slave population in XIX	3405	0.126	0.100	0.088	0.001	0.574	IPEA
Municipalities of early settlements	5507	0.005	0.000	0.067	0.000	1.000	Ferraz et al (2016)
Log(light at night PC in 1992)	4488	-4.014	-3.643	1.546	-10.335	-0.183	DMSP-OLS
Log(Total electoral campaign expenses)	5432	12.573	12.468	1.194	7.601	21.824	TSE
Competition index of electoral campaign expenses	5182	0.494	0.446	0.335	0.000	1.000	TSE
Herfindahl index of electoral campaign expenses	5432	0.492	0.500	0.161	0.133	1.000	TSE

Note: Detailed definitions of each variable appear in the main text

2.4 Empirical Strategy

The main challenge for an empirical analysis of causal effect of the size of population on electoral competition is the potential endogeneity of the size of population. In this section, I argue that using an instrumental variable (the interaction between the population size of

¹⁸The data on the density of light comes from the images reported by the “Defense Meteorological Satellite Program’s Operational Linescan System (DMSP-OLS)”, which is captured at night (between 8 PM and 9:30 PM) at a height of 830 km. The measure is a six bit digital number (0 -63) calculated for each “30-second output pixel” (approximately 0.86 square kilometers in the Equator) that is averaged with respect to the overlapping input pixels and with all of the valid nights during the year.

municipalities at the end of the 19th century and a dummy variable indicating if a municipality was created before or after the 20th century) allows me to identify the exogenous variation in the current size of population in different municipalities.

I argue that simple OLS regression between population size and political competition will produce downward biased estimates of the causal effect of the first variable over the second. The evidence shown in this paper goes in consonance with this idea, although the reasons may be many. One potential reason is that if Central Government is biased to give more economic/financial help to local governments related or aligned to its party in those more competitive municipalities (with larger populations) in order to increase the popularity of their party, a decrease would be expected in the effect of population over political competition. Another potential reason is that political parties elites could prefer to maintain control in municipalities with better economic performance, and this performance could be attracting more people to live at these municipalities, so, less competitive municipalities (or with political elites) could be growing more in terms of population. Also, people would like to emigrate to municipalities which might adjust better to their own preferences (political preferences, for example) decreasing political competition. Alternatively, OLS estimates could be biased upward if the size of population responds to some unobserved characteristics (to the econometricians) of the municipality that have a positive effect on political competition.

My identification strategy exploits the interaction between the population size of municipalities at the end of the 19th century and a dummy variable indicating if a municipality was created before or after the 20th century to identify the exogenous variation in the size of population in the Brazilian regions, after controlling for a set of variables, like the (log of) distance to the sea, the (log of) slave population, the (log of) light density at night, the (log of) territory latitude, ideological historical preferences of the municipalities, regional fixed effects, and year (of the 'split' of the new municipalities) fixed effects. The reasons for controlling by these variables are several. First, I control for the municipalities' distance to the sea in order to isolate previous economic outcomes that shaped the first population's settlement and could be affecting the political competition today, and it is well documented that geography is a powerful determinant of regional development via bilateral trade (Hans Linneman, 1966, Frankel et al., 1995, and Frankel, 1997, Romer and Frankel, 1999). So, if the favorable location of some municipalities determined some variation of the population across Brazilian territory, I expect to solve this problem controlling by this variable¹⁹.

In addition, I control for the density of slaves across municipalities because it is well documented that these regions with higher ratios of slave population were more economically active (mainly in agriculture) during the colonial and post-colonial periods. Also, according

¹⁹I also control for some other geographic characteristics, like the type of soils and the territory latitude in order to isolate other possible determinants of economic activity. My results remain similar, but I do not show the results in order to save space.

to Young (1994) and Acemoglu et al (2001), this variable could be a proxy of the persistence of the extractive institutions long after the colonial regime ended. Hence, controlling for this variable may help to exclude some possible effect of population on political competition through institutions. I also include the light density at night variable to control for recent economic activities that could be driving population movements. However, this control could be a bad control, and therefore it should be interpreted with caution. Finally, I control for dummy variable indicating if a municipality was emancipated after the 19th century.

The basic motivation for this identification strategy is straightforward. On the one hand, there are direct effects of the historical population settlements on the distribution of the population across a country. However, I argue that the magnitude of the effect of the size of the early population across the Brazilian territory on the current size of population depends on if the municipality was a “core municipality” or not. I refer to a core municipality to those early municipalities that existed before the 20th century (around 600 jurisdictions). There will be a stronger relation between the old population size and the current population size on those core municipalities than with those municipalities created afterwards (“emancipated municipalities”), because the latter generally originated from the population at the periphery territory of the former²⁰. So, the fragmented population of the new municipalities will not necessarily represent the real (or proportional) size of the former municipality.

I will have two excluded instruments in my specification. The population in 1872 and the interaction of this variable with a dummy indicating if the municipality is a core municipality or not. Population has been used as an instrument variable in several studies. For example, Frankel and Romer, (1999) and Frankel and Rose (2002) used it as an instrument for trade as a determinant of the level of income per capita. Spolaore and Wacziarg (2005) also use population as an instrument for trade, but as a determinant of economic growth. Djankov, Montalvo and Reynal-Querol (2008), on the other hand, use population size as an instrument to identify the effect of foreign aid on democracy.

However, one criticism of these studies is that the population variable is not exogenous and could violate the restriction of exclusion when used as an instrument. For this reason, different to these studies, I do not use the current or recent population as an instrumental variable. In fact, I use the population in the late nineteenth century to explain the current population. Obviously, this early population may also suffer the same criticism from the

²⁰For the reasons mentioned in the previous section, some populations inside the same municipalities were very bad connected to the town of the municipality because of some geographical features, like bodies of water or mountains. In fact, natural accidents were one of the main determinants establishing territorial limits. According to The Brazilian Law that creates new Municipalities, it will define its limits according to geodetic lines between well-identified points or following natural accidents (Art 8., Lei Complementar N° 1, De 9 De Novembro De 1967)

other studies. Therefore, in order to validate my exclusion restriction, I first control by the set of instruments previously mentioned. For example, to exclude the effect of the early population on competition through economic development, I control for old and current economic development proxies variables, finding that the effect of current population on competition remains stable before and after the inclusion of these variables.

Second, regarding the exogenous variation of the population, I argue that this is obtained conditionally in some predetermined variables. When examining the population density of Brazil across its territory, it can be seen that this is concentrated along the coast of the country, which should be explained because of the resource exploitation strategy of the Portuguese colonizers (Martine and McGranahan, 2010; Martine and Diniz, 1997; Martine, 1990). In fact, Frei Vicente of Salvador, a Franciscan scholar of the time, said that the Portuguese colonists were like “crabs scratching on the coastline” (Diniz, 2005). The exploited wealth was mostly agricultural and mineral. However, Martine and McGranahan (2010) document that the distribution of the population outside the main ports and the main points of exploitation (this refers to other places along the coast or near the Amazon Forest) depended on the economic cycles experienced by the exploited products, depending, for example, on fluctuations in the international market. As they posit: “Each new economic cycle led to flourishing towns in some limited part of the country’s extensive coastline. Leading the drive towards the interior, these towns and cities were closely linked to the motherland but isolated from one another.”

Thus, it can be argued that the way in which the population of Brazil is distributed along the territory, conditional on certain variables such as the distance to the coast or territorial/wealth characteristics of the country, depends on the external phenomena of that period (colonial and recent post-colonial period), such as the shocks in the prices of the products exploited by Brazilians in the past. This shocks encouraged the colonizers to emigrate to the non-populated territories to exploit them with at least subsistence agriculture, creating the first “minifundios” of that time (Martine and McGranahan, 2010).

2.5 Main Results

In this section, I present the results of regressions using data on political competition from a cross-section of municipalities in the first electoral period in the democratic era of Brazil for which the data is available. This approach has some advantages. First, I have detailed information on the size of population and electorate for each municipality (since 1872). Second, I have data on the degree of electoral competition in the municipalities where politicians and political parties compete. I also have a recent dataset on the campaign expenses to extend my analysis of electoral competition into other variables. Finally, I extend my analysis to presidential and parliamentary elections, in order to explore some interaction effects between my political competition variables and other economic variables.

Thus, I estimate the impact of electoral competition on economic growth by running a regression of the form:

$$\kappa_i = \beta_1 \text{district_size}_i + X_i' \beta_2 + R_i + M_i + \epsilon_{1i} \quad (2.1)$$

Where κ_i is the measure of political competition in the municipality i , district_size_i is the population/electorate size²¹, X_i are controls (geographic, demographic, political, and economic controls for the municipalities), R_i are regional fixed effects, M_i is the time of jurisdictional separation fixed effects, and ϵ_{1i} is the error term.

In line with the literature on political competition (Lee, 2013; Alfano & Beraldi, 2010; Padovano & Ricciuti, 2009; Besley et al, 2010), I use the electoral winning margin in the recent elections as my measure of political competition (κ_i) at the municipality level. I treat the population variable (district_size_i) directly as endogenous, so I use as an instrument for the district population size the interaction between the population of municipalities in the 19th century with a dummy variable indicating if a municipality was created during the century 20th (as a result of a split). In fact, the first stage of my identification strategy is given by:

$$\text{district_size}_i = \theta_1 \text{Pop_XIX}_i + \theta_2 \text{Pop_XIX}_i * \text{Munic_XX}_i + \theta_3 \text{Munic_XX}_i + X_i' \theta_4 + R_i + M_i + \epsilon_{2i} \quad (2.2)$$

Where Pop_XIX_i is the population of municipalities in 1872. Brazil had nearly 600 municipalities at that time, these municipalities split into more municipalities along the 20th century. The variable Munic_XX_i is a dummy equals to 1 if the municipality was created in the 20th century, and it equals to 0 if it is one of the early (or 'core') municipalities. I include this variable as a control in the second stage. X_i, R_i, M_i are the same as in the first stage, and ϵ_{2i} is the error term. As I previously argued, I expect a stronger relationship between the populations of the core municipalities than that of the new municipalities. I show that this is the case in figure 2.

2.5.1 OLS estimates

Before estimating my IV regressions, I estimate equation (2.1) using the complete sample of municipalities in the 2004 electoral period. Table 2 presents OLS estimates. In this table, I first present a parsimonious representation of the regression without including controls. Then, I gradually include municipality-level controls.

These first results appear to indicate that there is no correlation between the population size and political competition. In all columns, the point estimate is near to zero, and it is not statistically significant different from it. However, as detailed in the previous section, I expect the OLS coefficients to be downward biased. This specification may suffer from many

²¹This variable will be used in logarithmic terms. The correlation between the electorate and population is near to 1, so I will refer to the size of the district indistinctly between electorate or population.

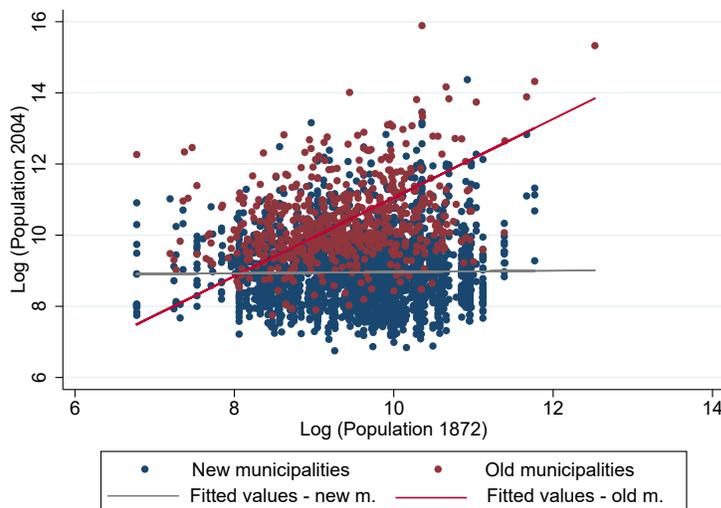


Figure 2.2: Old municipalities population vs current municipalities population

problems, like reversal causality, omitted variables, and some unobservables variables to the econometricians. So, in the next subsection I estimate my results with an IV approach.

Before moving to the next subsection, it is interesting to observe that the coefficients of the variable 'ratio of slave population' are statistically significant in all the specifications. The positive sign of the log of slave population sheds some light that there is a positive correlation between those more prosperous regions at the end of the 19th century with those which are more competitive now. However, I obtain a contra-intuitive sign for the 'distance to the sea' variable and the other proxy for more recent economic activity (but not statistically different from zero). So, the slavery variable may be reflecting something different to economic activity, and it could be more correlated to other exogenous factors, like (extractive) institutions, as pointed by Young (1994), also providing a contra-intuitive result.

2.5.2 IV estimates: First Stage

First of all, my IV identification strategy will be valid as long as my excluded instruments (Pop_XIX_i and $Pop_XIX_i * Munic_XX_i$) are uncorrelated with the error term in the second stage. That is, population in the 19th century interacted with creation of new districts it may have no effect on political competition today other than through their influence on the size of the municipalities' population. I argued that this exclusion restriction is plausible. The more tentative alternative channel is the effect through economic activity, however, as we will see, when I control for some proxies of early economic activity, my results remain

Table 2: Electoral competition vs population district size (OLS regressions)
 Dependent variable: Political competition in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Population)	-0.005 (0.003)	-0.005 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.003)	-0.004 (0.004)	-0.006 (0.004)	-0.006 (0.004)
Municipality emancipated in XX		0.008 (0.021)	0.007 (0.021)	0.007 (0.021)	0.007 (0.021)	0.007 (0.021)	-0.031 (0.023)	-0.031 (0.023)
Log(distance to sea)			0.002 (0.003)	0.002 (0.004)	0.002 (0.004)	0.002 (0.004)	0.003 (0.004)	0.003 (0.004)
Log(altitude)				-0.001 (0.004)	-0.001 (0.004)	-0.001 (0.004)	-0.002 (0.004)	-0.002 (0.004)
Log(territorial area)					0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Log(light at night PC)						-0.002 (0.009)	-0.001 (0.009)	-0.001 (0.009)
Ratio of slave population in XIX							0.061* (0.036)	0.061* (0.036)
Early settlements								0.003 (0.026)
Regional FE	Yes							
Time of separation FE	Yes							
Observations	3,629	3,629	3,629	3,627	3,626	3,626	3,337	3,337
R2	0.001	0.001	0.001	0.001	0.001	0.001	0.003	0.003

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

similar²². Secondly, I need to show that the my instruments are strongly related to the current size of the municipalities' population.

So, I turn to estimate equation (2.2), where my instruments are represented by the following terms Pop_XIX_i and $Pop_XIX_i * Munic_XX_i$. The results are shown in Table 3, where the first row contains my excluded instruments (the interaction and population of the 'core' or early municipalities). Furthermore, I use the dummy $Munic_XX_i$ as included instruments in all my following specifications to control for non observable characteristics of the split municipalities. As we can see in every column of Table 3, there is a strong relation between my instruments and current population size of municipalities; the coefficients of my excluded instruments remain stable with the inclusions of the controls used in the previous estimations (columns 1 to 6). It is also interesting to note that the distance to sea is one of the main variables determining the patterns of the population across Brazilian municipalities, but not affecting the magnitude of the coefficient of my instruments, providing more strength to the argument of a direct and exogenous effect of my excluded instruments over the current population. That is, the relation observed between the old population (interacted) and the current population is not driven by economic forces. The same is true when including territorial area and log of light density at night per capita.

²²In addition, when I use the light density at night per capita as my explanatory variable of political competition, I do not have statistically significant coefficients. I do not show the results to save space.

Table 3: District size vs instruments (IV regressions - 1st stage)
 Dependent variable: Electorate size in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Population XIX)	0.208*** (0.065)	0.398*** (0.077)	0.416*** (0.072)	0.417*** (0.072)	0.419*** (0.072)	0.320*** (0.060)	0.331*** (0.057)	0.325*** (0.056)
Log(Pop. XIX)*Municipality XX	-0.104** (0.044)	-0.339*** (0.062)	-0.384*** (0.062)	-0.385*** (0.062)	-0.388*** (0.062)	-0.260*** (0.052)	-0.269*** (0.052)	-0.265*** (0.051)
Municipality XX		3.359*** (0.604)	3.947*** (0.586)	3.949*** (0.586)	3.983*** (0.589)	2.670*** (0.514)	2.802*** (0.515)	2.767*** (0.510)
Log(distance to sea)			-0.214*** (0.034)	-0.193*** (0.057)	-0.192*** (0.057)	-0.142*** (0.055)	-0.145*** (0.048)	-0.137*** (0.045)
Log(altitude)				-0.040 (0.053)	-0.040 (0.053)	-0.041 (0.052)	-0.055 (0.045)	-0.062 (0.042)
Log(territorial area)					0.016** (0.008)	0.013* (0.007)	0.013** (0.007)	0.012* (0.007)
Log(light at night PC)						0.963*** (0.077)	0.993*** (0.075)	0.982*** (0.074)
Ratio of slave population in XIX							-1.401*** (0.528)	-1.418*** (0.494)
Early settlements								0.847*** (0.287)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,403	3,403	3,403	3,402	3,401	3,401	3,401	3,401
R2	0.014	0.026	0.079	0.080	0.081	0.202	0.215	0.222

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

2.5.3 IV estimates: Second Stage

Table 4 presents my IV estimates. As in the OLS estimations, I first present a parsimonious representation of the regression without including controls, and next I include municipality-level controls. As previously suggested, the IV estimates are larger than the OLS estimates. It is important to note that IV estimates are always stable, positive and significant. These results imply not only that the effects of population on political competition are economically relevant (even more than the first suggestion of the OLS estimates), but that there is a causal effect from the population to political competition. The coefficients in the first row indicate that an increase of 10% in the population of a municipality rises by 0.4%-0.5% the political competition index.

When exploring the coefficients of the control variables, we could see that our main proxies of economic activity (distance to sea and light at night) have a sign that may be different to what is expected (if we argue that there would be more political competition in more economically active areas). However, this does not have to be true. If smaller economies are growing faster (by the convergence theory) it could be that the sign just indicates that more regions that are growing more are more competitive (as suggested by the literature). In fact, when I calculate the economic growth at the beginning of 1990

Table 4: Political competition vs district size (IV regressions - 2nd stage)
 Dependent variable: Political competition in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.043*	0.040*	0.040*	0.040*	0.056**	0.053**	0.054**
	(0.024)	(0.022)	(0.022)	(0.022)	(0.030)	(0.028)	(0.028)
Municipality in XX	-0.051*	-0.059**	-0.059**	-0.059**	-0.058*	-0.061*	-0.062*
	(0.028)	(0.029)	(0.029)	(0.029)	(0.032)	(0.031)	(0.032)
Log(distance to sea)		0.011*	0.012*	0.012*	0.012	0.012*	0.011*
		(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
Log(altitude)			-0.001	-0.001	-0.000	0.001	0.002
			(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Log(territorial area)				0.000	0.000	0.000	0.000
				(0.001)	(0.002)	(0.001)	(0.001)
Log(light at night PC)					-0.063**	-0.063**	-0.063**
					(0.032)	(0.031)	(0.031)
Ratio of slave population in XIX						0.138**	0.141**
						(0.069)	(0.068)
Early settlements							-0.050
							(0.039)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First Stage							
F-Stat. Exclud.	16.31	19.94	20.13	20.33	15.23	17.51	17.43
Sargan-Hansen p_value	0.69	0.42	0.42	0.42	0.78	0.79	0.78
Obs	3,339	3,339	3,338	3,337	3,337	3,337	3,337

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

and I include it in my regressions, I find a positive sign between this variable and political competition (although it is not statistically significant at the conventional levels)²³.

On the other hand, one concern with my results is that the political competition could be affected just because of the number of the political candidates. So, in table B1, I control by the number of candidates, the predicted number of candidates (using a lag of this variable as predictor), the number of candidates in t-1, and the rate of the number of candidates by 10 thousand inhabitants. Taking into account that these controls could be bad controls, I find that the coefficient remains similar and statistically significant²⁴.

2.6 Scale effects on other electoral outcomes

Here I explore the effects of the size of population on other electoral variables. In particular, I study the effects on campaign expenses and the way in which politicians compete in this

²³In my main estimations, I only have nearly 3000 observations because I dropped those municipalities that were created (emancipated) from the region of two or more old municipalities. When I construct an estimated population for these municipalities, using the proportional population of the old municipalities (using the territorial area extracted from the old municipalities as my weight), I obtain similar results.

²⁴I do not control for another variable, like the number of seats in the municipal council, because this number is mathematically calculated proportional to the population of the municipality.

variable at the municipal level. Also, in order to understand where and why politicians compete in some regions versus others, I analyze the causal effect from the size of population on the average expenses per candidate and on the average campaign expenses per voter.

2.6.1 Population size vs electoral campaign expenses competition

To test the effect of the size of population on another index of electoral competition (in specific, electoral campaign expenses), I construct an index similar to political competition, in which I divide the expenses by candidates on the total expenses in the municipality, in order to obtain the politician share of expenses (as the vote share). Then, I calculate the competition index subtracting the second biggest expense ratio from the biggest expense ratio²⁵. Once this is established, I proceed to present the OLS estimations for the effect of the population size on campaign expenses competition. I show the results in table 5.

Table 5: Electoral campaign expenses competition vs district size (OLS regressions)
Dependent variable: Margin of the shares of the two biggest campaign expenses in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(Population)	0.032*** (0.007)	0.031*** (0.008)	0.031*** (0.008)	0.031*** (0.008)	0.027*** (0.009)	0.023*** (0.008)	0.023*** (0.008)
Municipality in XX	-0.031 (0.064)	-0.028 (0.064)	-0.028 (0.064)	-0.028 (0.064)	-0.029 (0.065)	0.092 (0.128)	0.092 (0.128)
Log(distance to sea)		-0.006 (0.007)	-0.007 (0.008)	-0.007 (0.008)	-0.007 (0.008)	-0.005 (0.008)	-0.005 (0.008)
Log(altitude)			0.003 (0.009)	0.003 (0.009)	0.003 (0.009)	0.001 (0.009)	0.000 (0.009)
Log(territorial area)				0.001 (0.003)	0.001 (0.003)	0.001 (0.003)	0.001 (0.003)
Log(light at night PC)					0.029 (0.025)	0.036 (0.025)	0.036 (0.025)
Ratio of slave population in XIX						0.193** (0.091)	0.193** (0.091)
Early settlements							0.003 (0.065)
Regional FE	Yes						
Time of separation FE	Yes						
R2	0.006	0.007	0.007	0.007	0.007	0.009	0.009
Obs	3,451	3,451	3,449	3,448	3,448	3,178	3,178

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

We can observe that, against Table 2, these OLS estimates are different from zero and with the expected sign (scale effects on electoral expenses competition). However, this estimates also can be downward biased for the same reasons that I mentioned before. In

²⁵I also use the Herfindahl Index (HHI) as a another proxy of competition (or how the total expenditure is concentrated among all participants). I have similar results with this variable.

fact, when I use a IV identification strategy, I obtain a bigger coefficient of the effect of population size on electoral expenses competition. I show the results in Table 6.

Table 6: Electoral campaign expenses competition vs district size (IV regressions)
Dependent variable: Margin of the shares of the two biggest campaign expenses in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.089*** (0.045)	0.083** (0.042)	0.083** (0.042)	0.082** (0.042)	0.097* (0.057)	0.091* (0.053)	0.092* (0.054)
Municipality in XX	0.066 (0.131)	0.063 (0.133)	0.063 (0.133)	0.063 (0.134)	0.058 (0.134)	0.051 (0.132)	0.050 (0.132)
Log(distance to sea)		0.005 (0.012)	0.005 (0.013)	0.005 (0.013)	0.006 (0.013)	0.005 (0.012)	0.005 (0.011)
Log(altitude)			0.001 (0.010)	0.001 (0.010)	0.001 (0.010)	0.004 (0.010)	0.004 (0.010)
Log(territorial area)				-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)	-0.000 (0.003)
Log(light at night PC)					-0.036 (0.065)	-0.036 (0.063)	-0.036 (0.063)
Ratio of slave population in XI						0.280** (0.129)	0.283** (0.130)
Early settlements							-0.057 (0.080)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First Stage							
F-Stat. Exclud.	14.52	18.55	18.74	18.86	13.9	15.78	15.67
Sargan-Hansen p_value	0.5	0.44	0.44	0.43	0.51	0.5	0.5
Obs	3,180	3,180	3,179	3,178	3,178	3,178	3,178

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

As in table 4, I have that the coefficient of interest remains stable across the specifications. The coefficient is near 9%, and it indicates that an increase of 1% in the population, will raise the competition on electoral expenses by 0.09% (almost two times the effect on political competition), providing some suggestive evidence that politicians, previous to the outcome of competition on votes, compete in the electoral process through campaign expenses. In fact, the number of matches in which the electoral winner was the one who spent the most during the electoral campaign is 63%²⁶.

To provide more robustness to my previous result, I use the Herfindahl Index to measure competition through electoral expenses. I present the results in table B2. The coefficient is statistically significant, but slightly lower to the first one presented. This difference could be

²⁶I also find that the correlation between the political competition and electoral expenses competition is positive and statistically significant.

because the interpretation of this variable, although it is used to measure competition, may also reflect market concentration. So, for example, if there are only two monopolizing the electoral expenses of a municipality, and if they have similar amounts of expenses, the first computed index will indicate high competition, while the HHI will reflect low competition (or high concentration)²⁷.

2.6.2 Population size vs average electoral campaign expenses

Now, with the previous results in mind, I proceed to explore the scale effects on the average electoral campaign expenses. One force explaining why politicians compete more in bigger regions is because of the returns of competing in these places. However, hereafter I document that there is another force that prevents many a politician from entering as a candidate in large municipalities: The entry costs (or the average expense by politician). I find that this is larger in more populated municipalities, indicating that there is a price to compete in these places.

In tables 7, I analyze the effect of population size on the average campaign expenses per candidate (total expenditure of candidates in a municipality divided by the total number of candidates). We could see that the effect is positive and that the coefficient remains stable across all the specifications²⁸, suggesting, as I previously mentioned, the bigger the population of municipality, the greater the entry cost to be paid by the candidates if they want to compete in more populated municipalities²⁹. But, is there a retribution for competing in these places? I explore this in table 8.

In fact, when I use the campaign expenses per capita as my dependent variable, I find that there is a gain on efficiency by competing on more populated municipalities. This implies that it is cheaper to gain a vote on larger municipalities than in the smaller ones. The coefficient indicates that an increase of 10% on the size of population decreases the average cost per voter in nearly 4%. We could see that this negative relation holds when I plot a semi-parametric relation between the size of population and the average campaign expenses per capita in figure 3³⁰.

²⁷However, maybe this is not the regular case, because the correlation between these two indexes is 0.8

²⁸Which are the same as the previous tables.

²⁹I obtain similar results in table B3 when using the total campaign expenses.

³⁰I use the predicted population by my instrument in an effort to avoid endogeneity problems

Table 7: Average campaign expenses per candidates vs district size (IV regressions)
 Dependent variable: Campaign expenses per candidate in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.440*** (0.106)	0.458*** (0.092)	0.463*** (0.090)	0.463*** (0.090)	0.349*** (0.127)	0.372*** (0.121)	0.371*** (0.123)
Municipality in XX	0.020 (0.257)	0.061 (0.242)	0.045 (0.249)	0.043 (0.249)	0.024 (0.258)	0.048 (0.262)	0.049 (0.263)
Log(distance to sea)		-0.061** (0.026)	-0.017 (0.031)	-0.018 (0.031)	-0.016 (0.034)	-0.014 (0.030)	-0.014 (0.030)
Log(altitude)			-0.077*** (0.026)	-0.077*** (0.026)	-0.082*** (0.029)	-0.090*** (0.027)	-0.091*** (0.027)
Log(territorial area)				-0.003 (0.006)	-0.003 (0.006)	-0.003 (0.006)	-0.003 (0.006)
Log(light at night PC)					0.490*** (0.147)	0.487*** (0.144)	0.487*** (0.145)
Ratio of slave population in XIX						-0.934*** (0.309)	-0.937*** (0.309)
Early settlements							0.066 (0.147)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First Stage							
F-Stat. Exclud.	15.05	18.89	19.08	19.2	14.65	16.92	16.83
Sargan-Hansen p_value	0.78	0.53	0.53	0.54	0.95	0.95	0.96
Obs	3,353	3,353	3,352	3,351	3,351	3,351	3,351

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

2.7 Extending the analysis to parliamentary and presidential elections

In this section, I extend the analysis to a different electoral market: parliamentary elections (which remain regional or local, but in a lower degree than those of mayors) and presidential elections (non-regional). Obviously, the electoral mechanism that operates behind local elections does not have to be the same as in elections whose target audience is larger. In municipal electoral campaigns, the resources of the candidates in each municipality are destined to promote themselves within the jurisdiction that corresponds to them, whereas in the legislative and presidential campaigns, the candidates are promoted in many or all the municipalities of the country. Thus, the tools of municipal electoral campaigns versus presidential or parliamentary campaigns could vary, for example, in the more intensive use of mass media. I argue that the legislative elections are even more similar to municipal elections because they are still at a local level.

Boas (2005) indicates that television is the main media used by important political figures in order to contact the citizens in Brazil. Dias (2011), on the other hand, indicates that presidential elections are the most professionalized, hiring specialized services of advertising agencies, while regional campaigns tend to be handmade; with a tight budget which is often

Table 8: Campaign expenses per capita vs district size (IV regressions)
 Dependent variable: Campaign expenses per voter in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	-0.367*** (0.121)	-0.331*** (0.100)	-0.325*** (0.098)	-0.325*** (0.098)	-0.457*** (0.137)	-0.435*** (0.131)	-0.435*** (0.133)
Municipality in XX	-0.282 (0.341)	-0.200 (0.306)	-0.220 (0.312)	-0.222 (0.312)	-0.230 (0.330)	-0.208 (0.334)	-0.208 (0.334)
Log(distance to sea)		-0.121*** (0.028)	-0.065** (0.031)	-0.065** (0.031)	-0.067* (0.036)	-0.065** (0.032)	-0.065** (0.031)
Log(altitude)			-0.101*** (0.027)	-0.101*** (0.027)	-0.106*** (0.030)	-0.114*** (0.028)	-0.114*** (0.028)
Log(territorial area)				-0.003 (0.006)	-0.002 (0.006)	-0.002 (0.006)	-0.002 (0.006)
Log(light at night PC)					0.499*** (0.157)	0.496*** (0.155)	0.496*** (0.156)
Ratio of slave population in XI						-0.889*** (0.309)	-0.890*** (0.312)
Early settlements							0.026 (0.156)
Regional FE	Yes						
Time of separation FE	Yes						
Panel B: First Stage							
F-Stat. Exclud.	15.05	18.89	19.08	19.2	14.65	16.92	16.83
Sargan-Hansen p_value	0.63	0.25	0.25	0.25	0.61	0.6	0.6
Obs	3,353	3,353	3,352	3,351	3,351	3,351	3,351

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

prepared by the own party bureaucracy. An example of this may be the video reproduced by the BBC regarding the recent elections for deputies, where candidates dressed in Batman and Robin to make their announcements³¹. Although this propaganda is for the election of deputies, a political advertisement like this tends to be more similar to the advertisements of the mayors than to the presidential ones, because deputies candidates still participate in regional contests and, since there are several candidates, they usually come from different municipalities within the same state (Moraes, 2012). Obviously, this does not happen at the presidential level.

Therefore, we can expect that, if presidential elections emphasize a more global-than-regional election campaign, the effect of the size of municipal jurisdictions will dissolve. However, as Dias (2011) indicates, presidential elections do not mean that regional campaigns are neglected, but the budget for these is less than for national campaigns. Then, it is also possible that, if presidential candidates take advantage of scale effects to competing in larger jurisdictions, the effect on political competition is not necessarily zero in presidential elections. Table 9 provides some evidence about this, in which I use the presidential

³¹<http://www.bbc.com/news/av/world-latin-america-19700072/batman-and-robin-candidates-in-brazil-local-elections>

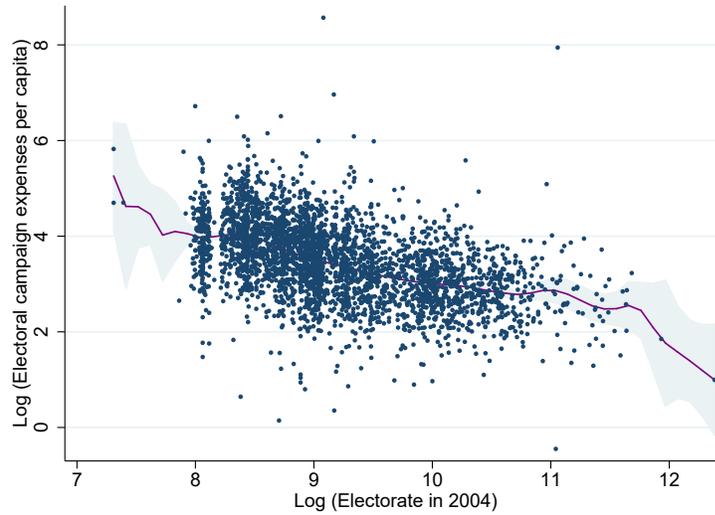


Figure 2.3: District size versus Average electoral expenses per capita

elections of 2006. We could note that the coefficient of the effect of population size on political competition is somewhat lower than that estimated for municipal elections, however, it is estimated with less precision in most specifications, rejecting the hypothesis that this is nonzero³².

On the other hand, in table 10, in doing the same analysis with the parliamentary elections of 2006 (candidates for the Chamber of State Deputies), I obtain a coefficient similar to the one estimated for the municipal elections, but it is slightly higher and more precisely estimated³³. This evidence is in line with the argument that the elections of deputies are more similar to those of mayors, because they conserve locality.

This could be explained by the fact that in the electoral market of parliamentary elections, candidates for deputies also take the full advantage of the scale effects to compete in campaign expenses in larger jurisdictions (because they still have the incentives to do so). Unfortunately, the expenditures of legislative electoral campaigns, unlike municipal campaigns, are not disaggregated at a municipal level, so it is difficult to test how much the scale effect actually is on competition in expenses, average expenditures per candidate and average expenditures per voter. Although, due to the aforementioned arguments, it is possible to expect the behavior to be the same as that observed for the variable of political

³²Standard errors hold fairly similar, so the fall in precision is by a fall in coefficient.

³³One reason may be that the "Fundo partidário no Brasil" gives money to the political parties in accordance to votes obtained in the parliamentary elections. So, this could be an incentive to compete more in larger jurisdictions in this electoral market.

Table 9: Political competition vs district size (IV regressions - 2nd stage)
 Dependent variable: Presidential political competition in 2006

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.038 (0.024)	0.039* (0.020)	0.038* (0.020)	0.038* (0.020)	0.037 (0.029)	0.036 (0.028)	0.036 (0.029)
Municipality in XX	0.031 (0.046)	0.020 (0.047)	0.020 (0.047)	0.021 (0.047)	0.024 (0.047)	0.022 (0.048)	0.022 (0.048)
Log(distance to sea)		0.014** (0.007)	0.012* (0.007)	0.012* (0.007)	0.012 (0.007)	0.011 (0.007)	0.011* (0.007)
Log(altitude)			0.003 (0.007)	0.003 (0.007)	0.003 (0.007)	0.004 (0.007)	0.004 (0.007)
Log(territorial area)				0.001 (0.002)	0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Log(light at night PC)					-0.010 (0.034)	-0.010 (0.033)	-0.010 (0.033)
Ratio of slave population in XIX						0.077 (0.072)	0.077 (0.072)
Early settlements							-0.005 (0.035)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First Stage							
F-Stat. Exclud.	15.18	18.97	19.17	19.31	14.65	17.01	16.92
Sargan-Hansen p_value	0.55	0.72	0.72	0.72	0.66	0.66	0.67
Obs	3,401	3,401	3,400	3,399	3,399	3,399	3,399

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

competition. Testing this would be interesting once this data is available at a more regional level.

2.8 Concluding remarks

There are many forces shaping political competition, and scale effects could be one of them. In fact, I show in this paper that the size of population has a positive effect in the way politicians compete. In the first place, I find that an increase of 10% in the size of population raises the political competition by 0.5% (0.3 standard deviations) in Brazil's municipal elections, and that this result is robust to a series of specifications.

I also provide evidence that politicians not only compete on votes, but also on campaign expenses, because of the close relationship between these two electoral markets. In fact, the number of times in which the electoral winner was the one who spent the most during the electoral campaign is 63%. Subsequently, when I use a measure of electoral competition in campaign expenses, I find that an increase of 10% in the population also raises it by 0.9% (or 0.5% measured with the Herfindahl Index).

I find that there are scale effects on other electoral outcomes, for example the average

Table 10: Political competition vs district size (IV regressions - 2nd stage)
 Dependent variable: Legislative political competition in 2006

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.058*** (0.019)	0.054*** (0.018)	0.055*** (0.018)	0.055*** (0.018)	0.074*** (0.026)	0.070*** (0.024)	0.072*** (0.024)
Municipality in XX	-0.049 (0.046)	-0.045 (0.046)	-0.046 (0.047)	-0.045 (0.047)	-0.044 (0.052)	-0.048 (0.051)	-0.048 (0.051)
Log(distance to sea)		-0.003 (0.005)	-0.001 (0.006)	-0.001 (0.006)	-0.001 (0.007)	-0.001 (0.006)	-0.001 (0.006)
Log(altitude)			-0.004 (0.005)	-0.004 (0.005)	-0.003 (0.005)	-0.002 (0.005)	-0.001 (0.005)
Log(territorial area)				0.002 (0.001)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)
Log(light at night PC)					-0.071** (0.030)	-0.071** (0.028)	-0.072** (0.028)
Ratio of slave population in XIX						0.160** (0.072)	0.163** (0.071)
Early settlements							-0.059 (0.038)
Regional FE	Yes						
Time of separation FE	Yes						
Panel B: First Stage							
F-Stat. Exclud.	15.24	18.99	19.18	19.32	14.61	16.98	16.89
Sargan-Hansen p_value	0.27	0.32	0.31	0.31	0.67	0.65	0.64
Obs	3,402	3,402	3,401	3,400	3,400	3,400	3,400

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

expense per vote. I show that the bigger the jurisdiction in which politicians compete, the lower the expenses per capita. However, the expenses per candidate are also larger in these more populated municipalities. This suggests that, although there are efficiency gains of competing in larger municipalities, there are also bigger entry costs that prevent many a politician to compete in the biggest municipalities.

Finally, when extending my analysis to different electoral markets, I find that the effect over presidential elections is not so robust as in municipal elections and legislative elections. I argue that the main reason behind this result is because the locality of electoral markets is the one that enhances the scale effects on political competition. As Dias (2011) indicates, presidential elections are oriented to a more global-than-regional election campaign, exploiting the scale effects at the country level more than at regional level, so the effect of municipal population on political competition could be diminished.

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Appendix A:

Appendix to Chapter 1

Table A1: FMLN vs previous potential determinants
FMLN Votes Shares in 1994 as dependent variable

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Main controls							
Rightist municipalities in 1974	-0.14*** (0.03)			-0.12*** (0.03)	-0.12*** (0.03)	-0.07** (0.04)	-0.07* (0.04)
Log(Altitude of municipality)		0.03*** (0.01)		0.03*** (0.01)	0.02** (0.01)	0.02** (0.01)	0.02 (0.01)
Parishes/10k inhab.			0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
B. Some additional controls							
Log(surface area in km2)					-0.00 (0.01)		0.01 (0.01)
Log(Population in 1960)					0.01 (0.01)		0.01 (0.01)
Fixed regional Effects	No	No	No	No	No	Yes	Yes
R2	0.07	0.02	0.02	0.10	0.10	0.16	0.17
Obs	260	261	261	260	259	260	259

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

Table A2: Growth vs competition (Robustness checks on IV regressions)

Dependent variable: Growth (Light density)

	(1)	(2)	(3)	(4)
Panel A: Second Stage				
Polit. Compet.	0.70** (0.34)	0.70** (0.34)	0.73** (0.36)	0.72** (0.35)
Growth in t-1	0.27* (0.14)			0.26 (.18)
Log(Light density in t-1)		0.04 (0.03)		0.00 (0.04)
Growth of neighbors			0.14 (0.13)	0.12 (0.11)
Regional FE	Yes	Yes	Yes	Yes
Panel B: First Stage				
F-Stat. Exclud.	11.1	10.62	10.94	10.29
Sargan Stat. (p_val)	0.53	0.46	0.37	0.45
Obs	259	259	259	259

All regressions include all the controls used in table 4

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

Table A3: Growth vs competition (IV regressions)
 Dependent variable: Growth (Light density)

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Second Stage						
Polit. Compet.	0.62** (0.31)	0.58* (0.33)	0.62** (0.31)	0.62* (0.33)	0.58* (0.34)	0.56 (0.35)
FMLN 1994	0.39 (0.38)	0.33 (0.38)	0.39 (0.38)	0.39 (0.38)	0.37 (0.38)	0.24 (0.40)
Pre-Ideology	0.01 (0.05)	0.02 (0.05)	0.01 (0.05)	0.01 (0.05)	0.01 (0.05)	0.06 (0.05)
FMLN 1994 ²	-0.53 (0.57)	-0.53 (0.59)	-0.54 (0.57)	-0.54 (0.56)	-0.57 (0.57)	-0.37 (0.57)
Log(Altitude of municipality)		0.06** (0.03)			0.06** (0.03)	0.03 (0.03)
Parishes/10k inhab.			0.00 (0.01)		0.00 (0.01)	-0.01 (0.01)
Log(Population 1960)				-0.00 (0.02)	-0.01 (0.03)	-0.00 (0.03)
Regional FE	No	No	No	No	No	Yes
Panel B: First Stage						
F-Stat. Exclud.	4.00	3.90	3.82	4.03	3.73	4.34
Sargan Stat. (p_val)	0.43	0.32	0.43	0.42	0.29	0.40
Obs	259	259	259	259	259	259

All regressions include all the controls used in table 4

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

Table A4: Testing the exclusion restriction: Growth vs political identity

Dependent variable: Growth (Light density)

	(1)	(2)	(3)	(4)	
Panel A: Second Stage					
Polit. Compet.	0.70**			0.72*	
	(0.35)			(0.37)	
Prob. FMLN win 1994		-3.71	-0.23	0.08	
		(6.14)	(0.24)	(0.34)	
FMLN votes share 1994	0.05	2.40			
	(0.22)	(4.20)			
Pre-Ideology	0.04	-0.35	0.06	0.05	
	(0.05)	(0.70)	(0.06)	(0.06)	
Altitude	0.03	-0.04	0.03	0.03	
	(0.03)	(0.14)	(0.03)	(0.03)	
Parishes/10k inhab.	-0.02	-0.04	-0.01	-0.02	
	(0.01)	(0.05)	(0.01)	(0.01)	
Population 1960	-0.00	0.09	0.02	-0.01	
	(0.03)	(0.12)	(0.02)	(0.03)	
Regional FE	Yes	Yes	Yes	Yes	
Panel B: First Stage					
Instrumented variable	Pol. Comp.	Pr. FMLN	Pr. FMLN	Pr. FMLN Pol. Comp.	
Pre-Ideology*FMLN 94	1.8***	-.22***	-0.22	-0.22	1.74 ***
	(.59)	(.05)	(.36)	(.36)	(.57)
Pre-Ideology*FMLN 94^2	-1.23***	.36 *	0.05	0.05	-1.14***
	(.27)	(.21)	(.21)	(.21)	(.28)
FMLN 1994	-1.26**	.87 ***	.87 ***	.87 ***	-1.27**
	(.57)	(.33)	(.33)	(.33)	(.56)
Pre-Ideology	-0.31**	-0.06	-0.06	-0.06	-.30**
	(.15)	(.10)	(.10)	(.10)	(.14)
Log(Altitude of municipality)	0.00	-0.02	-0.02	-0.02	0.00
	(.00)	(.01)	(.01)	(.01)	(.01)
Parishes/10k inhab.	0.01	-0.01	-0.01	-0.01	0.01
	(.01)	(.01)	(.01)	(.01)	(.01)
Log(Population 1960)	0.00	.02 **	.02 **	.02 **	0.02
	(.00)	(.01)	(.01)	(.01)	(.01)
F-Stat. Exclud.	11.21	0.18	49.20	11.43	
Sargan Stat. (p_val)	0.45	0.35	0.16	0.44	
Obs	259	259	259	259	

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

Table A5: Growth, education, health and competition
 Dependent variables: Growth of light, children medical disease visits, grade repetition rate and homicide rate

Growth of:	(1)		(2)		(3)		(4)		(5)		(6)	
	Homicide rate		Children medical disease		Grade repetition rate							
	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES	>50% FODES	<50% FODES
I. Second Stage												
Polit. Compet.	-2.47*	-0.78	-3.35***	0.26	-0.07***	0.02						
	(1.28)	(.76)	(.86)	(.26)	(.03)	(.05)						
Growth of light	-0.37*	-0.06	-0.06	-0.04	-0.01	0						
	(.21)	(.21)	(.19)	(.11)	(.00)	(.01)						
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes						
II. First Stage												
F-Stat. Exclud.	13.85	54.22	13.85	54.22	13.85	54.22						
Sargan Stat. (p_val)	0.58	0.103	0.112	0.259	0.19	0.182						
Obs	130	129	130	129	130	129						

*, **, ***, significant at 10%, 5% and 1%

Robust Standard Errors in parenthesis

Appendix B:

Appendix to Chapter 2

Table B1: Additional controls on Political competition vs district size (IV regressions)
Dependent variable: Political competition in 2004

	(1)	(2)	(3)	(4)
Panel A: Second Stage				
Log(Population)	0.060* (0.035)	0.062* (0.033)	0.062** (0.033)	0.061** (0.030)
Municipality in XX	-0.069* (0.036)	-0.064* (0.033)	-0.064* (0.033)	-0.044* (0.026)
Log(distance to sea)	0.010* (0.006)	0.009 (0.006)	0.009 (0.006)	0.009* (0.005)
Log(altitude)	0.001 (0.005)	0.001 (0.005)	0.001 (0.005)	0.002 (0.005)
Log(territorial area)	0.000 (0.001)	-0.000 (0.002)	-0.000 (0.002)	0.000 (0.001)
Log(light at night PC)	-0.064** (0.032)	-0.064** (0.032)	-0.064** (0.032)	-0.054** (0.026)
Ratio of slave population in XIX	0.144** (0.072)	0.146** (0.071)	0.146** (0.071)	0.098** (0.049)
Early settlements	-0.052 (0.041)	-0.045 (0.038)	-0.045 (0.038)	-0.044 (0.038)
Log(candidates)	-0.025 (0.030)			
Estimated Log(total candidates)		-0.103* (0.058)		
Log(candidates t-1)			-0.045* (0.025)	
Candidates per 10k inhabitants				0.012** (0.005)
Regional FE	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes
Panel B: First Stage				
F-Stat. Exclud.	14.16	15.3	15.28	19.28
Sargan-Hansen p_value	0.83	0.83	0.83	0.9
Obs	3,336	3,337	3,337	3,336

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

Table B2: Electoral campaign expenses competition vs district size (IV regressions)

Dependent variable: Campaigning expenses HHI in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.052*	0.052*	0.052*	0.052*	0.050*	0.047*	0.047*
	(0.028)	(0.027)	(0.027)	(0.027)	(0.026)	(0.025)	(0.026)
Municipality in XX	0.043	0.048	0.047	0.048	0.056	0.053	0.052
	(0.093)	(0.093)	(0.093)	(0.093)	(0.093)	(0.092)	(0.092)
Log(distance to sea)		-0.004	-0.004	-0.004	-0.009	-0.010	-0.010
		(0.007)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Log(altitude)			-0.001	-0.001	-0.001	0.001	0.001
			(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
Log(territorial area)				0.000	-0.000	-0.000	-0.000
				(0.002)	(0.002)	(0.002)	(0.002)
Log(light at night PC)					-0.005	-0.005	-0.005
					(0.004)	(0.004)	(0.004)
Ratio of slave population in XI						0.159**	0.161**
						(0.067)	(0.067)
Early settlements							-0.029
							(0.048)
Regional FE	Yes						
Time of separation FE	Yes						
Panel B: First Stage							
F-Stat. Exclud.	14.44	18.46	18.64	18.77	21.19	22.11	19.82
Sargan-Hansen p_value	0.68	0.75	0.75	0.75	0.94	0.97	0.96
Obs	3,177	3,177	3,176	3,175	2,671	2,671	2,671

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis

Table B3: Total campaign expenses vs district size (IV regressions)
 Dependent variable: Total campaign expenses in 2004

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: Second Stage							
Log(Population)	0.633*** (0.121)	0.669*** (0.100)	0.675*** (0.098)	0.675*** (0.098)	0.543*** (0.137)	0.565*** (0.131)	0.565*** (0.133)
Municipality in XX	-0.282 (0.341)	-0.200 (0.306)	-0.220 (0.312)	-0.222 (0.312)	-0.230 (0.330)	-0.208 (0.334)	-0.208 (0.334)
Log(distance to sea)		-0.121*** (0.028)	-0.065** (0.031)	-0.065** (0.031)	-0.067* (0.036)	-0.065** (0.032)	-0.065** (0.031)
Log(altitude)			-0.101*** (0.027)	-0.101*** (0.027)	-0.106*** (0.030)	-0.114*** (0.028)	-0.114*** (0.028)
Log(territorial area)				-0.003 (0.006)	-0.002 (0.006)	-0.002 (0.006)	-0.002 (0.006)
Log(light at night PC)					0.499*** (0.157)	0.496*** (0.155)	0.496*** (0.156)
Ratio of slave population in XIX						-0.889*** (0.309)	-0.890*** (0.312)
Early settlements							0.026 (0.156)
Regional FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time of separation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: First Stage							
F-Stat. Exclud.	15.05	18.89	19.08	19.2	14.65	16.92	16.83
Sargan-Hansen p_value	0.63	0.25	0.25	0.25	0.61	0.6	0.6
Obs	3,353	3,353	3,352	3,351	3,351	3,351	3,351

*, **, ***, significant at 10%, 5% and 1%

Clustered standard errors at original municipalities level in parenthesis