

Popularity, Legislative Majority, or Party Building: A Structural Model to Estimate Presidents' Priorities in Latin America

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Abstract

This paper develops a methodology for consistently estimating the relative weights Latin American presidents assign to three political goals when allocating discretionary resources to municipalities: increasing popularity, raise legislative majority, and build a national party. The empirical results suggest that party building has the largest weight in Lula's utility function, and it is especially important in years previous to mayoral elections. In Venezuela, on the other hand, popularity is the primary determinant of resource allocations throughout the entire period of Chávez administration. In Mexico, all three components of the president's decision function are weighted similarly, although popularity gains salience in years preceding presidential elections. These results cast doubt on the empirical generalization of coalition building models in multiparty presidential systems. Estimation only requires government expenditure data and OLS, making it widely applicable (JEL 072, 078).

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Introduction

A popular question in the distributive politics literature in Latin America is what presidents take into account when determining where to allocate the enormous amount of discretionary resources under their control. This debate can be summarized in three different sets of presidential goals: (i) The president's interest in personal popularity, which is a short-term goal to increase electoral prospects; (ii) the president's interest in building a legislative majority, which is a short-term goal to make sure his government is producing the policy changes advocated in campaign; and (iii) the president's interest in strengthen the basis of his own party, which is a long-term goal to guarantee his policies will be carry over after he leaves office. The relative importance of those competing factors, however, remains an open question in most of the literature in comparative politics. The primary difficulty that arises in attempting to answer what politicians prefer is the difficulty in observing what politicians want when making allocation decisions.

This paper develops a methodology to overcome this limitation by recovering how much weight presidents assign to specific goals, given the pattern of resource allocation observed in a variety of districts. Instead of designing a solution to identify what presidents prefer, this paper proposes a solution based on revealed preferences. I develop a structural model to estimate the relative weights Latin American presidents assign to popularity, to legislative majority, and to party building when allocating discretionary resources to municipalities. I am able to use this methodology to recover consistent estimates of such weights using an OLS model, despite the fact that president's preferences are unobserved.

The model has a number of attractive features. First, because the parameter estimates obtained are explicit weights in the utility function, interpretation of the results

is straightforward. Second, the model is ideal for testing a wide variety of hypotheses concerning presidential distributive behavior. For instance, one can test whether the weight placed on voter preferences increases as presidential elections approach, or whether the weight of subnational pressures increase with proximity of local elections. Finally, because the model requires only resource allocation data as inputs, it can be applied to any time period or subset of resource allocation data, and therefore may prove to be a valuable tool in studying a wide range of questions about distributive politics.

On the substantive side, this methodology provides an empirical strategy to test competing implications from theories of distributive politics. Although this literature has engaged in a spirited debate about how politicians allocate targetable goods in order to optimize their electoral prospects, competing results are demonstrated to be true in different settings. For some scholars, core voters are the most important predictor of discretionary transfers (???). For others, presidents in Latin America use their distributive powers for legislative coalition building (????????). But there is also evidence that transfers are politically manipulated to target mayors aligned with the president (????).

Recognizing the importance of this debate, the paper proceeds to estimate the model using data from Brazil, Venezuela and Mexico from 2000 to 2012. My aim is to reconcile these alternative explanations in a unified model of presidential allocation to compare the different predictions using the same model. Identification of the model hinges on three critical assumptions: (1) each president's preferences remains fixed over his term, (2) presidential decision functions are logarithmic — he gain decreasing marginal utility from allocations, and (3) municipal voter preferences are reasonably proxied by the votes cast both in legislative and presidential elections. Under those assumptions, it is demonstrated that Hugo Chávez (Venezuela) was mainly a popularity-seeking

politician when allocating resources; Luis Inácio Lula da Silva (Brazil), while valued his popularity, assigned most of weight on building his party; whereas Vicente Fox (Mexico) and Felipe Calderón (Mexico), equally rated popularity, legislative majority, and party building.

These results are consistent with a model of resource allocation that expect newly inaugurated presidents in decentralized settings to use central government fiscal authority to create a network of competent candidates for subnational offices. This is the only way to guarantee that a local politician will act as a good agent. First, co-partisans have less incentives to blame each other, because negative effects have spillovers for them. Second, co-partisans have more incentives to build party reputation, as such positive image has also spillover effects over both offices. This would explain the actual allocative patterns in Brazil, a decentralized country with a president elected with very few local co-partisans in office. When local politicians are weak political figures who do not influence electoral or policy outcomes, presidents can bypass them and use discretionary powers to build direct linkage with voters instead. In this situation, local politicians cannot credibly free-ride on federal resources to extract electoral advantage from them, as they are not credible claimers. The results could also explain the results for Venezuela, a very centralized country divided between friends and rivals of the president.

The paper is organized as follows. In section 1, I present a formal model of presidential discretionary allocation and demonstrate that presidents' revealed strategies can be estimated without directly observing their preferences about geographically allocation of goods. In section 2, I justify the choice of Brazil, Mexico and Venezuela as the cases to be studied and present the data used here. In section 3, I discuss the choice of proxy variables, their limitations, and the sample constraints. In section 4, I present empirical estimates of the basic specifications across countries and within

countries over time. Finally, I conclude in section 5.

Modeling Presidential Allocation

There is a rich debate in the distributive politics literature about how politicians strategically allocate government goods and services to geographic localities to ensure electoral success (for a good summary see ?). This literature has mostly ignored the role of other politicians in multi-tier systems. Politics in federal countries, for example, is tied to multiple and legitimate governments of presidents, legislators, governors, and mayors. To correctly understand how resources are distributed, one needs to take into account that all players have inter-connected interests in getting benefits from investments, but also in blaming opponents for bad performance. My contribution is to add to this literature the complicating factor of how ‘elected mediators’ operate in federal systems in which devolution has given power to them in varying degrees. The main models in distributive politics assume away the problems of agency loss and credit-claiming competition as they model the direct connection between voters and politicians.

In order to understand the dynamics of the interaction between local and national politicians I propose a structural equation model of how presidents allocate resources to municipalities given its relative importance for the president’s allies in congress and in city halls. Instead of deriving comparative statics and testing them against the estimated parameters of a regression model about presidential allocation, I use the structure of the formal model to predict the strategic interaction between mayors and presidents in respect to how much the president cares about his popularity, or building his party or a legislative majority as a function of the resources disbursed to municipalities. These are, I believe, the main alternative explanations discussed in the

literature. Instead of confronting the predictive power of each of these models, I tie their implications together and formulate a general theory of discretionary allocation that will allow me to identify how much support each theoretical explanation receives from the data. This is a fundamental step toward the actual test of specific theoretical implications, as we will be able to measure president's preferences from his behavior.

My methodology has a number of attractive features. First, because the parameter estimates obtained are explicit weights in the presidents' utility functions, interpretation of the results is straightforward. Second, the model is ideal for testing a wide variety of hypotheses concerning presidential distributive behavior. For instance, one can test whether the weight placed on voter preferences increases as presidential elections approach, or whether the weight of subnational pressures increase with proximity of local elections. Finally, because the model requires only resource allocation data as inputs, it can be applied to any time period or subset of resource allocation data, and therefore may prove to be a valuable tool in studying a wide range of questions about distributive politics.

A Structural Model for Discretionary Allocation

It seems appropriate to assume that in determining whether or not to allocate resources to a particular municipality, presidents must balance the wishes of the overall electorate, the pressures from party leaders within and outside the legislature, as well as the force of local politicians. My theoretical model, therefore, incorporates these alternative pressures and endogenously determines which of them have greater influence over the way presidential allocation is determined. I start assuming that presidents would prefer a more accommodative legislature, a larger cadre of co-partisan mayors, and a higher level of personal popularity, and therefore all presidents will be motivated to use their discretionary power over resource allocation to improve in all three areas.

But I also assume that presidential resources, while substantial, are not unlimited, and presidents must optimize their pursuit of legislative allies, co-partisan mayors, and personal popularity given the circumstances they face when they take office. The question is then what sorts of trade-offs they privilege when choosing between these strategies and under what circumstances they weight one more than the other.

Pure popularity seekers, legislative majority seekers, or party-building seekers are unlikely to exist, though each of the three can be seen as ideal types to be contrasted with empirical predictions. Figure 1 illustrates the space of trade-offs between these different pursuits in a ternary diagram with each of the three apexes representing one political goal.¹ Any president plotted at the top of this diagram would be classified as a pure popularity seeking politician. Any deviation from there means that he puts some weight on party-building and on legislative majority that is bigger than 0. This representation further assumes that there is a constraint on the total quantity of each goal presidents can obtain that sums to 1. As an example, I plotted in the ternary diagram three Presidents. President A assigns .33 weight to each of strategies. President B assigns .60 to popularity, .30 to legislative majority building, and only .10 to party building. President C, in turn, is almost purely a party building seeker assigning .90 weight to this strategy while .05 for increasing both his popularity and legislative majority.

To model a president's behavior I use his discretionary power over resource distribution as the starting point. Let us assume presidents and mayors are deciding what to do based on their utility functions, and legislators are receiving the benefits or costs of this dispute indirectly. Again, I assume that presidents care about their popularity among voters, about building a legislative coalition, and about nationalizing his party presence in the municipalities across the country. I assume, however, that mayors care about their own careers and have incentives to divert the resources granted from the

¹I borrow the idea from Strom and Mueller (1999).

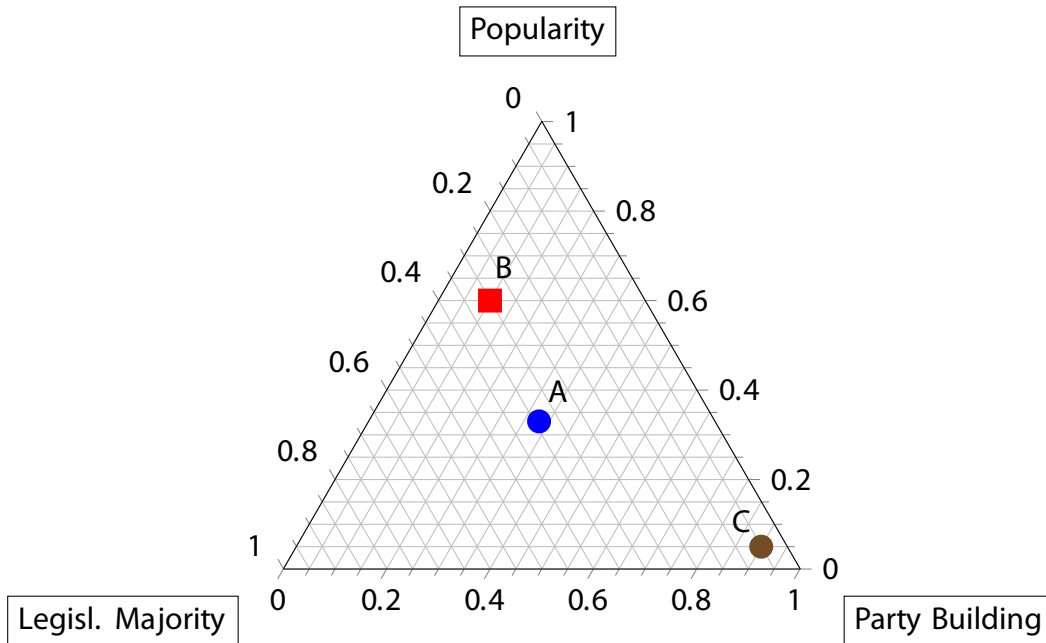


Figure 1: Ternary Diagram with the Range of Feasible Presidential Types. President A assigns .33 weight to each of strategies. President B assigns .60 to popularity, .30 to legislative majority building, and only .10 to party building. President C, in turn, is almost purely a party building seeker assigning .90 weight to this strategy while .05 for increasing both his popularity and legislative majority.

president to their municipalities to accomplish personal goals. I am not asserting that mayors divert resources illegally or for corruption purposes. I merely posit that they might have interests different than the president's, and they might prefer to spend the resources allocated from the president in a way that benefit their own political ambitions.

Let us assume that local politicians are able to divert *political credit* from allocations that the president has appropriated in their municipalities, reducing the amount of resources voters identify as coming straight from the president's purse. I formalize this idea defining *political siphoning* as the difference between what is allocated by the president in municipality i (z_i) and what voters observed was invested in municipality

$i(x_i)$:

$$\ell_i = \ln(z_i - x_i) \tag{1}$$

where *siphoning* has a decreasing marginal utility to mayors and $z_i > x_i$.² More siphoning means voters will be exposed to less investments from the president and will not reward him for the benefits potentially provided. The literature on distributive politics has explained discretionary distribution of goods depending solely on the preferences and behavior of local voters (????). But politics in multi-tier countries is tied to multiple and legitimate governments. The distribution of resources, then, needs to take into account that all such players have interconnected interests in benefitting from investments, and also in blaming opponents for bad performance.

The most important implication for assuming that *siphoning* can happen is that it brings attention to the trade-offs newly inaugurated presidents face when assume power. To the extent that voters respond to targeted spending, a president can use budgetary discretion to gain votes for himself or his designated successor. But federal transfer spending also improves re-election odds for incumbent mayors in targeted municipalities - because of *siphoning*. The political benefits of transfer spending thus accrue not just to the president, but also to an array of local politicians who may or may not share the president's party and political goals. By targeting his own core voters and pursuing social policy goals, the president may be supporting the reelection goals of his political enemies at the local level. This dilemma looms larger when the president's party is weak at the municipal level, which was the case of Brazil and Mexico when, respectively, Lula (PT) and Fox (PAN) won their presidential elections.

²Note that assuming z_i to be strictly bigger than x_i makes siphoning function to be different than zero. This is necessary, as $\ln(0)$ does not exist. But this also implies that in every situation we will observe some (small or large) siphon.

To a much smaller extent, this was also the case for Chávez (MRV) when inaugurated in Venezuela.

Given this complication, should a newly inaugurated president allocate resources to localities full of his voters but governed by enemies, even when the local officials might be able to *siphon* credit from the president? Or should he allocate resources exclusively to local allies, a minority in the country, even though this would mean jeopardizing his electoral support in the majority of the country who will not receive benefits? To assess this problem let us define the political support function of the president as V_i , the number of votes he received in municipality i :

$$V_i = \beta_{1i}^P + \beta_2 \ln(x_i) \quad (2)$$

where β_{1i}^P captures municipal characteristics that create a baseline of votes to the president, and β_2 represents the effect of allocation x_i over presidential votes (V_i). Let us define the political support function of locally elected national legislators as L_i , the number of votes legislator received from municipality i :

$$L_i = \beta_{1i}^L + \beta_2 \ln(x_i) \quad (3)$$

where β_{1i}^L captures municipal characteristics that create a baseline of votes to the legislator, and β_2 represents the effect of allocation x_i over legislator votes (L_i). Let us define the political support function of mayors as M_i , the number of votes he received in municipality i :

$$M_i = \beta_{1i}^M + \beta_2 \ln(x_i) \quad (4)$$

where β_{1i}^M captures municipal characteristics that create a baseline of votes to the

mayor, and β_2 represents the effect of allocation x_i over mayor votes (M_i).³

Presidents care about political success in general. This can be described as a combination of the number of votes his party receives in presidential, legislative and local elections. In analyzing the influences on a president's behavior, I focus here on the overall utility of a president when receiving inputs from these three elements. Then, I formalize the problem assuming that the presidential utility function is a weighted average of his political support function, in addition to the ones of mayors and legislators from his party (where co-partisanship is symbolized by κ). Broadly speaking, we can think of presidents allocating resources z_i across municipalities $i = \{1, \dots, n\}$, to maximize his utility function such that legislators and mayors in municipality i are from president's party κ :

$$U_P = \alpha \sum_{\kappa \in i} V_i + \gamma \sum_{\kappa \in i} L_i + \omega \sum_{\kappa \in i} M_i \quad (5)$$

In equation (5), parameter $\sum_{\kappa \in i} V_i$ represents the number of votes the president received in the last election, $\sum_{\kappa \in i} L_i$ the total number of votes received by legislators who are willing to support the president's legislative agenda, and $\sum_{\kappa \in i} M_i$ the total number of votes mayors co-partisans to the president received in the last election. I will extrapolate these meanings and interpret $\sum_{\kappa \in i} V_i$ as a *proxy* for president's popularity, $\sum_{\kappa \in i} L_i$ as a *proxy* for president's legislative majority, and $\sum_{\kappa \in i} M_i$ as a *proxy* for president's party local strength. The relative magnitude of parameters α , γ and ω indicates, therefore, the importance presidents place on popularity, legislative majority,

³The identification for the structural estimation relies on the fact that β_2 is assumed the same for the president, the legislators, and the mayors. This is a simplifying assumption if we believe that the amount of votes produced by dollars invested is different for each office. In future work I will relax this assumption. Here, however, I deal with this problem by letting the intercept of the political support functions vary by municipality and by office.

and party building when allocating resources to municipalities. Let us assume the weight parameters of the president's objective function to be constrained to $\alpha + \gamma + \omega = 1$.⁴

The theoretical and empirical literature on distributive politics has provided contrasting explanations for politically motivated transfers, or tactical redistribution. The most prominent arguments expect that (a) core voters are a strong predictor of municipal discretionary transfers (??????), (b) national politicians favor municipalities in which coalition partners have constituents as a way to guarantee their support in Congress (????), or (c) transfers are politically manipulated, targeting mayors who align with the President (????). These case-studies find support for different hypothesis without excluding the possibility of rival explanations for the same pattern of discretionary distribution and without considering the constraint presidential budgets have.

My proposed solution is to model president's utility function as a combination of all these strategies and to assume that in order to distribute, presidents need to collect resources through taxes. This implies that president's distributive strategy is constrained by the total taxes his government is able to raise given the transfers he is willing to distribute. Let us define $Z = \sum z_i$ as the total taxes president must raise. Tax rate is fixed for every municipality and defined as τ . The government budget constraint is, then $G = \tau Z$. Finally, I assume that the impact of spending is separable across municipalities, that is, spending in municipality j has no effect on mayoral, legislative or presidential politics in municipality i . Finally, it is necessary to assume legislators have no control over ℓ_i , but mayors do. Legislators are, then, passive players who we assume cannot influence the president's decision to allocate z_i

⁴Since utility functions are defined only up to an affine transformation, there is no loss of generality implied in constraining the decision weights to sum to one. In order for the estimated coefficients to be directly interpretable as weights in the utility function, however, all of the variables inputted in president's utility functions must be measured in the same units.

or mayors decision to *siphon* ℓ_i . Mayors control how much resources voters observe and, given that president's and legislators' political support functions are determined by x_i , mayors choices affect these other players, as well as their own political support functions.

Mayors are assumed to care about both their own political careers and their relative power in the political system. With votes they can maintain their offices. With siphoning they can show prestige and power to grow in their careers. This assumption finds support in the literature about political careers in Latin America and in the U.S. [?], for example, was the first to point out that even while serving in the national legislature, 'Brazilian legislators act strategically to further their future extra legislative careers by serving as "ambassadors" of subnational governments.' It is the power and prestige acquired locally that allows politicians to bargain nationally, what makes Brazil's federal institutions important factors for understanding politicians' electoral prospects and career goals. [?] go further and argue that local officeholders view intergovernmental cooperation as a means of promoting their political careers. Local elected officials with ambition for higher office may pursue intergovernmental relations as a way to promote themselves to a larger constituency.

In the model presented here, mayors' power in the political system might come at the detriment of the president - when $z_i - x_i > 0$ - or it might come in addition to it - when $z_i = x_i$. Then, the mayor's utility function can be defined as:

$$\begin{aligned} U_M(x_i; \lambda^j, z_i) &= \lambda^j[\ell_i] + (1 - \lambda^j)[M_i] \\ &= \lambda^j[\ln(z_i - x_i)] + (1 - \lambda^j)[\beta_{1i}^M + \beta_2 \ln(x_i)] \end{aligned} \quad (6)$$

where λ^j is given by mayor's partisan status and refers to the probability that mayor of type j will steal credit from the president ($0 \leq \lambda^j \leq 1$). When $\lambda^j = 0$ the president

is facing a state of the world in which the mayor is a co-partisan, when $\lambda^j = 1$ the mayor is from the opposition. The justification for this comes from the literature on principal-agency theory (???) and on party reputation incentives (????????). Following these scholars, I assume to be likely that mayors from the presidential party will have incentives to steal credit from the president's action. Hurting a president from the same party would mean hurting the overall reputation of the 'team', which might also hurt mayors' own political support. Opposition and coalition mayors, on the other hand, have incentives to divert credit from allocations that should be bigger than 0, so they can run their campaigns independently in the next round.

The presidential discretionary allocation strategy depends on each mayor's incentives to collaborate with him, which is a function of how similar are his interests with the president and how much *de facto* power mayors have to *siphon* political credit and resources from what presidents allocate. This is an optimization problem in which the president and mayors are trying to identify the optimal choice of allocation and siphoning, respectively. The political context in which this game operates can be summarized as: (1) the president elected sets z_i for municipality i , (2) mayor of municipality i , takes z_i as given and decides on ℓ level, and (3) voters in municipality i observe x_i .

Maximizing function 6 with respect to how much resources identified with the president mayors' choose to reveal to voters x_i yields a mayor's optimal revelation strategy x_i^* which is a function of λ , β_2 , and z_i :

$$x_i^* = \frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2\lambda^j} \times z_i \quad (7)$$

Note that by $\frac{\beta_2(1-\lambda^j)}{\lambda^j+\beta_2-\beta_2\lambda^j}$, the share of z_i mayor will not siphon from the presidential allocation is a function of elasticity of his vote to x_i (β_2) and his nature-given propensity to steal credit (λ^j). We can, then, re-write mayor's political support function (Eq. 4)

as

$$\begin{aligned}
M_i &= \beta_{1i}^M + \beta_2 \ln(x_i^*) \\
&= \beta_{1i}^M + A + \beta_2 \ln(z_i)
\end{aligned} \tag{8}$$

where $A = \left[\beta_2 \ln \left(\frac{\beta_2(1-\lambda^j)}{\lambda^j + \beta_2 - \beta_2\lambda^j} \right) \right]$.

Equation (8) gives mayor's political support function when he maximizes x_i - the amount of resources voters observed as being invested in municipality i . With such result we can calculate the presidential utility under four mutually exclusive conditions: (1) when municipality i is represented by a legislator and is governed by a mayor from the same party as the president, (2) when municipality i is represented by a legislator from the same party as the president, but governed by a mayor from a party different to the president, (3) when municipality i is governed by a mayor from the same party as the president, but represented by a legislator from a party different to the president, and (4) when municipality i is governed by a mayor and represented by a legislator from parties different than the president.

If municipality i is represented by a legislator and is governed by a mayor from the same party as the president, then, the president chooses z_i to maximize U_P under the constraint of G which gives: $z_i^* = \frac{\beta_2}{\tau}$. If municipality i is represented by a legislator from the same party as the president, but governed by a mayor from a different party he does not care about this mayor and chooses z_i to maximize U_P . By the same calculation we get $z_i^* = (\alpha + \gamma) \frac{\beta_2}{\tau}$. If municipality i is governed by a mayor from the same party as the president, but represented by a legislator from a party different from the president, he does not care about this legislator and chooses z_i to maximize U_P : $z_i^* = (\alpha + \omega) \frac{\beta_2}{\tau}$. If municipality i is governed by a mayor and represented by a legislator

from parties different than the president, he does not care about either the legislator or the mayor. Then the president chooses z_i to maximize U_P : $z_i^* = \alpha \frac{\beta_2}{\tau}$ (see Table 1).

Table 1: *Presidential Optimal Choice of Allocation to Maximize his Utility Function*

		Legislator	
		Co-partisan	Not
Mayor	Co-partisan	$\frac{\beta_2}{\tau}$	$(\alpha + \omega) \frac{\beta_2}{\tau}$
	Not	$(\alpha + \gamma) \frac{\beta_2}{\tau}$	$\alpha \frac{\beta_2}{\tau}$

Now that we have the utility function of mayors and the president under the optimal points of x_i^* and z_i^* , it is possible to rewrite equations above in indicator-variable notation:

$$\begin{aligned}
z_i^* &= \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L and M same party}\}} \\
&+ (\alpha + \gamma) \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L same party, M different party}\}} \\
&+ (\alpha + \omega) \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L different party, M same party}\}} \\
&+ \alpha \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L and M different than president's party}\}} \tag{9}
\end{aligned}$$

Equation 9 defines the conditions under which the president's likelihood of allocating resources to certain kinds of municipalities tends to be higher or lower. From this result one could find comparative statics to be tested against data on discretionary

allocation. Instead, I use this result to estimate values for the weights on president's utility function on popularity (α), on legislative building (γ) and on party building (ω). In the next section, I explain my identification and estimation process from the structural model described before.

Estimation Strategy

Equation 9 can be estimated by OLS assuming there is a stochastic parameter to the presidential allocation such that $\epsilon \sim N(\mu, \sigma^2)$, and including year and municipality fixed effects. The estimates of the coefficients associated with the fixed effects represents all the other features of municipality i that are not associated with the party affiliation of its representatives in the Congress or in the City Hall.

This equation is, however, not identified. To estimate its parameters it is necessary to re-parametrize it by assuming:

$$D_1 = \frac{\beta_2}{\tau} \tag{10}$$

$$D_2 = (\alpha + \gamma) \frac{\beta_2}{\tau} \tag{11}$$

$$D_3 = (\alpha + \omega) \frac{\beta_2}{\tau} \tag{12}$$

$$D_4 = \alpha \frac{\beta_2}{\tau} \tag{13}$$

From this we can find

$$\frac{D_2}{D_1} = \alpha + \gamma \qquad \frac{D_3}{D_1} = \alpha + \omega \qquad \frac{D_4}{D_1} = \alpha$$

Note that equations 10, 11, 12, and 13 imply that $D_1 + D_4 = D_2 + D_3$.⁵ Thus, it is

⁵Given that $\alpha + \gamma + \omega = 1$, we can write $\omega = 1 - \alpha - \gamma$. Thus, $D_3/D_1 = \alpha + \omega = \alpha + 1 - \alpha - \gamma = 1 - \gamma$. We know that $D_2/D_1 = \alpha + \gamma$, and that $D_4/D_1 = \alpha$. Then, we can write $\alpha = D_4/D_1$ and $\gamma = 1 - D_3/D_1$. Therefore, $D_2/D_1 = D_4/D_1 + 1 - D_3/D_1$, and $D_2 = D_4 + D_1 - D_3$ or

possible to estimate D_1 , D_2 , D_3 and D_4 by regressing z_i on $x_1 = \mathbf{1}(\text{Legislator and Mayor president co-partisan})$, $x_2 = \mathbf{1}(\text{Legislator is president's co-partisan, but Mayor is not})$, $x_3 = \mathbf{1}(\text{Mayor is president's co-partisan, but Legislator is not})$, and $x_4 = \mathbf{1}(\text{Mayor and Legislator are not from president's party})$, constraining the sum of the coefficients of x_1 and x_4 to equal the sum of the coefficients of x_2 and x_3 , and the regression intercept to equal zero.⁶

After estimating equation 9 under the re-parametrized model, the OLS estimates of D_1 , D_2 , D_3 and D_4 can be used to find the values for α , γ , and ω . Given the constraint imposed over these parameters, we know that the weights over popularity, legislative majority and party building should sum to 1. Thus, finding α and γ will be sufficient to solve the estimation problem proposed here. The identification of the parameters hinges on having all of the variables in the model measured in the same units. If the different variables are arbitrarily scaled, then there is no reason for the decision weights to sum to 1, and none of the parameters in the model are identified. That requirement drives the data choices outlined in the following section.

Data

In applying the model of the previous section to the data, three sets of choices are required. First, the units of measure must be defined. Second, proxy variables must be selected. Third, the sample needs to be identified.

My data cover all 5,564 municipalities in Brazil from during the eight years of Lula's presidency (2003-2010), all 335 municipalities in Venezuela during the 12 years

$D_2 + D_3 = D_1 + D_4$.

⁶In practice, this can be done by regressing z_i on the following three independent variables $(x_1 - x_4)$, $(x_2 + x_4)$, $(x_3 + x_4)$, while restricting the intercept to zero. Note this estimates $z_i = D_1x_1 + D_2x_2 + D_3x_3 + D_4x_4 = D_1x_1 + D_2x_2 + D_3x_3 + (D_2 + D_3 - D_1)x_4 = D_1x_1 - D_1x_4 + D_2x_2 + D_2x_4 + D_3x_3 + D_3x_4 = D_1(x_1 - x_4) + D_2(x_2 + x_4) + D_3(x_3 + x_4)$. Note that this constrains the coefficient on x_4 (i.e. D_4) to equal $D_2 + D_3 - D_1$.

of Chávez's presidency (2000-2011), and all 2,438 municipalities in Mexico from during the 12 years of PAN's presidency (2000-2012), a total of nearly 80,000 municipality-year observations. The abundance of data is what allows me to fit the structural model proposed here. I am able to find enough variation of all possible municipal status in the data set. The federal discretionary transfers are measured for each municipality on approximately 12 years per country. These resources are typically used to infrastructure investments that impact education, health, sanitation and transportation in the municipalities. Transfers are scaled by municipal population to avoid the necessity to deal with large heterogeneous municipal population sizes.

The only requirement for a unit of measure for the analysis is that it reflects discretionary allocations across municipalities and that it is available for all four municipal types (both mayor and legislator are from president's party, only mayor is from president's party, only legislator is from president's party, and neither mayor nor legislator are from president's party) for the time period in question. Any expenditure variable compiled annually, as well as estimates from public and private institutions satisfy this criterion. In practice, the discretionary transfers allocated from presidents directly to municipalities (compiled annually by the countries' ministries of finance) are used in the analysis that follows, primarily because they have been the standard measure in previous literature on the topic (see for example ?, ?, ?, ?, ?, ?).

There is one primary shortcoming of analyzing federal transfers (see Figure 2). They exhibit left censoring (that is, transfers are restricted to be non-negative), which may lead to inconsistent parameter estimates. The critical case is Brazil, where the large majority of municipalities do not receive investments every year. The top-right graph in Figure 2 shows how the number of zero values is much higher than the frequency of municipalities that receive some investments. For the cases of Mexico and Venezuela, this is less of a problem. Note how the density height for these cases is higher for the

municipalities that receive investments. In practice, however, I do not treat zero values as censoring, but as real values. Municipalities that do not receive appropriations are not proxies for negative transfers, but places where investments were indeed not seen by voters.⁷ As a check for bias induced by censoring, the basic specifications of the previous section were replicated using symmetrically trimmed least squares (?), an estimation technique that is robust to censoring. In all cases, the estimates of the weighting parameters in the utility function were virtually unchanged, suggesting that censoring is not a critical issue.

Choice of Variables

Variables are needed for identifying the party affiliation of mayors and legislators. The framework developed in Section I imposes an important restriction: in order for the model to be identified, all of the variables must be mutually exclusive indicator variables. See Table 2 for the summary statistics of the variables. During Lula's government, he faced 45% of municipalities with legislators from his party, but only 3% with both legislators and mayors. In Mexico, the PAN governed without representation of mayors or legislators in 72% of municipalities, an expected picture given the dominance of the PRI in that country. In Venezuela, Chavez faced the best scenario when compared to other presidents in the region. In 39% of the municipalities his party elected the mayor and the legislator running for those seats, and in only 19% of the country's territory was his party absent. This scenario describes very well the different levels of what I define as the 'presidential dilemma' (?). Whereas in Brazil, Lula faced a large opposition setting in the municipalities, in Venezuela, Chavez controlled most of the offices in the country. The Mexican case is in between them.

⁷In another paper I propose a Bayesian two-part model (BTM) to deal with semicontinuous variables, and argue this is the solution required to solve this issue. The structural model presented above will not be estimated using the BTM in this paper, but results are unchanged using it.

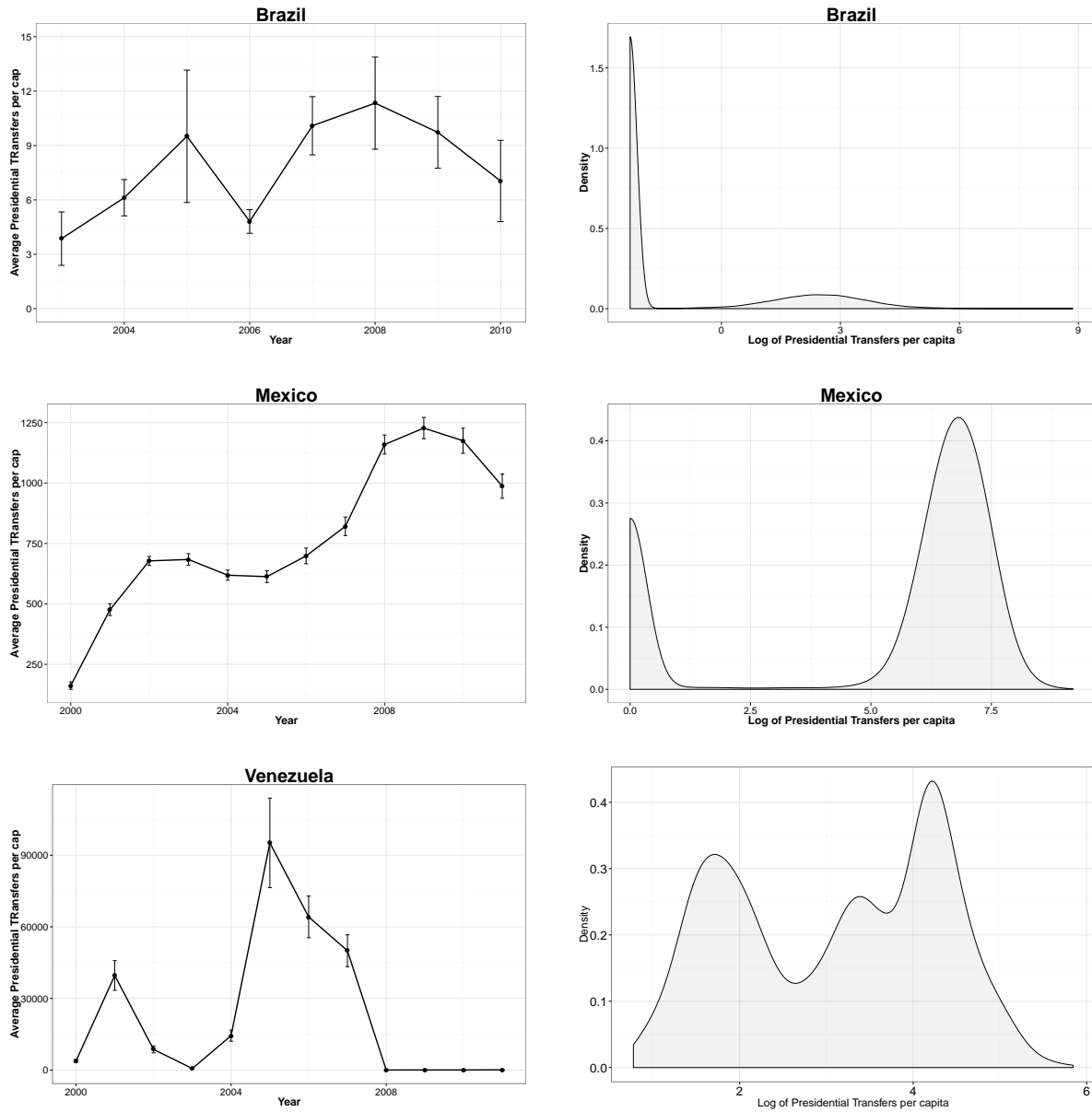


Figure 2: *On the left, the average of presidential appropriations per capita over time. On the right, the distribution of the log of presidential appropriations per capita.*

Table 2: *Distribution of Municipal Types by Country*

	Neither	Mayor	Legislator	Mayor+Legislator
	N (%)	N (%)	N (%)	N (%)
Brazil	20462 (48)	1874 (4)	1933 (45)	1150 (3)
Mexico	11897 (72)	1752 (11)	2148 (13)	763 (5)
Venezuela	62 (19)	54 (16)	89 (27)	130 (39)

These four binary variables were created based on two indicators: (1) party affiliation of mayors, and (2) percentage of votes the president’s party received in each municipality for the legislative elections. The first variable is self explanatory and does not present any special challenge. The official electoral results from each country were collected and allowed me to identify the party of each mayor. The second variable, however, needs a justification. Brazil has a open-list proportional representation systems. Mexico, in turn, has a mixed system with some deputies elected by a plurality single-member districts, and others by closed list PR. Venezuela has a single-member district system. In order to identify the municipalities that could be classified as constituencies of legislators from the president’s party, I calculated the amount of votes each party received in each municipality in the legislative elections, and I selected the municipalities in which the president’s party vote share was the largest. In Mexico and Venezuela this was less a problem because of the low number of relevant parties. Most of the municipalities in which the president’s party was the largest also had majority of the votes there. In Brazil, by contrast, the fragmentation of the party system reduced the chances that a party received the majority of votes in each municipality. Most of the municipalities identified as president’s party constituencies did not vote more than 50% for the president’s party.

Although there is no good measurement for legislator's constituency for PR systems, capturing the dominance and presence of a party in a municipality by counting the number of votes it received there, seems to be a good approximation for the purposes of my research. With this measurement choice I will be able to parse out the municipalities in which the president's party did very well in the legislative elections, and use this as a *proxy* for how much a president should care about such municipality if he is interested in helping his legislators for the next election. Again, I believe this to be a good measurement because in PR systems the number of seats is generally allocated by the total number of votes a party list obtain. Getting the majority of votes in many municipalities increases directly the likelihood a party will elect more seats for the legislature, which can be taken as a *proxy* for how much important a municipality is for this party.

Due to the non-concurrent election cycles, mayoral affiliations change in a year different than legislators' affiliations. In Brazil, for example, mayoral partisanship changed in 2005, reflecting the 2004 mayoral elections, and in 2009, reflecting the 2008 local elections. Legislators, on the other hand, changed with the other national elections in 2006 and 2010. In Mexico, municipal affiliations changed in 2004 and 2009, whereas national elections changed legislators' affiliations in 2000 and in 2006. In Venezuela, national elections occurred in 2000, 2006 and 2012, whereas municipal elections occurred in 2000, 2004 and 2008. In the data used here, mayoral affiliations also change between these these intervals (although marginally) as a function of mayor's party switching, or party splitting.

The Choice of Sample

Presidential discretionary transfers directly to municipalities over the period 2000-2012 are the basis of the sample. I make three types of exclusions. First, municipalities with

less than 6 years of information are dropped. The model requires estimating a fixed effect for each municipality. For those places in which data is only available for few years (either because they are new municipalities, or because I could not find enough information for them), those estimates are quite imprecise. Moreover, the imprecision of those estimates has an adverse impact on the standard errors of the weights in the utility function. Including only municipalities for which data exists for a minimum of 6 years in the sample reduces the number of parameters to be estimated by 375 in Brazil, by 132 in Mexico and by 12 in Venezuela, while lowering the available observations to 5215, 1380, and 300, respectively.

Second, as noted earlier, for municipalities which party affiliation of mayors and legislators did not change over time, the legislators' voter proxy is likely to be noisy and very sensitive to the party affiliation of mayors. Therefore, municipalities for which affiliation of mayors or legislators do not change at least once are excluded from the sample. This eliminates an additional 155 municipalities in Brazil, 37 in Mexico and 22 in Venezuela, leaving 4,840 municipalities in Brazil, 1,343 in Mexico, and 278 in Venezuela.

The third type of exclusion is for missing data. I excluded from the sample all municipalities for which I could not find mayoral party affiliation, national transfers or party vote shares for legislative elections. After exploring the raw data, I believe it is reasonable to claim the missing data happens at random. To check for that, I ran a logit model having as a dependent variable a *dummy* for inclusion/exclusion of the data point in the sample, and as independent variables the variables I am going to use in this paper. No coefficient was statistically different than zero, suggesting no systematic effect of any independent variable important for my study on the chances of being included or not in the sample. I also ran the results with an imputed data set from Amelia (?), and weights of utility function came all very similar.

Empirical Estimates

Regression estimates of equation 9, using the variables and sample defined in the previous section, are presented in Tables 3, 4, and 5. The coefficients reported in the tables are decision weights in presidents' utility functions. As a test of the robustness of the results, a range of specifications are estimated using different legislative constituency proxies, sometimes instrumenting for party, and sometimes including year dummies to capture any systematic variation over time. Columns (1), (2), (5), and (6) of Table 3 use the president's party's votes in lower house elections as the proxy for how much he cares about his legislative majority; the remaining columns use the president's party's votes in upper house elections as a proxy. The odd-numbered columns are OLS estimates; the even-numbered columns instrument for the legislative vote proxies with once-lagged and twice-lagged values. Columns (5) - (8) add year dummies to the specification. In all cases, the sum of the weights in the utility function were restricted to equal 1, and overall presidential preferences were assumed to be constant over time.

Table 3: *Estimated Weights in Presidents Decision Functions - Brazil*

Weight on:	<i>Dep. variable: Federal transfer spending per capita</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Popularity	.463	.450	.452	.451	.453	.453	.459	.456
Legislative Majority	.021	.052	.034	.036	.046	.048	.049	.051
Party Building	.516	.498	.514	.513	.501	.499	.492	.493
Proxy Legislative Maj.	<i>Lower House</i>		<i>Upper House</i>		<i>Lower House</i>		<i>Upper House</i>	
Instrument for Party	No	Yes	No	Yes	No	Yes	No	Yes
Includes year dummies	No	No	No	No	Yes	Yes	Yes	Yes
Adj. R^2	.91	-	.91	-	.99	-	.91	-

The results are quite similar across the different specifications. It is reassuring to note that all of the weights are positive, although that restriction was not imposed. The high adjusted R^2 values in the OLS cases imply that the regressions are able to

explain almost all of the variation in presidents distributive strategies. This is largely attributable to the municipality fixed effects, since variation across municipalities is much more pronounced than variation in a given municipality's transfer pattern over time. I do not have estimation of precision for the weights, as I have not calculated standard errors for these estimated values yet.⁸

In Brazil, legislative support is estimated to receive only 2 percent of the weight in presidents' decision functions, suggesting that the constituency of legislators has relatively little influence on the distributive strategy of the president. The coefficient on the president's popularity, however, is approximately the same magnitude as that on party building: roughly .46 and .51. The similarity of those parameters suggest that Lula used his discretionary power to produce more popularity for himself and to build his party strength in the municipalities. Although under some specifications the party building weight gains in magnitude, I would say this is an indication of a strategy that allows the president to build his support and his party at the same time. Given that Lula was facing municipalities in which his party was not governing, but in which he had gained the majority of the presidential votes, his decision function seems to accommodate both situations at once. He targeted municipalities to maintain the popularity he achieved in the previous election, but also to strengthen the presence of his party in the municipalities (Nunes, 2013). These results provide little evidence for the legislative majority argument presented before, but strong support for the popularity and party building hypothesis.

In Mexico, the scenario looks different with all the three components of the president's utility function having very similar weights. The most salient one is the popularity, roughly .38; followed by the legislative majority, approximately .33; and by

⁸I am implementing a bootstrap function to produce the standard errors. The next version of this paper will already contain such necessary improvement.

Table 4: *Estimated Weights in Presidents Decision Functions - Mexico*

Weight on:	<i>Dep. variable: Federal transfer spending per capita</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Popularity	.378	.375	.370	.371	.368	.382	.383	.375
Legislative Majority	.334	.332	.331	.338	.337	.324	.321	.329
Party Building	.288	.293	.299	.291	.295	.294	.296	.296
Proxy Legislative Maj.	<i>Lower House</i>		<i>Upper House</i>		<i>Lower House</i>		<i>Upper House</i>	
Instrument for Party	No	Yes	No	Yes	No	Yes	No	Yes
Includes year dummies	No	No	No	No	Yes	Yes	Yes	Yes
Adj. R^2	.96	-	.93	-	.97	-	.93	-

party building, .29. Given the long history of dominance by the PRI across different offices in the country, it seems that the PAN government had to spend resources to build their power on all three levels. This is a typical case of portfolio diversification strategy in which the president uses the available resources to benefit his party members in congress, in the municipalities, and also help out his own voters. As I was expecting the Mexican presidents during PAN's government to be more party building than the model estimated, the low weights on party building make sense for the level of decentralization observed in Mexico. World Bank reports show Mexico in a position lower than Brazil in its fiscal decentralization ranking, implying that mayors are not as important for the presidential goals as in Brazil.

In Venezuela, the popularity of the president appears to be the most important determinant of the discretionary transfers, garnering between 65 and 69 percent of the overall weight. The main implication of this results is that president Chavez was distributing discretionary investments to reward his supporters, and to build a personal linkage with voters. This result is consistent with many studies about the new left in Latin America and lends some empirical support to the recent theoretical work that stresses the importance of popularity to populist politicians (??????). The low weight

Table 5: *Estimated Weights in Presidents Decision Functions - Venezuela*

Weight on:	<i>Dep. variable: Federal transfer spending per capita</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Popularity	.674	.654	.694	.654	.661	.672	.681	.678
Legislative Majority	.194	.193	.191	.197	.190	.195	.194	.192
Party Building	.132	.153	.115	.149	.501	.149	.125	.130
Proxy Legislative Maj.	<i>Lower House</i>		<i>Upper House</i>		<i>Lower House</i>		<i>Upper House</i>	
Instrument for Party	No	Yes	No	Yes	No	Yes	No	Yes
Includes year dummies	No	No	No	No	Yes	Yes	Yes	Yes
Adj. R^2	.87		.89		.91		.95	

of Chavez on party building is also consistent with my expectation that a president from a centralized system should not worry too much about the dilemma of not having loyal agents in the local offices to implement his policies. Venezuela, as stated by the World Bank, is the most centralized country in Latin America.

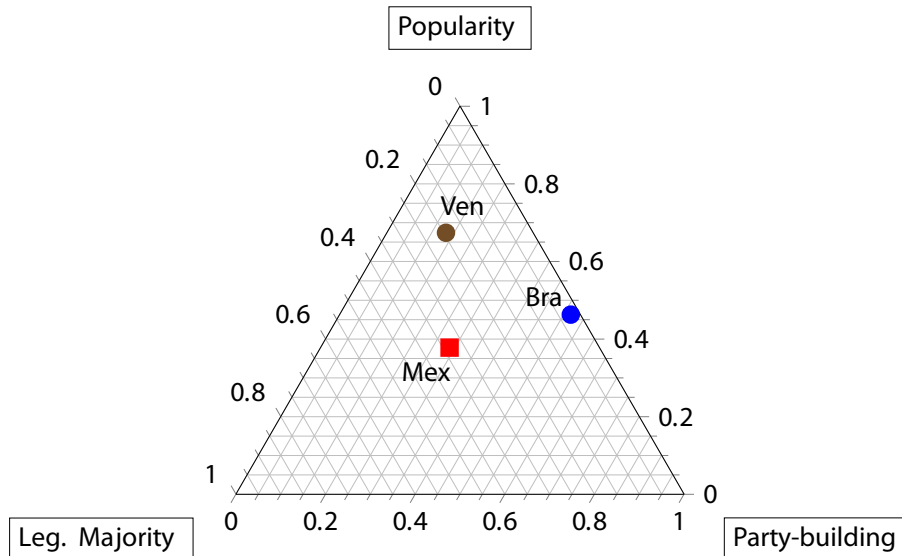


Figure 3: *Ternary Diagram with the Estimated Presidential Weights. Hugo Chávez in Venezuela assigns .67 to popularity. Luis Inácio Lula da Silva in Brazil assigns .46 to popularity, only .02 to legislative majority building, and .52 to party building. Presidents Fox and Calderón in Mexico, in turn, assign close to .33 percent weight to each of the strategies.*

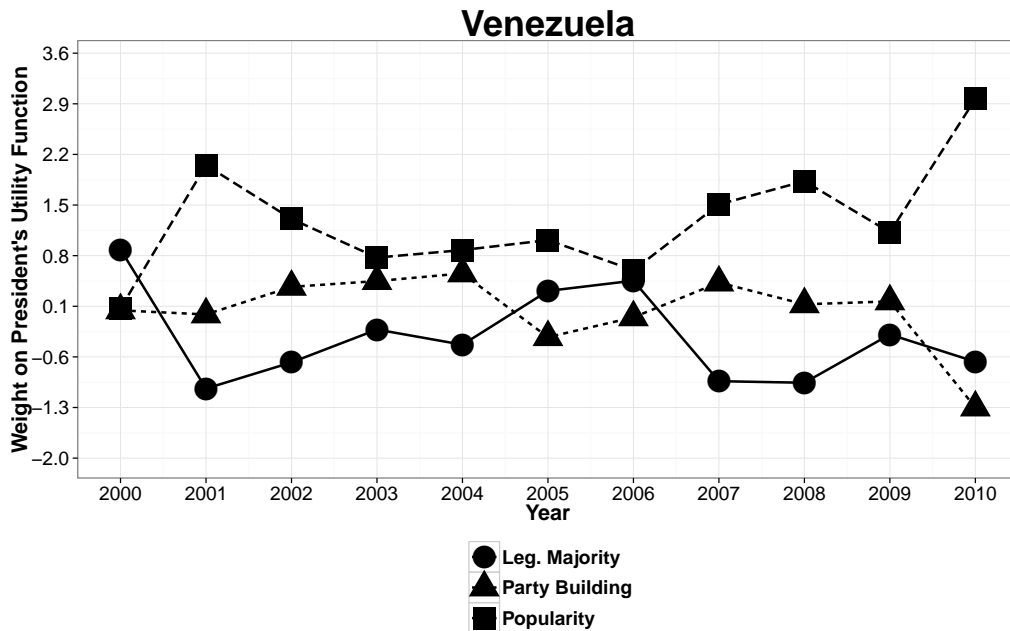
The results for Brazil, Mexico and Venezuela are summarized in the ternary diagram on Figure 3. The circle close to the right edge summarizes Lula's position (BRA), the circle at the top of the diagram summarizes Chavez' position (VEN), and the square in the middle of the diagram summarizes Fox's and Calderon's positions (MEX). This representation express the different expectations about the behavior of presidents in allocating resources and these estimates have important implications for a wide range of political science research. The methodology proposed here will make possible the comparison of presidential behavior measuring their revealed preferences for goals that motivate many models in the discipline.

Estimating the Weights Over Time

The model developed here is extremely flexible in its ability to test hypotheses about president allocative patterns. In this section, I will explore the variation of allocations over time to estimate the weights of president's utility function by year. This will allow me to explore a wide range of factors that potentially influence decision weights. In all cases, the specification employed uses votes for the elections for the lower house as a *proxy* for legislative majority, and does not instrument for that variable using lagged values. Therefore, the results reported below are variations on the results reported in column (1) of Tables 3, 4, 5. In this section, then, each president's weight functions will be allowed to vary over time.

The patterns identified in each plot suggest three different stories. In Venezuela the overall pattern estimated in the last section is confirmed. Chávez used his discretionary power to allocate resources in order to build his popularity among voters. The weight that this estimate gains is the largest across all years. Given the documented control

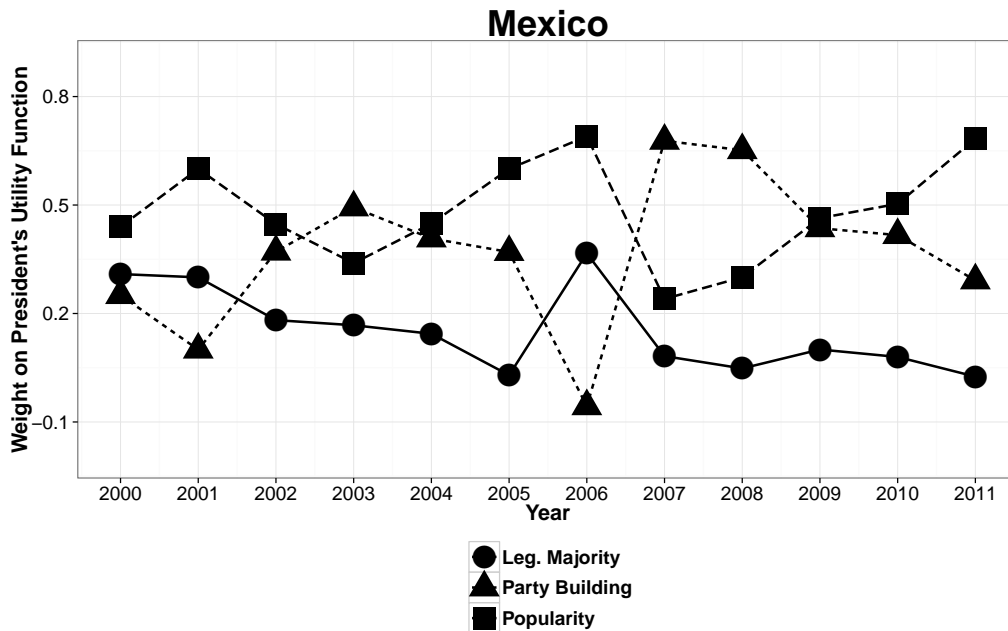
Figure 4: *Estimated Weights in Presidents Decision Functions Over Time*



that he had over the legislature during his government (???), it is not a surprise that the weight the legislators have on his decisions was, in general, smaller. Note, however, that in the beginning of his mandate, when he did not have that much control over the government, Chávez’s main concern in the allocation of resources was to build his legislative majority. The two peaks in the popularity weight happens in the year of the opposition coup against Chávez in 2001, and in the year before the last presidential election, in 2010.

In Mexico, popularity gains weight during the two first years of PAN’s government – a historical turnover in the presidency after 70 years of dominance of the PRI – , and in the years previous to the presidential elections in 2005 and 2011. It also come out larger for the first years of the PAN in government. In the years close to municipal elections, the party-building component of the president’s utility function is what appears to be the most important determinant of the discretionary transfers,

Figure 5: *Estimated Weights in Presidents Decision Functions Over Time*

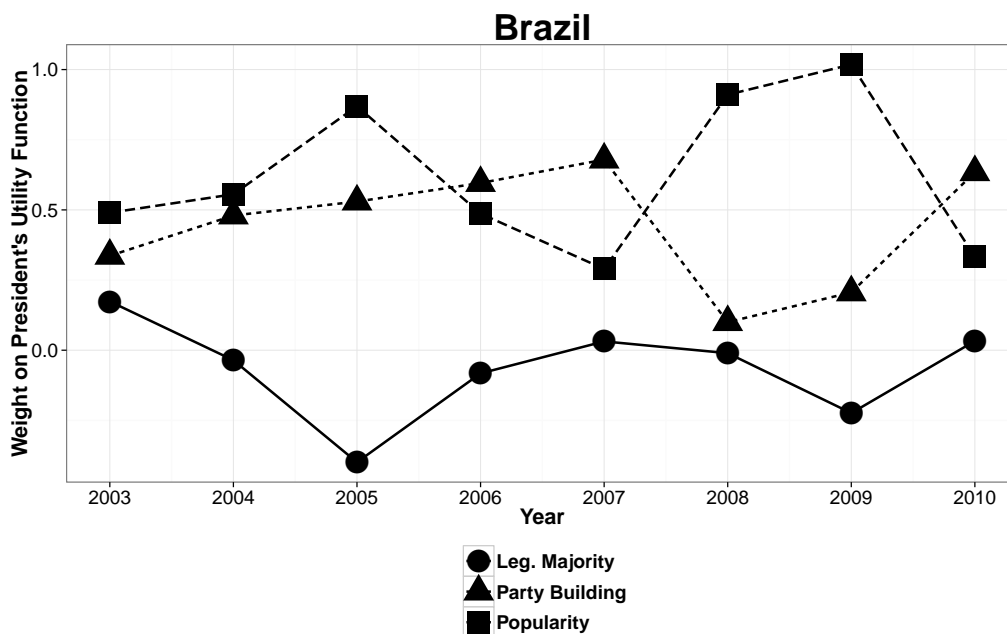


garnering between 50 and 60 percent of the overall weight. The legislative majority strategy has never influenced the PAN's government enough. The estimated weight for this element has almost always been close to zero. When disaggregated, the evidence for Mexico suggests a different story than the one estimated in the aggregate level. The electoral cycle of the nonconcurrent elections for the national and local levels seems to be an important factor in determining when each strategy becomes dominant in the Mexicans utility functions. The temporal diversification of strategies points me to conclude that politicians are indeed acting in order to maximize their utilities dynamically over time.

The pattern of allocation in Brazil seems similar to the one identified in Mexico. The weight on legislative majority is always the lowest, popularity is higher in the years previously to national elections, and party building in the years previous to municipal elections. The coincidences of both cases suggest that decentralization might not be the

only variable important to measure how important mayors are for presidents interested in the implementation of a infra-structure agendas in the municipalities. Brazil has a much more decentralized system than Mexico, however, the weight of party building seems to follow the same pattern in both cases. My hypothesis about this similarity is that even a small level of decentralization might be enough to make mayors important players in the political system. If that is the case, the predictive power of fiscal decentralization might be even stronger when correlated with the allocative strategies of presidents.

Figure 6: *Estimated Weights in Presidents Decision Functions Over Time*



Conclusion

This paper attempts to disentangle the relative weights that Latin American presidents assign to various factors in establishing which municipality receives investments from the federal government. The primary methodological contribution of this work is the attainment of consistent estimates of the presidential decision function weights, even though presidents preferences are not observed. Popularity and party building are both shown to play a role in predicting presidents' allocation patterns, although a huge variation was measured across countries. Less than one fifth of the weight in the decision function is devoted to legislative majority, suggesting a substantial amount of successful pressure coming from local politicians and voters, but not from legislators.

My findings suggest that Lula, Chávez, and Fox distributed resources to guarantee their popularity across the municipalities. The importance of this element is documented in the size of the weight popularity receives over the years. In the Venezuelan case, this is true for the entire period, which suggests the centralization of the distribution and implementation of policies made Chávez a popularity-seeking politician. For the cases of Brazil and Mexico, we observe a diversification strategy over time. In the years preceding presidential elections, the weight of popularity peaks in their utility functions, while in the years preceding municipal elections, the weight on party building grows. I believe that the higher level of decentralization of these two countries, as compared to Venezuela, suggests that mayors are important players for the presidents in Brazil and Mexico.

The formal political economy literature has argued that presidents should just target cheap voters, not differentiating the role that the different levels of government play in shaping the presidential preferences. My model develops the previous ones further showing that all three possible goals (popularity, majority in the legislature, and

nationalized party) are not mutually exclusive, although I highlight the importance of understanding politics as prioritization under scarce time and resources.

As pointed out by ?, in the democratic countries of Latin America the parties in power used to find it extremely difficult to win the election following their ascent to power, or even to avoid a decrease of their share of the vote. Although turnovers were in fashion in the region since re-democratization, *de facto* partisan shifts were only observed in the beginning of the 21st century. In the first years after re-democratization, the political parties controlling the presidency were either inheritors of the authoritarian regime alliances, or groups that were not opposed to the regime at all. It is only with the emergence of left political parties with political agendas ideologically different from the ones carried out by the traditional ruling parties that turnovers should be taken as indeed in place. Such moves are considered important because they not only changed traditional structures in most countries, but they also marked the ‘left turn’ in the region (??).⁹

Although such turnovers produced large reordering at the central level of government, historical political machines were still in place in the lower levels of government. In other words, elected presidents did not have a range of allies to give them political and electoral support. In Brazil, Lula’s party governed less than 3% of the municipalities (or 18% of the population) in 2002. In Venezuela, Chavez’s party governed less than 18% of the municipalities (or 24% of voters). In Mexico, Fox’s party controlled 27% of the municipalities in 2000, which represented 35% of the total population. Given this scenario of uncertainties about what would happen in the region, it became of real interest to know which interests the new presidents would prefer to benefit. Or to put in a different way, it became of interest of most scholars of the region what these new presidents prioritize in their redistributive agendas.

⁹Mexico’s Vicente Fox is the only exception, as his electoral victory marked the first turnover toward a conservative party in Latin America (?).

The methodology and estimation I present here have as the main aim to help understanding how presidents acted. But the application of it can be wider. Having the necessary data, any research can estimate the weight politicians put in these three components of their utility functions anywhere else. Although I cannot make general conclusions here, I believe my results open a research agenda that needs to be explored in Latin America and elsewhere. The combination of presidential turnovers and decentralization produced an interesting puzzle for newcomer presidents in Latin America. On the one hand, Latin American presidents enjoy great discretion over targeted spending decisions (?). Such resources could, then, be geographically targeted to promote policy goals (???), and to promote voter support for the president's party in national elections (???). On the other hand, given the processes of decentralization in these countries, presidents could not rely on local politicians as good agents who would cooperate with the president on the implementation of his agenda, in helping him getting electoral credit for the public goods allocated, and in mobilizing voters to support the president in the next electoral cycle.

Thus, although the president enjoyed budgetary power, his allocated strategy needed to take into consideration the risks of agency loss. To the extent that voters respond to targeted spending, a president can use budgetary discretion to gain votes for him. But federal transfer spending also improves re-election odds for incumbent mayors in targeted municipalities, especially under a decentralized setting. The political benefits of transfer spending thus accrue not just to the president, but also to an array of local politicians who may or may not share the president's party and political goals. By targeting his own core voters and pursuing social policy goals, the president may be supporting the reelection goals of his political enemies at the local level. When a president and local mayors are from different parties, and mayors have autonomy to manage and implement public services and goods, the president faces a trade-off

between (1) meeting core voter expectations on outcomes while providing resources to opponents who could threaten his power; or (2) only allocating resources to towns run by co-partisan mayors, while excluding the majority of his supporters from receiving benefits.

In the cases of Brazil, Mexico, and Venezuela in the beginning of Lula, Fox, and Chavez governments, respectively, we observe a critical detachment between the presidential electoral support, and the presidential party's local electoral support. Consequentially, presidents elected with the majority of votes faced a new situation, in which their personal electoral support had not translated into party support. The methodology I presented in this paper is a first attempt to estimate how much presidents care about his own popularity, the majority he needs in the Legislature, and the structure of his party in the municipalities. Because the estimation technique applied in this paper requires only the allocation data, it can be applied to any time period and any subset of discretionary transfers. For instance, one could examine earlier periods of the history of Latin American countries, tracing the importance of parties and the degree to which the neo-populism resembles the classic one. It might also be of interest to apply this methodology to other countries. Alternatively, one could determine how the distribution of resources vary across areas, comparing, for instance, how left and right presidents weight votes, legislators and their own parties.

Appendix

Proof 1: Mayor chooses x_i to maximize $U_M(\lambda^C, z_i, x_i)$

$$\begin{aligned}
 \max_{x_i} \quad & [\lambda^j \ln(z_i - x_i) + (1 - \lambda^j)(\beta_{1i}^M + \beta_2 \ln(x_i))] \\
 -\frac{\lambda^j}{z_i - x_i} + \frac{(1 - \lambda^j)\beta_2}{x_i} &= 0 \\
 \frac{\lambda^j}{z_i - x_i} &= \frac{(1 - \lambda^j)\beta_2}{x_i} \\
 \lambda^j x_i &= (1 - \lambda^j)\beta_2(z_i - x_i) \\
 \lambda^j x_i &= (1 - \lambda^j)\beta_2 z_i - (1 - \lambda^j)\beta_2 x_i \\
 \lambda^j x_i + (1 - \lambda^j)\beta_2 x_i &= \beta_2 z_i - \beta_2 z_i \lambda^j \\
 \lambda^j x_i + \beta_2 x_i - \beta_2 x_i \lambda^j &= \beta_2 z_i - \beta_2 z_i \lambda^j \\
 x_i[\lambda^j + \beta_2 - \beta_2 \lambda^j] &= \beta_2 z_i(1 - \lambda^j) \\
 x_i^* &= \frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j} \times z_i \tag{14}
 \end{aligned}$$

Equation 14 specifies x_i such that a mayor from the presidential coalition maximizes his/her utility. We can, then, re-write mayor's utility function as

$$\begin{aligned}
 M_i &= \beta_{1i}^M + \beta_2 \ln(x_i^*) \\
 &= \beta_{1i}^M + \beta_2 \ln\left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j} \times z_i\right) \\
 &= \beta_{1i}^M + \beta_2 \ln\left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j}\right) + \beta \ln(z_i) \\
 &= \beta_{1i}^M + A + \beta_2 \ln(z_i) \tag{15}
 \end{aligned}$$

where $A = \left[\beta_2 \ln\left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j}\right)\right]$

Proof 2: President chooses $z_i|x_i$ to maximize $U_P(x_i, z_i)$

Equation 15 gives us the mayor's utility function when he/she maximizes x_i - the political credit he/she reveals from the presidential allocation. With such result we can calculate the presidential utility under four different conditions:

1. If municipality i is represented by a legislator and is governed by a mayor from the same party as the president, then, the president chooses z_i to maximize $U_p(x_i, z_i)$

$$\begin{aligned}
& \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} V_i + \gamma \sum_{\kappa \in i} L_i + \omega \sum_{\kappa \in i} M_i - \tau Z \right\} \\
& \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + \beta_2 \ln(x_i)] + \gamma \sum_{\kappa \in i} [\beta_{1i}^L + \beta_2 \ln(x_i)] \right. \\
& \quad \left. + \omega \sum_{\kappa \in i} [\beta_{1i}^M + \beta_2 \ln(x_i)] - \tau \sum z_i \right\} \\
& \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} \left[\beta_{1i}^P + \beta_2 \ln \left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j} \times z_i \right) \right] \right. \\
& \quad \left. + \gamma \sum_{\kappa \in i} \left[\beta_{1i}^L + \beta_2 \ln \left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j} \times z_i \right) \right] \right. \\
& \quad \left. + \omega \sum_{\kappa \in i} \left[\beta_{1i}^M + \beta_2 \ln \left(\frac{\beta_2(1 - \lambda^j)}{\lambda^j + \beta_2 - \beta_2 \lambda^j} \times z_i \right) \right] - \tau \sum z_i \right\} \\
& \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + A^C + \beta_2 \ln(z_i)] \right. \\
& \quad \left. + \gamma \sum_{\kappa \in i} [\beta_{1i}^L + A^L + \beta_2 \ln(z_i)] \right. \\
& \quad \left. + \omega \sum_{\kappa \in i} [\beta_{1i}^M + A^M + \beta_2 \ln(z_i)] - \tau \sum z_i \right\} \\
& \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + A^C] + \gamma \sum_{\kappa \in i} [\beta_{1i}^L + A^L] + \omega \sum_{\kappa \in i} [\beta_{1i}^M + A^M] \right. \\
& \quad \left. + [\alpha + \gamma + \omega] \sum_{\kappa \in i} \beta_2 \ln(z_i) - \tau \sum z_i \right\}
\end{aligned} \tag{16}$$

Differentiating in respect to z_i

$$\begin{aligned}\frac{\beta_2}{z_i} - \tau &= 0 \\ z_i^* &= \frac{\beta_2}{\tau}\end{aligned}\tag{17}$$

2. If municipality i is represented by a legislator from the same party as the president, but governed by a mayor from a party different to the president, the president does not care about this mayor and then chooses z_i to maximize $U_p(x_i, z_i)$. By the same calculation above we get something similar to equation 17

$$\begin{aligned}\max_{z_i} & \left\{ \alpha \sum_{\kappa \in i} V_i + \gamma \sum_{\kappa \in i} L_i - \tau \sum z_i \right\} \\ \dots \\ \max_{z_i} & \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + A^C] + \gamma \sum_{\kappa \in i} [\beta_{1i}^L + A^L] \right. \\ & \left. + (\alpha + \gamma) \sum_{\kappa \in i} \beta_2 \ln(z_i) - \tau \sum z_i \right\}\end{aligned}\tag{18}$$

Differentiating in respect to z_i

$$\begin{aligned}\frac{(\alpha + \gamma)\beta_2}{z_i} - \tau &= 0 \\ \frac{(\alpha + \gamma)\beta_2}{z_i} &= \tau \\ z_i^* &= (\alpha + \gamma) \frac{\beta_2}{\tau}\end{aligned}\tag{19}$$

3. If municipality i is governed by a mayor from the same party as the president, but represented by a legislator from a party different to the president, the president

does not care about this legislator and then chooses z_i to maximize $U_p(x_i, z_i)$

$$\begin{aligned} & \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} V_i + \omega \sum_{\kappa \in i} M_i - \tau \sum z_i \right\} \\ & \dots \\ & \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + A^C] + \omega \sum_{\kappa \in i} [\beta_{1i}^L + A^M] \right. \\ & \quad \left. + (\alpha + \omega) \sum_{\kappa \in i} \beta_2 \ln(z_i) - \tau \sum z_i \right\} \end{aligned} \quad (20)$$

Differentiating in respect to z_i

$$z_i^* = (\alpha + \omega) \frac{\beta_2}{\tau} \quad (21)$$

4. If municipality i is governed by a mayor and represented by a legislator from parties different than the president, he does not care about neither the legislator nor the mayor. Then the president chooses z_i to maximize $U_p(x_i, z_i)$

$$\begin{aligned} & \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} V_i - \tau \sum z_i \right\} \\ & \dots \\ & \max_{z_i} \left\{ \alpha \sum_{\kappa \in i} [\beta_{1i}^P + A^C] + \alpha \sum_{\kappa \in i} \beta_2 \ln(z_i) - \tau \sum z_i \right\} \end{aligned} \quad (22)$$

Differentiating in respect to z_i

$$z_i^* = (\alpha) \frac{\beta_2}{\tau} \quad (23)$$

Now that we have the utility function of mayors and the president under the optimal points of x_i^* and z_i^* , we can put the pieces of z_i^* together with indicator variables for

party affiliation of legislators and mayors to obtain a regression model:

$$\begin{aligned}
z_i^* &= \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L and M same party}\}} \\
&\quad + (\alpha + \gamma) \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L same party, M different party}\}} \\
&\quad + (\alpha + \omega) \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L different party, and same party}\}} \\
&\quad + (\alpha) \frac{\beta_2}{\tau} \mathbf{1}_{\{\text{L and M different party}\}} \\
&\quad + \epsilon_i
\end{aligned} \tag{24}$$

where $\epsilon \sim N(\mu, \sigma^2)$. Equation 24 can be estimated by including municipality fixed effects. The estimates of the coefficients associated with the fixed effects represents all the other features of municipality i that are not associated with the party affiliation of its representatives in the Congress or in the City Hall.