STRATEGIC PARTISAN TRANSFERS IN A FISCAL FEDERATION: EVIDENCE FROM A NEW BRAZILIAN DATABASE

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This article makes use of a unique database that allows, for the first time, calculating in a precise way the amounts of discretionary transfers from the Brazilian Federal government to municipalities in the period from 1997 to 2012. The new database is used to test the "strategic partisan transfers hypothesis", which states that mayors from the same party as the president receive higher federal transfers than those from different parties, if the corresponding municipality is situated in a state where the governor is not aligned with the president. In general, the econometric analysis strongly supports the strategic partisan transfers hypothesis. Furthermore, it supports the hypothesis that there is a biannual political transfers cycle in Brazil due to the country's staggered electoral system with elections every other year.

I. Introduction

Intergovernmental fiscal transfers constitute a vital instrument in a fiscal federation. Their normative goals are straightforward: reduce the fiscal imbalances across jurisdictions, thereby ensuring that all citizens have access to basic standards of public goods and services provision; solve externalities related to public goods spillovers, thereby increasing the efficiency of providing pubic goods and services; improve the overall tax system; and support local macroeconomic stabilization.[1] In practice, intergovernmental transfers are redistributions that benefit unequally different jurisdictions and may, hence, have different effects on local citizens' support to the federal government.

The literature on distributive politics aims to understand how political incumbents design intergovernmental transfers, when they care not only about the transfers' normative goals, but also about their political effect. Traditionally, there are basically two competing views on the political use of intergovernmental transfers. Consider a model of electoral competition where each candidate's platform is the intergovernmental fiscal transfer scheme to be implemented if that candidate wins. The "core voter" view of Cox and McCubbins (1986) suggests that a (risk-

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averse) candidate will propose higher transfers to the jurisdictions where he holds strong political support. Conversely, the "swing voter" view of Lindbeck and Weibull (1987) suggests that the candidate's platform will propose to benefit jurisdictions where there are relatively high numbers of undecided voters, who would be more sensitive to the benefits of those transfers.

Cox and McCubbins (1986)'s "core voter" view has a very clear implication for fiscal federation. Indeed, if we measure political support in a local jurisdiction (municipality) by the fact that the local incumbent (mayor) belongs to the same party as the higher-level incumbent (President, state governor), then, those local jurisdictions should receive more intergovernmental transfers. This implication of the "core voter" hypothesis is called here the "traditional partisan transfers hypothesis" (TPTH).

There is significant empirical support for the traditional partisan transfers hypothesis. For the United States, for example, Wright (1974) found evidence that the distribution of resources during the New Deal period favored regions in which the President's party received higher votes. The recent literature also finds evidence pointing in that direction. Ansolabehere and Snyder (2006) analyze transfers from U.S. state governments to their respective counties from 1957 to 1997 and find that "the governing parties skew the distribution of funds in favor of areas that provide them with the strongest electoral support". For Russia, Popov (2004) uses cross-section data and finds evidence that net transfers increased with pro-Yeltsin's vote in the period 1995 to 2001 while Jarocinska (2010) confirms these results for the period 1995 to 1999 using panel data. Similar results are established for Mexico in Kraemer (1997), for India in Khemani (2003, 2007), for Spain in Sollé-Ollé and Sorribas-Navarro (2008), and for the first 14 years of the return to democracy in Portugal in Veiga and Pinho (2007).

For the specific case of Brazil, Ferreira and Bugarin (2005) is the first article to examine the role of political alignment between municipality mayors and state governors in voluntary transfers. Using a panel of state discretionary transfers to municipalities from 1998 to 2003, the paper finds evidence that a municipality receives significantly higher discretionary transfers from the state government when the mayor belongs to the governor's party. Next, Ferreira and Bugarin (2007) uses a panel from 1998 to 2004 consisting of overall discretionary transfers from the state and the federal government and find evidence that transfers increase when the mayor belongs to the same party as the president or when the mayor belongs to a party in the coalition that supported the state governor (but does not belong to the state governor's party). In addition, both Ferreira and Bugarin (2005) and (2007) find evidence of a shorter, two-year political cycle in overall transfers, probably due to the fact that there are (staggered)

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elections every other year in Brazil. Brollo and Tommaso (2012) use a panel data of discretionary federal transfers directed to infrastructure projects exclusively and find evidence that "politically aligned municipalities receive more infrastructure transfers in the last two years of the mayoral mandate". Sakurai and Theodoro (2014) use a "Triple-Difference" econometric approach to a panel for the period 1998-2008 and conclude that "political alignment exerts little influence on the level of Current transfers, but positive and significant effect on Capital transfers". Finally, Bugarin and Ubrig (2013) extend the empirical study of Ferreira and Bugarin (2007) to the period 1997 to 2008, and find increases in overall transfers to municipalities associated with all types of political alignment, i.e., when the mayor belongs to the party of the president or the state governor's party, or when he belongs to another party in the coalition that supported the president or the governor.

Apart from Brollo and Tommaso (2012), which uses only infrastructure transfers from the federal government, all the previously cited evidence for Brazil is based on imperfect proxies of discretionary transfers.[2] The imperfection is due to the fact that the aggregated data on transfers made available until recently by the National Treasury Secretariat STN (Secretaria do Tesouro Nacional) did not distinguish properly the different types of mandatory and discretionary transfers. However, a task force created by the Brazilian federal government in 2014 was able to precisely identify discretionary transfers and, in 2015, made available a new, accurate database of federal discretionary transfers to the municipalities, as described in detail in section II. The new database, in turn, allows for an accurate study of the effects of political alignment on overall federal discretionary transfers. This is the general goal of the present article.

The empirical literature on partisan transfers typically considers two levels of government, either the federal and state governments or the federal and local governments or again the state and local governments. Therefore, that literature misses a very important aspect of a federal system, namely, the fact that there usually are three levels of nested governments, the federal, the state and the local. As far as we know, Garofalo (2015) is the first research that tries to bring together all three levels of government and reaches a new, a priori unexpected result. Indeed, that paper finds that the federal government will direct more transfers to politically aligned local districts that are in non-aligned states than those in aligned states. The underlying rationale is straightforward: state governors transfer more efficiently funds to their districts than the federal government. If the state governor is aligned with the president, then

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[2] For example, Bugarin and Ubrig (2014) use "Other current transfers from the Union" and "Other current transfers from the State" for current discretionary transfers and "Other capital transfers from the Union and the State" for capital discretionary transfers. Sakurai and Theodoro (2014), on the other hand, use the same variables for current transfers but use "Capital transfers from the Union" and "Capital transfers from the State" for capital transfers.

he has similar preferences over transfers; therefore, the president prefers to make transfers to the state government and delegate to the governor the distribution within his state. Conversely, the president prefers to bypass unaligned governors and directly transfer federal funds to aligned districts because the unaligned governor will not redistribute federal resources according to the president's preferences. By allowing to distinguish between aligned local governments in aligned states from those in unaligned states, Garofalo (2015) highlights a deeper form of partisan transfers, that we call here the "strategic partisan transfer hypothesis" (SPTH), which consists of biasing transfers to aligned local governments only where these transfers will be more advantageous, i.e., where the aligned municipality belongs to a non-aligned state. That paper finds supporting evidence for the U.S. The present article tests that highly strategic form of partisan transfers in a fully three-level of government federation, Brazil, where there are fully constituted elected governments at all three levels: the federal, the state and the municipal levels.

The econometric analysis uses a panel from 1997 to 2012 and its main finding is that there is clear evidence that direct political alignment between the mayor and the president increases federal transfers to a municipality, most significantly when the municipality belongs to a non-aligned state. Additionally, the econometric study confirms the biannual cycle hypothesis for federal voluntary transfers in Brazil first highlighted in Ferreira and Bugarin (2005).

The remaining of the article is organized as follows. Section II briefly describes the new database on voluntary transfers in Brazil. Section III presents the variables used in the econometric model and their expected signs. Section IV, the core section of the paper, presents the econometric strategy and its findings. Section V briefly discusses several robustness checks (that are detailed in the Online Appendix) and Section VI concludes the paper.

II. Voluntary transfers in Brazil: a new database

On May 16, 2012 the Brazilian Information Access Law (IAL) came into force. The IAL established open access to government information as the rule and secrecy as the exceptional situation. [3] The Brazilian IAL is very comprehensive and effective and huge amounts of information became available through the Internet including, for example, every Federal government public servant's wage.[4] In 2015, the international NGO International Budget

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[3] For additional information on the Brazilian Information Access Law, in Portuguese: http://www.acessoainformacao.gov.br/perguntas-frequentes/aspectos-gerais-da-lei#1
[4] For the Executive civil servants' branch, all one needs to do is to access http://www.portaldatransparencia.gov.br/servidores/Servidor-ListaServidores.asp and type in the civil servant's name.

Partnership classified Brazil in 6th position worldwide, ahead of advanced economies such as France, the United Kingdom and Germany, in terms of budget transparency, in their Open Budget Survey.[5]

In accordance to the IAL, the Brazilian Union's General Comptroller GCU (Controladoria Geral da União) made public the detailed list of all "Convênios" (grant contracts) between the Federal government and the municipalities since January 1, 1996.[6] That list consists of over 467 thousand contracts not categorized as to which type of federal transfers each contract belongs to.

In parallel, given the multitude of different classes of federal transfers available, the Federal government created an inter-ministerial task force aimed at clearly defining and categorizing the different types of transfers. High ranked specialists from the National Treasury Secretariat (STN, Ministry of Finance), the Secretariat of the Federal Budget (SOF, Ministry of Planning), the Secretariat of Logistics and Information Technology (SLTI, Ministry of Planning) and the Union's General Comptroller (CGU) composed the task force, which worked from June to November 2014.

The task force produced a general classification of all federal government transfers, first into two categories, mandatory versus discretionary, then into two sub-categories of mandatory transfers and four sub-categories of discretionary transfers. Table 1 below presents the detailed classification.[7]

<insert Table 1>

The classification in Table 1 is the first comprehensive and accurate classification of Federal discretionary fiscal transfers in Brazil. It shows how complex the concepts of mandatory and voluntary fiscal transfers are in a country where certain categories of transfers may be defined as mandatory or automatic by law and still be subject to discretion, such as the "Specific" transfers category.

Once the task force completed its mission, the National Treasury Secretariat had a framework for classifying federal government fiscal transfers. Then, Roberto Mendes Altavilla Luttner and the team of COINT, the General Department of Intergovernmental Fiscal Transfers of STN were able to precisely pinpoint all contracts that referred to discretionary fiscal transfers from the Union to the Brazilian municipalities from 1997 to 2012. Sergio Ricardo de

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[5] http://www.internationalbudget.org/, retrieved on January 23, 2016.
[6] The complete database is available here: http://www.portaldatransparencia.gov.br/downloads/snapshot.asp?c=Convenios#get.
[7] The task force's Report was completed on May 18, 2015 and can be retrieved from:
http://www.tesouro.fazenda.gov.br/documents/10180/333563/pge_relatorio_class_transf.pdf. The subsequent Technical Note was signed on July 7, 2015 and can be retrieved here: http://www.tesouro.fazenda.gov.br/documents/10180/333563/pge_NT14_2015.pdf

Brito Gadelha and Roberto Mendes Altavilla Luttner kindly made the resulting database available to the authors of the present study.

Next, we aggregated all contract data by municipality and by year to form the most precise database on federal transfers to Brazilian municipalities to date. The corresponding variables are discussed in the following section.

III. The variables used in the econometric model and the testable hypotheses

A. The dependent variable

The main dependent variable is the total amount of discretionary fiscal transfers from the federal government to each Brazilian municipality from 1997 to 2012 that was constructed as discussed in the previous section. There are two ways to measure these transfers. First, one can compute the amounts agreed in the grant's contracts. Second, one can compute the amounts that were actually transferred. Figure 1 presents the total per year transfers according to the grant contracts and the actual transfers in constant 2012 Brazilian reals. The average amount was about R$7.24 (US$3.30) billions and about R$6.47 (US$3.7) billions for the contracted transfers and the actual transfers, respectively.[8]

<insert Figure 1>

It is very important to stress here that the yearly amounts in the database do not necessarily reflect the actual transfers even in the "actual transfers" series. This is a consequence of the fact that the database presents the contracted and realized amounts for the entire contract. However, given the yearly character of the federal budget, most of the contracts last one year and one should expect reduced losses in assigning the entire contracted amount to the year the contract was signed. Naturally, no such concern arises when we use the contracted series.

Note that the amounts are very similar and remain essentially identical in 8 out of the 16 years, and changed only slightly in another 6 years. Only during the final two years of the sample, 2011 and 2012, can we notice a more

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[8] Average 2012 US$-R$ exchange rate: US$1=R$1.96, retrieved in January 23, 2016 from http://200.189.102.61/SIEE/dashboard/ExchangeRate.

significant difference between the two series, when the nation started suffering the effects of the unsustainable fiscal policy of the previous years: fiscal deficits and rising inflation.[9]

It is worth discussing the economic significance of discretionary transfers in Brazil. According to Bremaeker (2011), 81% of Brazilian municipalities have the unconditional constitutional mandatory transfers FPM ("Fundo de Participação dos Municípios") as their main source of income. Figure 2 presents the graphs of discretionary transfers as a percentage of FPM.[10] On average, contracted discretionary transfers corresponded to almost 15% of FPM whereas actual transfers corresponded to over 13% of FPM in the period. These percentages indicate that discretionary transfers are, on average, an economically important source of income for the municipalities. If it is confirmed that transfers are not equally distributed over all municipalities, then the transfers may actually be highly significant for the privileged municipalities. Indeed, this appears to be the case, since about one-fifth of observations in our database correspond to zero transfers.

<insert Figure 2>

We believe that, in order to focus on the tactical aspect of transfers, the most appropriate variable to use in the present study is the original amounts agreed in the grant contracts. Indeed, these are the amounts that politicians widely use in their electoral campaigns. Therefore, that will be our main dependent variable. However, the robustness check presented in section V shows that the results remain essentially unchanged when we use instead the actual transfers as dependent variable.

Figure 1 shows a quite erratic behavior of the transfers series and, although there is an average increase when we compare the first half (1997-2004) with the second half (2005-2012) of 0.7 billions of reals, the variables do not seem to have a trend component.[11] However, we will use mandatory transfers and local taxes as explanatory variables and these variable appear to have a trend. Therefore, in order to avoid spurious correlations, we divide the dependent variable by yearly national GDP. We decided to use nation-wise GDP figures rather than local GDP for

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[9] The 2004-2008 was a period of high growth and growing export surpluses for Brazil. In February 21, 2008 Brazil became an international lender after centuries of being a borrower and, when the international financial crisis struck in 2008, Brazil had significant amounts of international reserves. The government decided, then, to implement a strong anti-cyclical fiscal policy and in 2010 the country's GDP grew by a record 7.5% rate.

[10] The FPM data were collected from the Brazilian Treasury Secretariat database FINBRA ("Finanças do Brasil", Brazilian Public Finances) available at http://www.tesouro.fazenda.gov.br/pt/finbra-financas-municipais.

[11] Dickey-Fuller tests do not provide reliable estimates when the time series is short, like here. We are grateful to an anonymous referee for pointing out the stationarity issue.

two reasons. First, we wish to assess the evidence of tactical transfers from the Federal government; therefore, it is the Federal government's income that affects its transfer capabilities. Hence, national GDP must be used as a normalizer.[12] Second, the Brazilian Institute of Geography and Statistics (IBGE) started producing reliable local GDP estimates only in 1999. Although there are estimates by IPEA available for the year 1996 and an interpolation could be performed, the different methodologies used do not make the IPEA estimates compatible with the IBGE ones.

In order to control for population size, we also divide the transfers variable by local population, i.e., in per capita terms. Finally, since national GDP is much higher than transfers, we multiplied the resulting variable by 10^{12}, i.e., we computed GDP in trillions of Brazilian reals. Therefore, our dependent variable is municipality yearly contracted discretionary transfers divided by national GDP (in trillions of reals) and by local population. Table 2 below presents the summary statistics of the dependent variable. It shows that an average municipality was expected to receive 18 reals of discretionary transfers per capita per trillions of Brazilian GDP per year. Note that in 2012 Brazilian GDP was about 4.7 trillion reals, which corresponds to about 85 reals per capita. Also note the spread of the differences among municipality, with some receiving 0 transfers (about 20% of the sample observations), others receiving over 100 reals per capita per national GDP (about 3% of the sample) and some receiving transfers above 2000 reals per capita per national GDP. About 0.4% of the observations correspond to above 1000 reals per capita per national GDP in transfers.

<insert Table 2>

Figure 3 presents the average annual values of the normalized discretionary contracted transfers dependent variable.

<insert Figure 3>

B. The explanatory variables

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[12] We also used the simple per capita, non-normalized transfers, and used GDP as an explanatory variable and obtained similar results. See section V and the Online Appendix.

The explanatory variables can be classified in four categories, as explained below.

The partisan identification variables

These are the main variables we use to test the partisan transfers hypothesis.

Mayor-President-Only. A dummy variable that takes value 1 if the mayor of the municipality and the president belong to the same party, but the state governor belongs to a different party. If transfers are technical and aimed at maximizing welfare (the "welfare maximization hypothesis", WMH), then we expect to find a statistically insignificant effect of that variable. Conversely, both the traditional partisan transfer hypothesis (TPTH) and the strategic partisan transfers hypothesis (SPTH) suggest a positive, significant sign for this variable.

Mayor-Governor-President. A dummy variable that takes value 1 if the Mayor of the municipality, the Governor of the State in which the municipality is located, and the President are aligned, i.e., all three belong to the same party. There are here three conflicting theories that could be used to predict the sign of this variable. The WMH suggests no explanatory role for that variable. The TPTH suggests a positive sign, statistically identical to the sign of Mayor-President-Only variable. Finally, the SPTH suggests either an insignificant role or a reduced, positive role.

Mayor-President's Coalition. A dummy variable that takes value 1 if the mayor's party belong to the coalition of parties that supported the president in its electoral campaign, other than the president's party. The TPTH also suggests a positive sign for this variable. However, one must note party coalitions at the different levels of government in Brazil are essentially independent. Two parties may be part of the same coalition for the presidential elections and belong to opposing coalitions for state government or yet for mayor elections. Therefore, we cannot separate this variable in two, the way we did for the previous variables. This fact suggests that this variable may be insignificant.

The President's ideological party bias

During the period 1999-2012 two very different parties held the country's presidency, the Social Democratic Party PSDB (Partido da Social Democracia Brasileira, from 1994 to 2002) and the Labor Party PT (Partido dos Trabalhadores). Cesar Zucco, Jr. and Timothy Powell have an active research agenda aimed at estimating Brazilian

political parties' ideology based on surveys of federal legislators, from 1990 to 2013. Parties' ideological positions are dynamic and classified from 0 to 10 where 0 corresponds to extreme left and 10 to extreme right.[13] Table A5 in the Online Appendix presents the estimates for the survey years in addition to interpolated estimates for the years in between, according to Lopez, Bugarin and Bugarin (2015), from 1997 to 2013. The lowest (leftist) ideology belongs to the Brazilian Communist Party PCdoP (Partido Comunista do Brasil) in 1997: 1.53; the highest (rightist) ideology pertains to the Democratic Social PDS (Partido Democrático Social) and the Popular PP (Partido Popular) parties, also in 1997: 7.09. Note that there is a Downsian-like dynamic movement towards convergence throughout the years: the highest polarization measured as the difference between lowest and highest ideologies is 5.56 in 1997 and reduces to 4.69 in 2013. The PSDB's ideology in 2012 is estimated at 5.07 whereas the PT's ideology that same year is estimated at 2.95. In general, the PSDB is viewed as a center-right party whereas the PT is viewed as a leftist party.

In order to test for an effect of the president's ideological party bias on the transfers, we proceed as follows. First, we assign an ideology to every municipality according to the mayor's party. This is the input variable *Ideology*. Note that several municipal parties are not represented in the federal legislature, therefore, a significant amount of missing data composes this variable (about 19 thousand observations out of about 89 thousand observations).

Next, we composed with the years each party held the National presidency to produce the ideological variables.

PT ideological bias. Equals the variable Ideology in the years 2003 to 2012 and 0 otherwise. We expect that variable to have a negative sign, i.e., the more towards the right leans the party of the mayor, the less transfers it will receive from the PT-executive.

PSDB ideological bias. Equals the variable Ideology in the years 1997 to 2002 and 0 otherwise. We expect that variable to have a positive sign, i.e., the more towards the right leans the party of the mayor, the more transfers it will receive from the PSDB-executive.

The political cycle variables

Ferreira and Bugarin (2005, 2007) build a political economy model of local elections in a fiscal federation in the presence of partisan transfers and study the effect of such transfers on the political cycle. These papers find evidence

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[13] See Zucco Jr (2011, 2014) and Zucco Jr. and Powell (2009).

that, in Brazil, there is a biannual political cycle in transfers. The authors interpret their findings as consequence of the fact that elections are staggered in Brazil. Indeed, if, at time $t=0$ there are presidential and state governor elections for a four-year term, then at $t=2$ there are municipal elections, also for a four-year term. Therefore, there are elections in Brazil every other year. Consequently, partisan transfers may increase every other (electoral) year. In order to test that hypothesis, we include two specific time dummies, as follows.

Presidential election year. A dummy variable that takes value 1 in presidential election years, i.e., in 1998, 2002, 2006 and 2010. If Ferreira and Bugarin (2005, 2007) are correct, then we should expect a positive sign for this variable.

Municipal election year. A dummy variable that takes value 1 in municipal election years, i.e., in 2000, 2004, 2008 and 2012. Again, if Ferreira and Bugarin (2005, 2007) are correct, then we should expect a positive sign also for this variable.

Fiscal variables

We include two local fiscal variables. For the sake of compatibility, we also consider these variables in per capita, per national GDP terms. All fiscal data are obtained from the Brazilian National Treasury Secretariat, STN. The variables are discussed below.

Mandatory transfers. Table 1 in section II shows that there are two categories of mandatory transfers in Brazil, the Constitutional and the legal ones. Although one may argue that legal transfers may be endogenous, it is a well-established fact that the "Municipalities' Participation Fund", FPM (Fundo de Participação dos Municípios) is a dynamically stable, clearly defined, rule-based Constitutional fund. Its present form has been defined when the country adopted the democratic constitution in 1988 and depends basically on the population size of the municipality, for the great part of the cities. The Appendix presents the details of the formula, to show that there is little room for endogeneity. This is the proxy we adopt for mandatory transfers. For the sake of robustness check, section V runs the same regression using the FPM as the dependent variable and shows no economically significant

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effect of the political identification variables on FPM.[14] Considering that the main criterion for mandatory transfers is population, there is no ex-ante expectation as to what could be the effect of this variable on discretionary transfers.

Local taxes. There are four major sources of local income generation in Brazilian municipalities. The most important one is the urban property tax IPTU. The other two are also property taxes: the ITR is the rural property tax and the ITBI is the tax for property ownership transfer. Finally, there is the local tax on services ISS. A graphic analysis shows that, when divided by population and by national GDP only the ISS may display some sort on nonstationarity[15]. Therefore, we selected the sum of the property-related taxes IPTU, ITR and ITBI as the proxy for local taxation. For the sake of robustness check, we also present the corresponding results for just the IPTU and for the sum of all four taxation categories in section IV. All local taxes' data come from the Brazilian Treasury Secretariat database FINBRA ("Finanças do Brasil", Brazilian Public Finances) available at http://www.tesouro.fazenda.gov.br/pt/finbra-financas-municipais.

Note that, differently from the mandatory transfers proxy, there is room here to expect endogeneity of this variable. Indeed, there may be other omitted variables that affect both taxation and discretionary transfers. For example, the quality of local public servants may allow the municipality to generate higher amounts of tax revenues, due to the superior quality of local tax administration, and, at the same time, these high-quality public servants may be more effective in performing the administrative procedures necessary to receive federal government grants. To cope with this problem, we instrument local taxation using neighboring municipalities' local taxes, following the methodology presented in Levitt and Snyder (1997).[16]

It is not clear what is the effect of local taxation on discretionary transfers. On the one hand, higher per capita local tax collection may reflect a better-qualified local civil service, which, as discussed above, may lead to higher discretionary transfers. This is the "local competence effect". On the other hand, higher per capita local tax collection may also reflect a richer municipality, which may reduce its likelihood of receiving grants aimed at the poorer municipalities. This is the "redistributive effect". Therefore, the effect of local taxation on discretionary transfers may be indeterminate.

Socio-economic and demographic variables

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[14] Brollo and Nannicini (2012) also performed a similar test and reached the same conclusion that FPM is exogenous for their study of discretionary transfers for infrastructure works.
[15] Detailed graphs not included for the sake of space, but available upon request to the authors.
[16] We are grateful to an anonymous referee for pointing out the endogeneity issue.

In order to control for time varying local characteristics, we included the following control variables.

***Illiteracy rate*.** The percentage, in the scale 0 to 100, of illiterates in the municipality.

***Unemployment rate*.** We also use the scale 0 to 100 for the municipality unemployment rate.

***Gini*.** The Gini coefficient of the municipality, in the scale 0 to 1.

All three variables were obtained from Brazilian Institute of Geography and Statistics' (IBGE) Census data, which are realized roughly every 10 years. There were censuses conducted in 1991, 2000 and 2010. Therefore, we interpolate the data obtained from these censuses to create the variables.

We expect that the higher the illiteracy rate, the higher the unemployment rate and the higher the Gini coefficient, the more federal support the municipality will need. Therefore, the higher the amount of discretionary transfers it will receive.

***Working age population*.** The working age population of the municipality, in thousands of people. This variable was also constructed from IBGE's censuses data.

***Population*.** The municipality's population, in thousands of citizens. This variable corresponds to Brazilian IBGE's estimates.

Since the dependent variable has already been divided by population, it is not clear what the effect of these demographics variables on the discretionary transfers will be. Regarding the total municipal population, on the one hand we could argue that bigger municipalities have more political clout; therefore, they would be able to increase their share in per capita transfers. On the other hand, one might argue that bigger municipalities have gains of scale and scope in producing public goods; therefore, they would need lower amounts of per capita discretionary transfers.

Table 3 presents the summary statistics of the independent variables and their expected effect on the dependent variable, under the strategic partisan transfers hypothesis. Note that, due to the use of interpolation for the variables Illiteracy rate, unemployment rate and Working age population, a few interpolated values appeared negative and were, thereby, recoded to zero. This explains why the minimum for these variables appears as zero.

<insert Table 3>

IV. The econometric evidence

A. The models and the econometric strategy

We will present regression results for six (nested) models, starting with the simplest model and including more variables successively, as described below. All models include a constant term. Model 1 uses only our main political identification variables: *Mayor-President-Only, Mayor-Governor-President* and *Mayor-President's Coalition*. Model 2 includes the additional year dummy variables. Model 3 adds party ideological bias variables *PT ideological bias* and *PSDB ideological bias*. Model 4 adds the political cycle variables *Presidential election year* and *Municipal election year*. Model 5 includes the remaining control variables, i.e., the local fiscal variables *Mandatory transfers* and *Local taxes* and the socio-economic-demographic variables *Illiteracy rate, Unemployment rate, Gin coefficient, Working age population* and *(municipal) Population*. Finally, Model 6 uses the same variables as Model 5, but instruments the *Local taxes* variable by neighboring municipalities' local taxes. Table 3 below summarizes the 6 models.

<insert Table 4>

In order to determine what econometric model to use we applied a series of tests to Model 5. First, we ran a Wald test to determine whether we should use year dummy variables. The statistic was $F(13, 59706)=154.14$ with Prob>F=0.0000. Therefore, we concluded that dummy years improve the model's fit. Next, we ran a (Chow) F-test to determine whether a fixed-effects panel regression best fits the data rather than a simple POLS regression. The resulting statistic was $F(5497, 59706)=3.44$ with Prob>F=0.0000. Therefore, we concluded for the superiority of the fixed-effects model. We also performed a Breusch-Pagan Lagrange multiplier (LM) to test the POLS model against the random-effects panel model. The resulting statistic was $\overline{\chi}^2(01) = 8815.24$ with $\text{Prob} > \overline{\chi}^2 = 0.0000$. Therefore, we rejected the null hypothesis that variances across entities is zero and concluded for the superiority of the random-effects model.

Therefore, both the fixed-effects and the random-effects panel models perform better than the POLS model. Given the nature of data, we firmly expected the fixed effects model to be preferable, because of the specificities of

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each municipality. To confirm that expectation we ran a Hausman test to compare these panel models. The resulting statistic was $\chi^2(27) = 653.24$ with Prob$> \chi^2 = 0.0000$. Furthermore, we also run an over-identification test that yielded a Sargan-Hansen statistic $\chi^2(27) = 638.78$ with Prob $> \chi^2 = 0.0000$. Both tests confirmed the fixed effects model's superiority.

Next, we analyzed the issue of endogeneity of the *Local taxes* variable. We performed a Davidson-MacKinnon test of exogeneity using the neighboring municipalities' local taxes as instruments and obtained the statistic $F(1,59718) = 5.95$ with Prob $> F = 0.0147$. Therefore, the null hypothesis of exogeneity is not rejected at 1%, suggesting that there is no evidence of endogeneity. However, the null hypothesis is rejected at the 5% significance level. Therefore, we present the results of the IV-regressions in Model 6.

Finally, we also run a Modified Wald test for groupwise heteroskedasticity in fixed effect regression models, which yielded the statistic $\chi^2(5498)=1.0\text{x}10^{35}$ with Prob$>\chi^2=0.0000$, showing strong evidence of heteroskedasticity. Therefore, we used robust estimations in all regressions.

B. The main econometric results

Table 5 presents the estimates of the regressions. The table shows very consistent results as we increase the number of variables from Model 1 to 6. The main political identification variable *Mayor-President-Only* is significant at 1% in all regressions. For the sake of space, we will discuss in detail only Model 6. Note that there are only two noticeable differences between the estimates of Model 5 and 6: the coefficients of the political cycle variables are more pronounced in Model 6 and the Gini coefficient is significant at 5%. All the remaining estimates are essentially the same for both models.

<insert Table 5>

In order to understand the marginal effect of the explanatory variables, recall that the dependent variable is discretionary transfers per capita divided by national GDP. Therefore, the effect of *Mayor-President-Only* on per capita discretionary transfers at a certain year, in constant terms, is obtained by multiplying the estimated coefficient by national GDP in the proper scale. The result for 2012, for example, is 29.25. This means that, ceteris paribus, a

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municipality whose mayor belongs to the same party as the president received in 2012, on average, almost 30 Brazilian reais (over US$15) per capita above what a municipality whose mayor belong to a different party received. That calculation can be made for each year and for each one of the significant variables. Table 6 presents the marginal effects of the significant independent variables on voluntary transfers, averaged over the period 1997-2012, in 2012 US dollars. For example, the estimated yearly average benefit for a municipality of having a mayor from the same party as the president but situated in a non-aligned state over the period 1997-2012 is roughly an additional 12.14 US dollars per citizen.[17]

<insert Table 6>

This result strongly supports the Strategic partisan transfers hypothesis, SPTH, but is also compatible with the traditional TPTH, against the WMH. Furthermore, the variable *Mayor-Governor-President* was insignificant, which means that there is no statistically distinguishable behavior when we compare federal transfers to aligned municipalities in aligned states with unaligned municipalities. This supports the SPTH against the TPTH.

On the other hand, there appears to be no evidence that belonging to a party (other than the president's) in the presidential coalition electoral campaign would have any effect on the transfers to that municipality. This confirms the view that subnational coalitions are quite different from the national ones. To cite an example, for the 2014 elections for president and state governors, the PMDB (the biggest Brazilian party) was part of the national coalition that supported Dilma whereas in the state of Bahia that same party supported Dilma's opponent, Aércio Neves (Duarte, 2014).

The party ideological bias variables are both significant at 1% and have the expected signs. Recall that the party ideology scale is 0 to 10; our analysis suggests that as a mayor's party ideology increases one unit in that scale, i.e., goes one unit to the right, for example, moving from ideological position 3 to 4 because of a change of mayor, then the discretionary transfers of the PT federal government reduce US$1.10 per capita and the discretionary transfers of the PSDB federal government increases by US$1.65 per capita (in 2012 values). If a municipality was to change from a mayor from DEM (the right-most party, with ideology 6.87) to PCdoB (the left-most party, with ideology 2.31) in 2012 it would receive an additional US$5 per capita of discretionary transfers from the PT federal

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[17] It is noteworthy that Garofalo (2115) found an increase in roughly 11.50 US dollars per capita in transfers to politically aligned counties when a state changes from being aligned with the federal government to being unaligned.

government. Hypothesis tests suggest that we cannot reject the hypothesis that these two bias variables' coefficients are identical in absolute value.[18]

There is strong support to the specific Brazilian political cycle hypothesis, i.e., discretionary transfers increase both during national and during local election years. This result confirms Ferreira and Bugarin (2005, 2007) findings of a shorter, two-year long political transfers cycle in Brazil. According to the estimates, ceteris paribus, there is an average increase in per capita discretionary transfers of about US$45 in presidential years and of about US$30 in municipal election years; these estimates are statistically distinct.[19] Therefore, although there is increase in discretionary transfers in all electoral years, these transfers are about 1.5 times higher in presidential elections years than in municipal elections years.

Neither the variable *Local tax* nor the variable *Mandatory transfers* has any significant effect on discretionary transfers. In particular, the constitutional (mandatory) transfers appear to be clearly designed in Brazil and not correlated with discretionary transfers, i.e., there does not appear to be room for partisan manipulation of mandatory transfers. We will discuss more about the constitutional transfers in the following section.

Illiteracy appears to have the expected effect on transfers: a municipality that has an increase of 1% in its illiteracy rate is expected to receive an additional US$2.4 per capita. Therefore, our regressions support the hypothesis that discretionary transfers are directed to less educated municipalities. Additional research may help explain the motivation for this fact. On the positive side, it may reflect the federal government concern in supporting the less developed municipalities. On the negative side, it may reflect a strategic electoral move, if it is the case that less literate voters may be more easily influenced.

Conversely, the *Gini* coefficient appears to have an effect opposite to the expected one. Indeed, the higher the Gini coefficient, i.e., the higher the inequality, the lower the discretionary transfers. Therefore, discretionary transfers do not seem to be directed at reducing regional inequality differences in the country, at least when inequality is measured by the Gini coefficient. However, it is noteworthy that the *Gini* variable is only significant at 5%, and only in Model 6, when the instrumental variable method is used.

There appears to be no effect of *Unemployment* on discretionary transfers. Therefore, there is no evidence that the federal government targets areas with high unemployment.

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[18] $\chi^2(1) = 0.92$, Prob $> \chi^2 = 0.3367$.
[19] $\chi^2(1) = 97.89$, Prob $> \chi^2 = 0.0000$.

Finally, there seems to be a (small) decreasing marginal population effect on transfers. According to our estimates, an increase in one thousand people in a municipality's population generates a reduction in about 17 cents of a US dollar per capita on average. This supports the idea that there is a gain of scale in transferring resources to bigger populations, in which case, as the population increases, the per capita transfers are reduced. Note, however, that the effect is economically small and it is statically significant at 1% only in Model 6 (5% in Model 5).

In summary, the econometric study shows strong support for the main strategic partisan transfers hypothesis tested here: discretionary transfers from the federal government to municipalities are significantly higher, both from a statistical and an economic view point, when the municipal mayor belongs to the same party as the president but the governor does not. Moreover, our results also support the hypothesis that these is a biannual transfers cycle in Brazil that follows the electoral calendar, so that discretionary transfers increase in electoral years. However, since elections are staggered in Brazil, with local elections taking place two years after state and national elections, we found that the cycle is heterogeneous, with transfers 1.5 times higher in national elections years.

V. Robustness check

In addition to the main econometric studies presented in section IV, we ran a series of alternative regressions to check the robustness of our findings. These regressions are explained in detail in the online appendix to this paper. This section briefly discusses the extensions.

A. Per capita variables

Our main econometric study used the per capita, per GDP discretionary transfers as the dependent variable. Alternatively, we use the per capita discretionary transfers, rather than dividing by GDP. In that case, we also use the per capita measurements of Local taxes and Mandatory transfers. Furthermore, we use GDP (in billions of Brazilian reals) as an additional explanatory variable. The new regressions support the SPTH. Indeed, the estimates are that an aligned municipality located in an unaligned state receives an additional amount of about 7.23 US dollars per capita when compared to nonaligned municipalities. Although Model 6 finds evidence of political transfers to aligned

municipalities in aligned states, the corresponding amount (about 1.89 US dollars per capita) is comparably much reduced.

B. Per GDP variables

Our main econometric study used the per capita, per GDP discretionary transfers as the dependent variable. Alternatively, we used simply the discretionary transfers per GDP, rather than dividing by the municipality's population. In that case, we also used the *Local taxes* and the *Mandatory transfers* variables divided only by GDP. The main qualitative results are unaltered when we run the corresponding regressions.

C. Regional effects

Encompassing an area of 8.5 million square meters, Brazil is the fifth biggest country in world. It is also one of the most unequal societies, with a Gini coefficient above 50. It is a highly-decentralized federation with huge regional gaps. Therefore, it is only natural to ask if the partisan transfers hypothesis is also confirmed at the regional level.

In order to disaggregate the analysis at the regional level we first created five regional dummy variables: *NO* (North), *NE* (North East), *CO* (Center West), *SE* (South East), and *SU* (South). Then, regional partisan identification variables were created by multiplying the original (national) *Mayor-President-Only*, *Mayor-Governor-President* and *Mayor-President's Coalition* by the regional dummies and we reran models 5 and 6.

The regionalized regressions confirm the strategic partisan transfers hypothesis for all regions. The regional *Mayor-President-Only* variables are all positive and significant at 1%, except the *CO Mayor-President-Only* variable, which is positive and significant at 5%. Three out of 5 regional *Mayor-Governor-President* variables are non-significant, one is significant at 5% and negative and only one, the *SU Mayor-Governor-President* is positive. Overall, the regional variables tend to support the SPTH against the TPTH.

D. Actual transfers

We discussed in section III.A that there are basically two ways to measure discretionary transfers from our new database. The first one, used in this paper, consists of computing the amounts of transfers agreed upon between the federal government and the municipalities when they signed a grant contract, a "Convênio". We also used the alternative way based on the amounts that are really transferred to the municipalities. The results we found remain essentially unchanged, corroborating the robustness of the analysis.

E. Alternative proxies for local taxation

Our main econometric study used the sum of the three main property taxes: urban (IPTU), rural (ITR) and ownership transfer (ITBR) as the proxy for local taxation. However, the most relevant local tax is the urban property tax IPTU. Furthermore, we discussed a fourth main source of local income, the tax on services, ISS. In order to check the robustness of our results, we rerun the models first using only IPTU as the proxy for local taxation, and then using all four main taxes, IPTU, ITR, ITBI and ISS. We found that the original regression results are robust.

F. Mandatory transfers as a dependent variable

In order to confirm that the FPM is indeed an endogenous proxy for mandatory transfers, we performed the following exercise: we reran our regressions using mandatory transfers as the dependent variable. We obtained regressions that have a very reduced power to explain mandatory transfers. Indeed, only in one of the models is there one variable statistically significant at 1%, Local tax. All other variables are either insignificant or have very low statistical significance. It is true that the main political variable Mayor-President party identification appears significant at 10% in models 10 and 11 and at 5% in model 9. However, their economic significance is extremely reduced. Indeed, by applying the same methodology we used in section IV.B for calculating the marginal effects of explanatory variables, we conclude that throughout the period 1997-2012 the estimated marginal effect of partisan identification was economically insignificant: according to the most favorable model, when the Mayor and the President are members of the same party the municipality receives an extra 3 cents of a (2012) US dollar in mandatory transfers. The authors believe that this result makes it clear that there is no economically significant role of political identification in the implementation of mandatory FPM constitutional transfers in Brazil.

VI. Conclusion

Until recently there was no database available for Brazil with accurate figures on federal discretionary fiscal transfers to municipalities. The present article used a novel database that became available in 2015 in order to precisely assess the effects of political alignment on transfers. Our econometric analysis first confirms that there exists a biannual cycle for federal voluntary transfers in Brazil, a result first pointed out in Ferreira and Bugarin (2005).

Furthermore, it finds evidence that municipalities whose mayor belongs to the same party as the president receive on average an additional 12 US dollars per inhabitant. However, this is true only when the municipality is in a non-aligned state. This is a completely new result in the literature for Brazil and is in line with what was also found recently for the U.S. in Garofalo (2015).

This phenomenon may reflect a deeper level of strategic behavior on the part of the federal government, because it appears to take into consideration the possibility of transferring resources directly to the state government when the governor is aligned, and letting the governor redistribute it among their preferred (aligned) municipalities. We call this the "Strategic partisan transfer hypothesis", SPTH. In order to confirm the underline rationale for this stylized fact, we also need the check the transfers from the federal government to the states and confront with the transfers from the states to the municipalities. This comparison is left here as a suggestion for further studies.

The present article calls attention for the need of a better regulation of discretionary transfers to avoid the negative effects of strategic partisan transfers. Furthermore, it suggests future research on the role of the governors as intermediaries in the partisan transfers scheme when they belong to the same party as the president.

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Table 1. Classification of the Brazilian Federal government fiscal transfers according to their legal characteristics

Category	Type	Description
Mandatory	Constitutional	Required by the Federal Constitutions, regulated by law, made automatically to Members of the Federation (States and Municipalities).
	Legal	Required by specific law and specific regulation, made to Members of the Federation and non-profit private organizations.
Discretionary	To civil society organizations	Direct resources to non-profit civil society organizations in the form of subsidy, support or contribution for achieving public interest goals. Require a contract.
	Voluntary	Direct resources to Members of the Federation in the form of cooperation grants, support or financial assistance that are not required by the Constitution neither specific law and are not directed to the National Public Health System (SUS). Require a contract and, in general, matching local funds.
	By delegation	Direct resources to Members of the Federation or Public Consortia aiming at delegating the implementation of public project or actions under the exclusive responsibility of the recipients. Require a contract.
	Specific	Direct resources in specific cases where the beneficiary is not required to comply with fiscal requisites. They are usually related to government programs. Require a contract and the budgetary execution in discretionary, in spite of the fact that some may be defined as mandatory or automatic transfers by law.

Source: Brazil. National Treasury Secretariat (2015).

Table 2. Summary statistics of the dependent variable: Contracted discretionary transfers per capita per national GDP (GDP in trillions of Brazilian reals)

Number of observations	Mean	Standard deviation	Minimum	Maximum
88720	18.202	35.888	0	2101.718

Source: Authors' calculations

Table 3. Summary statistics and expected effect of the in dependent variables under the strategic partisan transfer hypothesis

Variable	Observations	Mean	Standard deviation	Minimum	Maximum	Expected effect
Mayor-President-Only	88720	0.070	0.254	0	1	+
Mayor-Governor-President	88720	0.042	0.200	0	1	?
Mayor-President's Coalition	88720	0.158	0.365	0	1	+
PT ideological bias	69744	3.253	2.582	0.000	6.870	_
PSDB ideological bias	69744	1.789	2.553	0.000	6.900	+
Presidential election year	88720	0.250	0.433	0	1	+
Municipal election year	88720	0.250	0.433	0	1	+
Per capita Local Tax (IPTU+ITR+ITBI) per national GDP	83159	0.012	0.029	0	1.939	?
Per capita Mandatory transfers per national GDP	83159	0.194	0.503	0	91.534	none
Illiteracy rate (%)	88720	19.429	11.772	0	69.037	+
Unemployment rate (%)	88106	8.100	5.009	0	67.767	+
Gini coefficient (0,1)	88720	0.520	0.066	0.256	0.870	+
Working age population (1000)	88106	14.207	94.637	0	5993.668	?
Population (1000)	88720	31.923	190.773	0.697	11376.680	?

Source: Authors' calculations

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Table 4. Summary of explanatory variables used in the econometric models

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Mayor-President-Only	X	X	X	X	X	X
Mayor-Governor-President	X	X	X	X	X	X
Mayor-President's Coalition	X	X	X	X	X	X
PT ideological bias			X	X	X	X
PSDB ideological bias			X	X	X	X
Presidential election year				X	X	X
Municipal election year				X	X	X
Per capita Local Tax (IPTU+ ITR+ITBI) per national GDP					X	X (instru-mented)
Per capita Mandatory transfers per national GDP					X	X
Illiteracy rate (%)					X	X
Gini coefficient (0,1)					X	X
Unemployment rate (%)					X	X
Working age population (1000)					X	X
Population (1000)					X	X
Year Dummies		X	X	X	X	X

Source: Authors' calculations

Table 5. Robust and instrumental variable fixed effects regression estimates of the effects of political identification on discretionary transfers in Brazil, 1997-2012

Variables	Model 1 FE r	Model 2 FE r	Model 3 FE r	Model 4 FE r	Model 5 FE r	Model 6 FE IV
Mayor-President-Only	8.697***	7.271***	6.678***	6.678***	6.196***	6.206***
	(0.675)	(0.669)	(0.747)	(0.747)	(0.728)	(0.590)
Mayor-Governor-President	1.657***	-0.143	-0.130	-0.130	-0.130	-0.0580
	(0.570)	(0.599)	(0.656)	(0.656)	(0.650)	(0.728)
Mayor-President's Coalition	-0.0190	0.653	-0.172	-0.172	-0.00472	0.00788
	(0.378)	(0.433)	(0.675)	(0.675)	(0.684)	(0.591)
PT ideological bias			-0.393*	-0.393*	-0.563***	-0.562***
			(0.210)	(0.210)	(0.211)	(0.182)
PSDB ideological bias			1.175***	1.175***	0.840***	0.842***
			(0.251)	(0.251)	(0.256)	(0.213)
Presidential election year				8.842***	16.44***	23.48***
				(1.470)	(1.875)	(1.682)
Municipal election year				1.337	7.638***	16.20***
				(1.432)	(1.687)	(1.843)
Per capita Local Tax (IPTU+ITR+ITBI) per national GDP (instrumented in Model 6)					10.16	-20.25
					(8.354)	(91.79)
Per capita Mandatory transfers per national GDP					-0.00175	0.471
					(0.271)	(1.467)
Illiteracy rate (%)					1.237***	1.228***
					(0.142)	(0.0898)
Unemployment rate (%)					0.0732	0.0766
					(0.107)	(0.0658)
Gini coefficient (0,1)					-12.27	-12.29**
					(8.399)	(5.043)
Working age population (1000)					0.0566	0.0605
					(0.0365)	(0.0440)
Population (1000)					-0.0846**	-0.0879***
					(0.0339)	(0.0325)
Constant	17.53***	14.70***	9.242***	9.242***	-11.79*	-11.32***
	(0.0860)	(0.362)	(1.294)	(1.294)	(6.721)	(4.098)
Observations	88,720	88,720	69,744	69,744	65,231	65,231
R-squared	0.003	0.040	0.040	0.040	0.044	
Number of Municipalities	5,561	5,561	5,507	5,507	5,498	5,498
Year dummies	No	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Source: Authors' calculations

Table 6. Average marginal effects of the statistically significant independent variables on per capita discretionary transfers in Brazil, 1997-2012, in 2012 US dollars

Mayor-President-Only	PT ideological bias	PSDB ideological bias	Presidential election year	Local election year	Illiteracy rate	Gini	Population
12.14	-1.10	1.65	45.93	31.69	2.40	-24.04	-0.17

Source: Authors' calculations

Figure 1. Contracted and actual aggregated federal discretionary fiscal transfers to Brazilian municipalities from 1997 to 2012, in billions of 2012 Brazilian reals (R$)
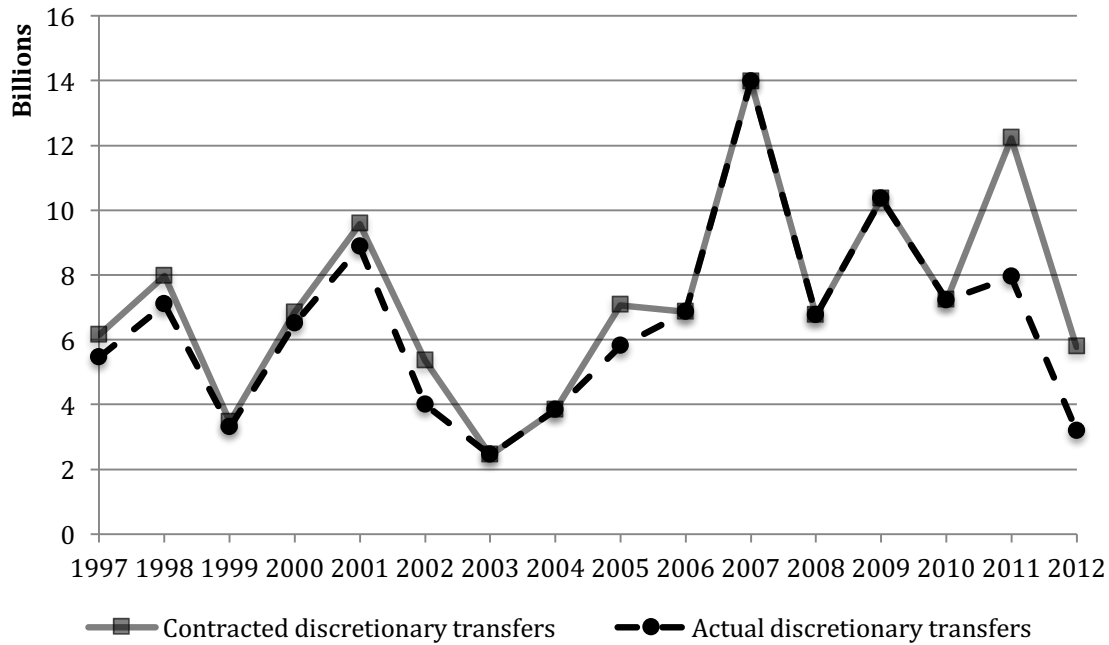
Source: Authors' calculations

Figure 2. Contracted and actual aggregated federal discretionary fiscal transfers to Brazilian municipalities from 1997 to 2012 as a percentage of FPM mandatory transfers
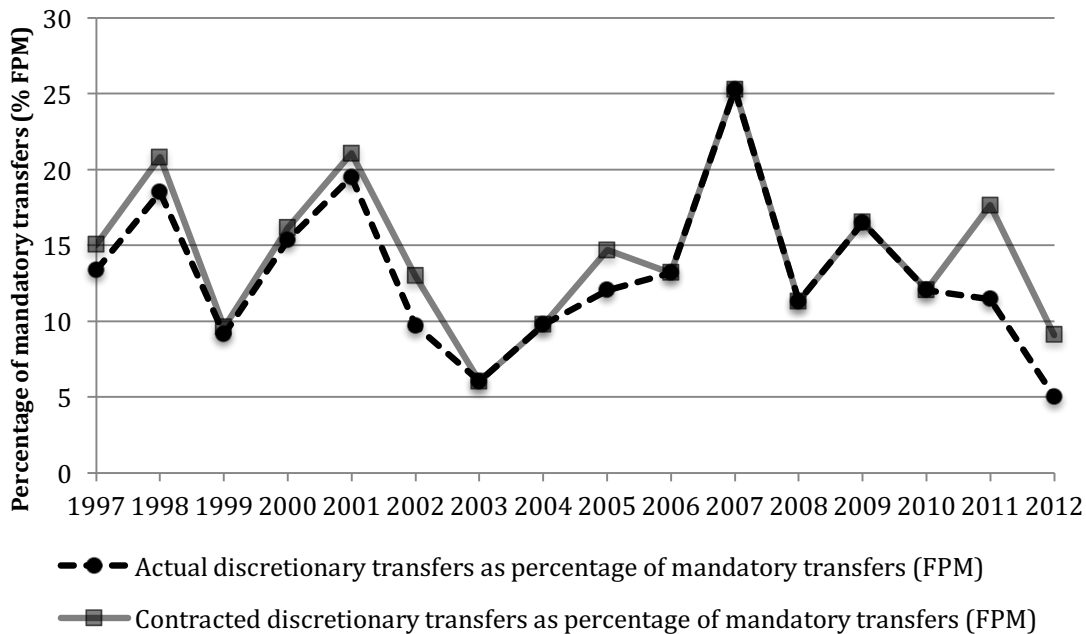
Source: Authors' calculations

Figure 3. Per capita, per national GDP, average contracted discretionary federal fiscal transfers to Brazilian municipalities from 1997 to 2012 (GDP in trillions of reals)
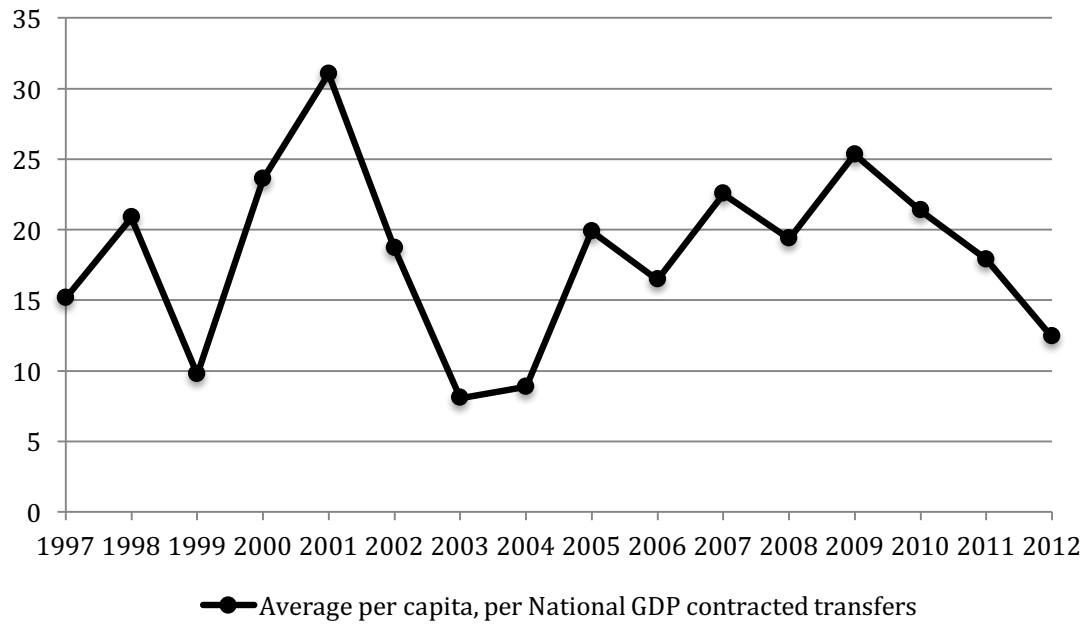
Source: Authors' calculations

STRATEGIC PARTISAN TRANSFERS IN A FISCAL FEDERATION: EVIDENCE FROM A NEW BRAZILIAN DATABASE

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This online appendix details the robustness chcks that are discussed in SECTION V in the main paper, as well as details on the technical rules for calculation of the mandatory transfers (FPM) and the detailed ideological classification of parties throughout the period 1997-2012.

A. Robustness check

A1. Per capita variables

Our main econometric study used the per capita, per GDP discretionary transfers as the dependent variable. Alternatively, we could have used simply the per capita discretionary transfers, rather than dividing by GDP. In that case, we would also use the per capita measurements of *Local taxes* and *Mandatory transfers*. Furthermore, we use GDP (in billions of Brazilian reals) as an additional explanatory variable. Table A1 below presents the corresponding regressions. A comparison with Table 5 and the average marginal effects' Table 6 is in order. The main result remains significant at 1%: when the Mayor and the President are aligned and the municipality is in an unaligned state, then the local government receives an additional 14.18 reals, about 7.23 US dollars in 2012 terms. Although the estimates are smaller than those in Table 6 (about 12 US dollars), it strongly supports the SPTH. The main

novelty here is that even when the municipality belongs to an aligned state, it receives an extra 3.7 reals (1.89 US dollars) if the Mayor is aligned with the President. However, this holds only at the 10% confidence level in Model 6 and it is much smaller in absolute values, which also supports the SPTH against the TPTH.

Table A1. Robust and instrumental variable fixed effects regression estimates of the effects of political identification on discretionary transfers in Brazil, 1997-2012, using per capita discretionary transfers, local taxes and mandatory transfers

VARIABLES	Model 1' FE r	Model 2' FE r	Model 3' FE r	Model 4' FE r	Model 5' FE r	Model 6' FE IV
Mayor-President-Only	16.96***	15.53***	15.34***	15.34***	14.45***	14.18***
	(1.765)	(1.771)	(1.825)	(1.825)	(1.810)	(1.773)
Mayor-Governor-President	5.638***	4.778***	5.385***	5.385***	5.169***	3.698*
	(1.492)	(1.552)	(1.703)	(1.703)	(1.744)	(2.148)
Mayor-President's Coalition	-2.404*	3.979***	4.261*	4.261*	4.817**	4.724***
	(1.241)	(1.347)	(2.312)	(2.312)	(2.452)	(1.773)
National GDP	0.0175***	0.0114***	0.0149***	0.0217***	0.0178***	0.0322***
	(0.000447)	(0.000651)	(0.00128)	(0.00124)	(0.00192)	(0.00164)
PT ideological bias			-0.684	-0.684	-1.276**	-1.314**
			(0.635)	(0.635)	(0.633)	(0.546)
PSDB ideological bias			1.489**	1.489**	0.845	0.767
			(0.663)	(0.663)	(0.664)	(0.642)
Presidential election year				2.353*	33.19***	20.09***
				(1.333)	(3.190)	(2.022)
Municipal election year				-25.56***	19.82***	-27.65***
				(3.283)	(1.687)	(2.154)
Per capita Local Tax (IPTU+ITR+ITBI)					0.0420	0.892***
					(0.0576)	(0.330)
Per capita Mandatory transfers					0.00496	-0.00103
					(0.00351)	(0.00250)
Illiteracy rate (%)					3.016***	3.264***
					(0.532)	(0.261)
Unemployment rate (%)					1.266***	1.272***
					(0.355)	(0.197)
Working age population (1000)					-0.162	-0.306**
					(0.164)	(0.143)
Population (1000)					-0.141	-0.0462
					(0.103)	(0.100)
Gini coefficient (0,1)					-26.32	-25.91*
					(24.61)	(15.16)
Constant	0.559	1.567	-9.692**	-16.19***	-76.77***	-103.7***
	(1.180)	(1.232)	(4.435)	(4.227)	(21.91)	(13.16)
Observations	88,720	88,720	69,744	69,744	65,231	65,231
R-squared	0.053	0.073	0.067	0.067	0.073	
Number of Municipalities	5,561	5,561	5,507	5,507	5,498	5,498
Year dummies	No	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations

A2. Per GDP variables

Our main econometric study used the per capita, per GDP discretionary transfers as the dependent variable. Alternatively, we could have used simply the discretionary transfers per GDP, rather than dividing by the municipality's population. In that case, we would also use the *Local taxes* and the *Mandatory transfers* variables divided only by GDP. Table A2 below shows that the main qualitative results are unaltered when we run the corresponding regressions.

Table A2. Robust and instrumental variable fixed effects regression estimates of the effects of political identification on discretionary transfers in Brazil, 1997-2012, using per GDP discretionary transfers, local taxes and mandatory transfers

VARIABLES	Model 1" FE r	Model 2" FE r	Model 3" FE r	Model 4" FE r	Model 5" FE r	Model 6" FE IV
Mayor-President-Only	0.251***	0.243***	0.175***	0.175***	0.159***	0.156***
	(0.0351)	(0.0373)	(0.0354)	(0.0354)	(0.0338)	(0.0264)
Mayor-Governor-President	0.0242	0.0369*	0.0124	0.0124	0.0332	0.0345
	(0.0190)	(0.0214)	(0.0233)	(0.0233)	(0.0240)	(0.0310)
Mayor-President's Coalition	-0.0217*	0.00499	-0.0327	-0.0327	-0.0247	-0.0280
	(0.0115)	(0.0134)	(0.0230)	(0.0230)	(0.0237)	(0.0264)
PT ideological bias			-0.0343***	-0.0343***	-0.0295***	-0.0284***
			(0.00792)	(0.00792)	(0.00726)	(0.00815)
PSDB ideological bias			0.0354***	0.0354***	0.0270**	0.0251***
			(0.0124)	(0.0124)	(0.0111)	(0.00959)
Presidential election year				0.404***	0.353***	0.307***
				(0.0941)	(0.0749)	(0.0769)
Municipal election year				0.307***	0.255***	0.262***
				(0.0930)	(0.0754)	(0.0845)
Local Tax (IPTU+ITR+ITBI) *per GDP*					-0.0223	0.0559
Mandatory transfers per GDP					(0.0459)	(0.0534)
Illiteracy rate (%)					0.0111	0.00309
					(0.00859)	(0.00631)
Unemployment rate (%)					0.0150***	0.0146***
					(0.00263)	(0.00384)
Working age population (1000)					-0.00381	-0.00329
					(0.00257)	(0.00293)
Population (1000)					-0.0251**	-0.0294***
					(0.0116)	(0.00345)
Gini coefficient (0,1)					0.0309***	0.0348***
					(0.119)	(0.226)
Constant	0.322***	0.254***	0.0887	0.0887	-0.818***	-0.911***
	(0.00315)	(0.0122)	(0.0613)	(0.0613)	(0.181)	(0.183)
Observations	88,720	88,720	69,744	69,744	65,231	65,231
R-squared	0.002	0.011	0.011	0.011	0.027	
Number of Municipalities	5,561	5,561	5,507	5,507	5,498	5,498
Year dummies	No	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

A3. Regional effects

Encompassing an area of 8.5 million square meters, Brazil is the fifth biggest country in world. It is also one of the most unequal societies, with a Gini coefficient above 50. It is a highly decentralized federation with huge regional gaps. Therefore, it is only natural to ask if the partisan transfers hypothesis is also confirmed at the regional level. This is the objective of the present section.

Brazilian states are grouped into five regions with different patterns of immigration, history, development and GDP, among others. In order to disaggregate the analysis at the regional level we first created five regional dummy variables, as described below.

NO: Northern region; includes the states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins.

NE: Northeastern region; includes the states of Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe.

CO: Center western region; includes the states of Mato Grosso, Mato Grosso do Sul, Goiás and the Federal District.

SE: Southeastern region; includes the states of São Paulo, Rio de Janeiro, Espírito Santo and Minas Gerais.

SU: Southern region; includes the states of Paraná, Rio Grande do Sul and Santa Catarina.

Next, we created the regional partisan identification variables by multiplying the original (national) *Mayor-President Id*, *Mayor-President's Coalition Id* and *Mayor-Governor-President Id* by the regional dummies and rerun models 5 and 6. Table A3 presents the corresponding regression results.

Table A3. Robust and instrumental variable fixed effects regression estimates of the effects of political identification on discretionary transfers in Brazil, by administrative region, 1997-2012

VARIABLES	Model 1''' FE r	Model 2''' FE r	Model 3''' FE r	Model 4''' FE r	Model 5''' FE r	Model 6''' FE IV
NO Mayor-President Only	11.94***	11.28***	10.91**	10.91**	10.84**	10.73***
	(4.081)	(3.999)	(4.422)	(4.422)	(4.462)	(1.961)
NE Mayor-President Only	9.119***	7.093***	6.937***	6.937***	5.780***	5.797***
	(1.330)	(1.299)	(1.328)	(1.328)	(1.393)	(1.182)
CO Mayor-President Only	7.129***	5.269**	5.134*	5.134*	4.693*	4.645**
	(2.594)	(2.590)	(2.822)	(2.822)	(2.685)	(1.962)
SE Mayor-President Only	6.757***	5.777***	4.919***	4.919***	4.715***	4.766***
	(0.806)	(0.809)	(0.853)	(0.853)	(0.854)	(0.935)
SU Mayor-President Only	10.63***	9.088***	8.622***	8.622***	8.100***	8.119***

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	(1)	(2)	(3)	(4)	(5)	(6)
	(1.298)	(1.296)	(1.379)	(1.379)	(1.322)	(1.099)
NO Mayor-Governor-President	0.885	-2.018	-2.277	-2.277	-2.860	-2.792
	(1.752)	(1.712)	(1.653)	(1.653)	(1.861)	(2.256)
NE Mayor-Governor-President	1.422	-0.827	-1.395	-1.395	-2.894***	-2.922**
	(0.897)	(0.911)	(1.023)	(1.023)	(1.059)	(1.351)
CO Mayor-Governor-President	3.818	0.375	0.963	0.963	0.809	0.827
	(2.354)	(2.373)	(2.462)	(2.462)	(2.406)	(1.915)
SE Mayor-Governor-President	0.307	-1.076	-0.952	-0.952	0.314	0.551
	(0.777)	(0.816)	(0.872)	(0.872)	(0.861)	(1.061)
SU Mayor-Governor-President	13.64***	17.23***	14.30***	14.30***	9.587**	9.630***
	(3.604)	(3.621)	(3.844)	(3.844)	(3.785)	(3.293)
NO Mayor-President's Coalition	-1.068	-0.149	-7.137***	-7.137***	-7.822***	-7.812***
	(2.070)	(2.066)	(2.498)	(2.498)	(2.790)	(1.639)
NE Mayor-President's Coalition	0.175	1.070*	-0.790	-0.790	-0.730	-0.746
	(0.588)	(0.614)	(0.917)	(0.917)	(1.016)	(0.821)
CO Mayor-President's Coalition	1.515	2.757	2.887	2.887	3.868	3.889**
	(1.772)	(1.783)	(2.572)	(2.572)	(2.704)	(1.571)
SE Mayor-President's Coalition	-0.476	0.169	-0.764	-0.764	-0.224	-0.162
	(0.490)	(0.516)	(0.777)	(0.777)	(0.779)	(0.928)
SU Mayor-President's Coalition	0.148	0.375	4.431***	4.431***	3.305**	3.336***
	(0.824)	(0.868)	(1.434)	(1.434)	(1.434)	(1.032)
PT ideological bias			-0.362*	-0.362*	-0.572***	-0.575***
			(0.213)	(0.213)	(0.214)	(0.184)
PSDB ideological bias			1.140***	1.140***	0.800***	0.802***
			(0.253)	(0.253)	(0.259)	(0.214)
Presidential election year				2.756***	16.03***	23.04***
				(0.649)	(1.892)	(1.700)
Municipal election year				8.026***	7.247***	15.49***
				(0.647)	(1.706)	(1.868)
Per capita Local Tax (IPTU+ITR+ITBI) per GDP					9.978	-41.49
					(8.319)	(92.82)
Per capita Mandatory transfers per GDP					0.0279	0.830
					(0.301)	(1.484)
Illiteracy rate (%)					1.211***	1.197***
					(0.145)	(0.0901)
Gini coefficient (0,1)					-12.38	-12.41**
					(8.367)	(5.044)
Unemployment rate (%)					0.0573	0.0627
					(0.107)	(0.0658)
Working age population (1000)					0.0561	0.0627
					(0.0357)	(0.0440)
Population (1000)					-0.0844**	-0.0901***
					(0.0334)	(0.0325)
Constant	17.54***	14.76***	9.538***	9.538***	-10.69	-9.934**
	(0.0854)	(0.365)	(1.296)	(1.296)	(6.703)	(4.097)
Observations	88,720	88,720	69,744	69,744	65,231	65,231
R-squared	0.004	0.040	0.041	0.041	0.045	
Number of Municipalities	5,561	5,561	5,507	5,507	5,498	5,498
Year dummies	No	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations

The regionalized regressions confirm the partisan transfers hypothesis against the WMH for all regions: all regional *Mayor-President Only* variables have positive statistically significant signs. The coefficients of the regions southeastern (SE), northeastern (NE) and center western (CO) are statically identical and the coefficients of the

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northern (NO) and southern (SU) regions are also statistically undistinguishable. The former coefficients are below the national mean whereas the latter are above. In other words, the partisan motive in discretionary transfers appears to manifest most strongly at the extreme northern and southern regions. Note that the northern region is the least developed of the five and encompasses most of Brazilian Amazon rain forest, whereas the southern region is one of the most developed and richest of the country.

Three out of five regional *Mayor-Governor-President* are statistically non-significant (NO, CO, SE), and the two that are significant (the Northeastern and the Southern regions) have opposite sign. The *NE Mayor-Governor-President* variable's sign is negative and, together with the *NO, CO* and *SE*, supports the SPTH against the TPTH. Only the *SU Mayor-Governor-President* variable does not support the SPTH against the TPTH. Further investigation is need to better understand this result for the Southern region.

The regional *Mayor-President's coalition* variables are now significant for three out of 5 regions, but with conflicting signs: It is negative for the NO region and positive for the CO and SU regions. This result suggests further investigations on subnational politics to better understand those signs.

The remaining variables, including the president's party ideological bias and the political cycle variables closely reflect the previous estimations, as expected.

A4. Actual transfers

We discussed in section III.A that there are basically two ways to measure discretionary transfers from our new database. The first one, used in this paper, consists of computing the amounts of transfers agreed upon between the federal government and the municipalities when they signed a grant contract, a "Convênio". We argued that these amounts better reflect the possible use of the grants for political promotion purposes. An alternative way is to compute the amounts that are effectively transferred to the municipalities.

Table A4 presents the corresponding regressions when the actual transfers dependent variable is used. Comparing Table A4 with Table 5 we confirm that the results we found remain essentially unchanged, corroborating the robustness of the analysis.

Table A4. Robust and instrumental variable fixed effects regression estimates of the effects of political identification

on actual discretionary transfers in Brazil, 1997-2012

VARIABLES	Model 1 FE r	Model 2 FE r	Model 3 FE r	Model 4 FE r	Model 5 FE r	Model 6 FE IV
Mayor-President-Only	7.916***	6.936***	6.243***	6.243***	5.809***	5.830***
	(0.634)	(0.628)	(0.700)	(0.700)	(0.677)	(0.551)
Mayor-Governor-President	0.833	-0.484	-0.535	-0.535	-0.535	-0.387
	(0.536)	(0.562)	(0.612)	(0.612)	(0.603)	(0.680)
Mayor-President's Coalition	-1.892***	0.145	-0.982	-0.982	-0.888	-0.862
	(0.330)	(0.373)	(0.601)	(0.601)	(0.603)	(0.552)
PT ideological bias			-0.458**	-0.458**	-0.611***	-0.610***
			(0.194)	(0.194)	(0.194)	(0.170)
PSDB ideological bias			1.142***	1.142***	0.819***	0.823***
			(0.229)	(0.229)	(0.230)	(0.199)
Presidential election year				10.05***	17.03***	23.82***
				(1.408)	(1.798)	(1.571)
Municipal election year				2.556*	8.339***	12.49***
				(1.366)	(1.620)	(1.721)
Per capita Local Tax (IPTU+ITR+ITBI)					7.709	-54.91
per national GDP (instrumented in Model 6)					(5.682)	(85.72)
Per capita Mandatory transfers per national GDP					0.00875	0.983
					(0.242)	(1.370)
Illiteracy rate (%)					1.171***	1.153***
					(0.132)	(0.0838)
Unemployment rate (%)					0.0258	0.0327
					(0.0990)	(0.0614)
Gini coefficient (0,1)					0.0587*	0.0668
					(0.0346)	(0.0411)
Working age population (1000)					-0.0852***	-0.0920***
					(0.0326)	(0.0303)
Population (1000)					-12.04	-12.08**
					(7.776)	(4.709)
Constant	16.57***	13.61***	8.396***	8.396***	-10.68*	-9.716**
	(0.0780)	(0.334)	(1.159)	(1.159)	(6.221)	(3.827)
Observations	88,720	88,720	69,744	69,744	65,231	65,231
R-squared	0.004	0.047	0.049	0.049	0.053	
Number of Municipalities	5,561	5,561	5,507	5,507	5,498	5,498
Year dummies	No	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations

A5. Alternative proxies for local taxation

Our main econometric study used the sum of the three main property taxes: urban (IPTU), rural (ITR) and ownership

transfer (ITBR) as the proxy for local taxation. However, the most relevant local tax is the urban property tax IPTU.

Furthermore, we discussed a fourth main source of local income, the tax on services, ISS. In order to check the

robustness of our results, we rerun the models first using only IPTU as the proxy for local taxation, and then using all four main taxes, IPTU, ITR, ITBI and ISS. For the sake of space, we present in Table A5 below only the fixed effects IV regression of the three proxies we used. Each IV regression used the corresponding neighboring municipalities' proxy for local taxation as instrument.

Table A5. Robust and instrumental-variable fixed-effects regression estimates of the effects of political identification on discretionary transfers in Brazil, 1997-2012

Using three different proxies for local taxation

VARIABLES	Model 6 IPTU+ITR+ITBI FE IV	Model 7 IPTU FE IV	Model 8 IPTU+ITR+ITBI+ISS FE IV
Mayor-President-Only	6.206***	6.213***	6.341***
	(0.590)	(0.591)	(0.606)
Mayor-Governor-President	-0.0580	-0.0597	0.146
	(0.728)	(0.717)	(0.719)
Mayor-President's Coalition	0.00788	0.0166	-0.0766
	(0.591)	(0.594)	(0.605)
PT ideological bias	-0.562***	-0.562***	-0.579***
	(0.182)	(0.182)	(0.186)
PSDB ideological bias	0.842***	0.841***	0.864***
	(0.213)	(0.213)	(0.218)
Presidential election year	23.48***	23.44***	25.34***
	(1.682)	(1.702)	(1.865)
Municipal election year	16.20***	16.15***	18.34***
	(1.843)	(1.870)	(2.063)
Per capita Mandatory transfers per GDP	0.471	0.180	5.429**
	(1.467)	(0.344)	(2.139)
Illiteracy rate (%)	1.228***	1.225***	1.189***
	(0.0898)	(0.0920)	(0.0898)
Gini coefficient (0,1)	-12.29**	-12.32**	-12.47**
	(5.043)	(5.045)	(5.167)
Unemployment rate (%)	0.0766	0.0799	0.0557
	(0.0658)	(0.0685)	(0.0670)
Working age population (1000)	0.0605	0.0600	0.112**
	(0.0440)	(0.0432)	(0.0485)
Population (1000)	-0.0879***	-0.0880***	-0.123***
	(0.0325)	(0.0321)	(0.0350)
Per capita Local land (IPTU) tax per GDP		-26.23	
		(101.6)	
Per capita Local Tax (IPTU+ITR+ITBI) per GDP	-20.25		
	(91.79)		
Per capita Local Tax (IPTU+ITR+ITBI+ISS) per GDP			-212.5**
			(85.08)
Constant	-11.32***	-11.24***	-7.386*
	(4.098)	(4.127)	(4.290)
Observations	65,231	65,231	65,231
Number of Municipalities	5,498	5,498	5,498
Year dummies	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations

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Table A5 shows that the original regression results are robust. The main estimates are similar in sign, magnitude and significance. There are, however, three novelties in the last regression, when we use all four local taxes. First, mandatory transfers become significant at 5% and positive; this suggests that municipalities that receive higher per capita mandatory transfers also receive higher per capita discretionary transfers, which might contradict hypothesis that mandatory transfers are not manipulable. We discuss further the exogeneity of mandatory transfers in the following section. Second, in Model 8 local taxes are also significant at 5% and negative, which supports the redistributive hypothesis, i.e., municipalities that are able to collect more taxes are richer and, therefore, the federal government does not prioritize them for discretionary transfers.

A6. Mandatory transfers as a dependent variable

In order to confirm that the FPM is indeed an endogenous proxy for mandatory transfers, we performed the following exercise: we rerun our regressions using mandatory transfers as the dependent variable. Table A6 below presents the results of the fixed effects IV regressions for the three proxies for local tax discussed in the previous section.

Table A6. Robust and instrumental variable fixed effects regression estimates of the effects of political identification

on mandatory transfers in Brazil, 1997-2012

Using three different proxies for local taxation

VARIABLES	Model 9 IPTU FE IV	Model 10 IPTU+ITR+ITBI FE IV	Model 11 IPTU+ITR+ITBI+ISS FE IV
Mayor-President-Only	0.0146**	0.0138*	0.0118*
	(0.00729)	(0.00710)	(0.00703)
Mayor-Governor-President	0.00440	0.000442	0.00111
	(0.00884)	(0.00874)	(0.00831)
Mayor-President's Coalition	0.0169**	0.0158**	0.0169**
	(0.00732)	(0.00712)	(0.00698)
PT ideological bias	0.00280	0.00270	0.00283
	(0.00224)	(0.00218)	(0.00215)
PSDB ideological bias	0.00254	0.00236	0.00205
	(0.00262)	(0.00256)	(0.00253)
Presidential election year	0.0326	0.0343*	0.00484
	(0.0210)	(0.0202)	(0.0216)
Municipal election year	0.0314	0.0325	-0.000151
	(0.0230)	(0.0221)	(0.0238)

Illiteracy rate (%)	0.00148	0.00187*	0.00190*
	(0.00113)	(0.00107)	(0.00103)
Gini coefficient (0,1)	-0.0299	-0.0282	-0.0255
	(0.0622)	(0.0606)	(0.0597)
Unemployment rate (%)	-0.000699	-0.000825	-0.000346
	(0.000843)	(0.000788)	(0.000775)
Working age population (1000)	0.000401	0.000177	-0.000340
	(0.000532)	(0.000529)	(0.000557)
Population (1000)	-0.000454	-0.000265	6.27e-05
	(0.000395)	(0.000391)	(0.000403)
Per capita Local land (IPTU) tax per GDP	0.264		
	(1.251)		
Per capita Local Tax (IPTU+ITR+ITBI) per GDP		1.811*	
		(1.072)	
Per capita Local Tax (IPTU+ITR+ITBI+ISS) per GDP			2.876***
			(0.913)
Constant	0.138***	0.110**	0.0742
	(0.0509)	(0.0499)	(0.0503)
Observations	65,231	65,231	65,231
Number of Municipalities	5,498	5,498	5,498
Year dummies	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Authors' calculations

Table A6 shows clearly that our regressions have a very reduced power to explain mandatory transfers. Indeed, only in model (11) is there one variable statistically significant at 1%, Local tax. All other variables are either insignificant or have very low statistical significance. It is true that the main political variable *Mayor-President-Only* appears significant at 10% in models 10 and 11 and at 5% in model 9. However, their economic significance is extremely reduced. Indeed, by applying the same methodology we used in section IV.B for calculating the marginal effects of explanatory variables, we conclude that throughout the period 1997-2012 the estimated marginal effect of partisan identification was never higher than 4 cents of a US dollar (in 2012 values). The average marginal effect is 3 cents of a US dollar per capita, i.e., according to the most favorable model 9, when the Mayor and the President are members of the same party in a nonaligned state, the municipality receives an extra 3 cents of a (2012) US dollar in mandatory transfers. The authors believe that this result makes it clear that there is no economically significant role of political identification in the implementation of mandatory FPM constitutional transfers in Brazil.

B. The Constitutional FPM fund's transfers rules

In order to better understand the FPM constitutional transfers funds, we present here the rules that define the amount of resources each Brazilian municipality is entitled to receive. To form the fund, the federal government transfers

22.5% of the two main federal taxes: the income tax IR ("Imposto de Renda") and the industrial products tax IPI ("Imposto sobre Produtos Industrializados"). The Brazilian Federal Court of Accounts TCU ("Tribunal de Contas da União"), an independent body, calculates the share of each municipality every year, based on estimations of the municipalities' population counts and the states' per capita income updated yearly by the Brazilian Institute of Geography and Statistics, IBGE. There are three subcategories of the FPM fund, which we describe below.

(1) 10% of the fund's resources go to the states' capitals according to a sharing rule that is proportional to the capital's population as compared to the total population of all capitals and inversely proportional to the per capita income of the corresponding state. Therefore, a richer state's capital will receive fewer resources than a poorer state's capital with the same population. The population coefficient is calculated according to Table A1 and the per capita income coefficient is calculated according to Table A2. The final share coefficient is the product of the population coefficient times the per capita income coefficient.

Table B1. Population coefficient for the distribution of FPM, 10% share

according to Law 5.172/1966.

Municipality population/Total reference population	Population coefficient
Up to 2%	2.0
Above 2% up to 2.5%	2.5
Above 2.5% up to 3%	3.0
Above 3% up to 3.5%	3.5
Above 3.5% up to 4%	4.0
Above 4% up to 4.5%	4.5
Above 4.5%	5.0

Source: Brazil. National Treasury Secretariat. 2012.
(http://www3.tesouro.fazenda.gov.br/estados_municipios/download/CartilhaFPM.pdf)

Table B2. State per capita income coefficient for the distribution of FPM

according to Law 5.172/1966.

Inverse of state per capita income	Per capita income coefficient
Up to 0.0045	0.4
Above 0.0045 up to 0.0055	0.5
Above 0.0055 up to 0.0065	0.6
Above 0.0065 up to 0.0075	0.7
Above 0.0075 up to 0.0085	0.8
Above 0.0085 up to 0.0095	0.9
Above 0.0095 up to 0.0110	1.0
Above 0.0110 up to 0.0130	1.2
Above 0.0130 up to 0.0150	1.4

Above 0.0150 up to 0.0170	1.6
Above 0.0170 up to 0.0190	1.8
Above 0.0190 up to 0.0220	2.0
Above 0.0220	2.5

Source: Brazil. National Treasury Secretariat. 2012.
(http://www3.tesouro.fazenda.gov.br/estados_municipios/download/CartilhaFPM.pdf)

(2) 3.6% (4% of the remaining 90%) of the fund's resources form a "Special Reserve" ("Reserva especial") that is distributed to all municipalities, other than the capitals, with population above 142,633 inhabitants, according to a rule similar to (1), i.e., proportional to the city's population as compared to the entire population of cities that qualify to that special reserve and inversely proportional to the per capita income of the state.

(3) 86.4% (96% of the remaining 90%) are distributed to all municipalities that are not state capitals. Each municipality's endowed resource is calculated in a three-step procedure.

    a.   First, the amount that goes to each state is calculated multiplying the total amount reserved for this distribution category (86.4% of FPM) by the state share coefficient, according to the table below, defined in Complementary Law no. 62/1989.

Table B3. Brazilian states' share coefficient of the 86.4% part of FPM

according to Complementary Law 62/1989

State Name	Share coefficient
Acre	0.2630
Alagoas	2.0883
Amapá	0.1392
Amazonas	1.2452
Bahia	9.2695
Ceará	4.5864
Distrito Federal	0.0000
Espírito Santo	1.7595
Goiás	3.7318
Maranhão	3.9715
Mato Grosso	1.8949
Mato Grosso do Sul	1.5004
Minas Gerais	4.1846
Pará	3.2948
Paraíba	3.1942
Paraná	7.2857
Pernambuco	4.7952
Piauí	2.4015
Rio de Janeiro	2.7379

Rio Grande do Norte	2.4324
Rio Grande do Sul	7.3011
Rondônia	0.7464
Roraima	0.0851
Santa Catarina	4.1997
São Paulo	4.2620
Sergipe	1.3342
Tocantins	1.2955

Source: Brazil. National Treasury Secretariat. 2012.
(http://www3.tesouro.fazenda.gov.br/estados_municipios/download/CartilhaFPM.pdf)

b. Next, each municipality receives a population coefficient according to the table below, defined in

Law-Decree no. 1881/1981. Then, each municipality receives a relative population coefficient that

is calculated dividing the city population coefficient by the sum of all city population coefficients

in that state (except the capital). Therefore, the sum of the relative population coefficients of all

cities in each state is one.

Table B4. Population coefficient for the distribution of FPM, 86.4% share

according to Law-Decree no. 1881/1981.

Municipality population (inhabitants)	Population coefficient
Up to 10188	0.6
From 10189 to 13584	0.8
From 13585 to 16980	1.0
From 16981 to 23772	1.2
From 23773 to 30564	1.4
From 30565 to 37356	1.6
From 37357 to 44148	1.8
From 44149 to 50940	2.0
From 50941 to 61128	2.2
From 61129 to 71316	2.4
From 71317 to 81504	2.6
From 81505 to 91692	2.8
From 91693 to 101880	3.0
From 101881 to 115464	3.2
From 115465 to 129048	3.4
From 129049 to 142632	3.6
From 142633 to 156216	3.8
Above 156216	4.0

Source: Brazil. National Treasury Secretariat. 2012.
(http://www3.tesouro.fazenda.gov.br/estados_municipios/download/CartilhaFPM.pdf)

c. Finally, the amount each city receives corresponds to the product of the city relative population coefficient times the state share of the 86.4% part of the FPM fund.

C. Brazilian parties' political ideology

We transpose here a table from Lopez, Bugarin and Bugarin (2015) that contains the dynamic evolution of Brazilian party ideologies that was adapted from Zucco, Jr (2014).

Table C1. Brazilian party ideology estimates from 1997 to 2013

on a scale from 0 (extreme left) to 10 (extreme right)

PARTY	YEAR																
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
PCdoB	*1,53*	1,60	1,66	1,73	1,79	1,92	2,06	2,19	*2,32*	2,31	2,31	2,30	*2,29*	2,30	2,30	2,31	*2,31*
PDS, PP	*7,09*	7,07	7,05	7,03	*7,01*	6,93	6,85	6,76	*6,68*	6,56	6,45	6,33	*6,21*	6,26	6,31	6,35	*6,40*
PDT	*2,84*	2,90	2,95	3,01	*3,06*	3,18	3,30	3,41	*3,53*	3,50	3,47	3,43	*3,40*	3,43	3,46	3,49	*3,52*
PFL, DEM	*6,90*	6,87	6,84	6,80	*6,77*	6,74	6,71	6,67	*6,64*	6,60	6,56	6,52	*6,48*	6,61	6,74	6,87	*7,00*
PMDB	*4,69*	4,78	4,86	4,95	*5,03*	5,04	5,05	5,05	*5,06*	4,98	4,89	4,81	*4,72*	4,81	4,89	4,98	*5,06*
PSB	*2,48*	2,52	2,55	2,59	*2,62*	2,70	2,79	2,87	*2,95*	2,98	3,01	3,03	*3,06*	3,08	3,09	3,11	*3,12*
PSD																	*5,68*
PSDB	*4,98*	5,01	5,04	5,07	*5,10*	5,05	5,00	4,95	*4,90*	4,87	4,83	4,80	*4,76*	4,86	4,97	5,07	*5,17*
PR, PL, PRB	*6,44*	6,30	6,17	6,03	*5,89*	5,92	5,95	5,97	*6,00*	5,90	5,80	5,70	*5,60*	5,65	5,70	5,74	*5,79*
PT	*1,78*	1,87	1,96	2,04	*2,13*	2,36	2,59	2,81	*3,04*	3,01	2,98	2,94	*2,91*	2,92	2,93	2,94	*2,95*
PV													*3,74*	3,77	3,81	3,84	*3,87*
Dilma																	*3,42*
Lula																	*3,24*
FHC																	*4,98*

Source: Zucco (2014) and Lopez, Bugarin and Bugarin (2015)
Note: italics correspond to Zucco (2014) estimates and non-italics correspond to Lopez, Bugarin and Bugarin (2015)'s interpolations.