



Administração Pública e Gestão Social  
ISSN: 2175-5787  
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Universidade Federal de Viçosa  
Brasil

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Administração Pública e Gestão Social, vol. 14, núm. 3, 2022

Universidade Federal de Viçosa, Brasil

Disponível em: <https://www.redalyc.org/articulo.oa?id=351571681002>



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## Voluntary Transfers and Flypaper Effect

Transferências Voluntárias e o Efeito Flypaper

Transferencias Voluntarias y el Efecto Flypaper

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Recepción: 09 Abril 2021  
Aprobación: 06 Marzo 2022  
Publicación: 22 Julio 2022

### ABSTRACT:

**Objective:** The objective of this paper is to examine the occurrence of the flypaper effect in voluntary transfers from the Union to Brazilian municipalities. The complexity and visibility factors explored by authors Tuckman and Chang (1991), Rios and Costa (2005), and Araújo and Siqueira (2015) were analyzed, plus the factor “political coalitions”, in the scenario regarding the provisions of the Constitutional Amendment (CA) 86/2015 and CA 95/2019.

**Originality:** While there are several studies existing on Brazilian tax budgeting, such as existence of several studies on tax budgeting in Brazil (Santos & Gasparine, 2020; Godoy, 2014; Gontijo, 2017), this paper is different as it also analyzes the occurrence of the flypaper effect on transfers resulting from impositional budget amendments, (Budget Law of the Union).

**Methodology:** A multivariate analysis method for panel data on secondary data collected from 5,484 Brazilian municipalities was used to test the flypaper effect on their total current and capital expenditure accounts, in relation to the amount of voluntary transfers received.

**Results:** It was possible to find evidence for the flypaper effect in regards to capital budget expenditures, which have increased above the capacity of the municipalities' economies to continue to provide resources for maintenance and costing of installed assets. Also, partisan political issues tend to direct resources to their bases, without carrying out technical studies which would enable future maintenance of investments resulting from parliamentary amendments. The results also suggest that changes in tax complexity may favor investment in structural assets.

**Theoretical and practical contributions:** The study of flypaper, in public administration, confirms the analysis made by Ministry of Planning, together with the Brazilian Federal Government, regarding the effectiveness of the application of public resources. The effects can have repercussions in the way of generating an increase in public spending; favoring the incompetence of tax collection, and running constant deficits in the municipal coffers; there is also the promotion of the nullity of financial return on public resources, perhaps in the form of tax reduction.

**KEYWORDS:** Municipal Public Expenditure, Voluntary Transfers from the country, flypaper effect.

### RESUMO:

**Objetivo:** Examinar a ocorrência do efeito *flypaper* nos repasses de transferências voluntárias da União para os municípios brasileiros. Foram analisados os fatores complexidade e visibilidade explorados pelos autores Tuckman e Chang (1991), Rios

e Costa (2005), Araújo e Siqueira (2015), acrescido do fator coligações políticas, no cenário dos dispositivos da Emenda Constitucional (EC) 86/2015 e EC 95/2019.

**Originalidade:** Apesar de existir vários estudos sobre orçamento impositivo no Brasil (Santos & Gasparine, 2020; Godoy, 2014; Gontijo, 2017). O diferencial desta pesquisa em relação às demais, se dá pela análise da ocorrência do efeito *flypaper* dos repasses decorrentes das emendas orçamentária impositivas (Lei Orçamentária da União).

**Metodologia:** Foi utilizado o método de análise multivariada para dados em painel sobre dados secundários coletados de 5.484 municípios brasileiros para testar o efeito *flypaper* nas contas totais das despesas correntes e de capital dos municípios brasileiros, em relação às transferências voluntárias recebidas.

**Resultados:** Foi possível evidenciar o efeito *flypaper* para as despesas orçamentárias de capital, que têm aumentado acima da capacidade da economia dos municípios em proverem recursos para manutenção e custeios dos bens instalados. De forma associada, questões partidárias e políticas tendem a direcionar recursos para suas bases, sem realizarem estudos técnicos que viabilizam manutenções futuras dos investimentos decorrentes das emendas parlamentares. Os resultados também sugerem que mudanças na complexidade tributária podem favorecer o investimento em bens estruturais.

**Contribuições teóricas e práticas:** O estudo do *flypaper*, na administração pública, ratifica as análises do ministério do Planejamento, junto ao Governo Federal brasileiro, no que tange à efetividade de aplicação dos recursos públicos; seu efeito pode trazer repercussões na geração de aumento dos gastos públicos; favorece a imperícia do recolhimento de tributos e constantes déficits nos cofres municipais; promove a nulidade de retorno financeiro dos recursos públicos, talvez na forma de redução tributária.

**PALAVRAS-CHAVE:** Gasto Público Municipal, Transferências Voluntárias da União, Efeito *flypaper* nos gastos públicos .

## RESUMEN:

**Objetivo:** Examinar la ocurrencia del efecto *flypaper* en las transferencias voluntarias de la Unión para los municipios brasileños. Se analizaron los factores de complejidad y visibilidad explorados por los autores Tuckman y Chang (1991), Rios y Costa (2005), Araújo y Siqueira (2015), más el factor coaliciones políticas, en el escenario de las disposiciones de la Enmienda Constitucional (CE) 86/2015 y CE 95/2019.

**Originalidad:** Apesar de la existencia de varios estudios sobre presupuesto tributario en Brasil (Santos & Gasparine, 2020; Godoy, 2014; Gontijo, 2017). El diferencial de esta investigación con relación a las demás, está dado por el análisis de la ocurrencia del efecto *flypaper* de las transferencias resultantes de las reformas presupuestarias impositivas (Ley de Presupuesto de la Unión).

**Metodología:** Se utilizó el método de análisis multivariado para datos de panel sobre datos secundarios recopilados de 5.484 municipios brasileños para verificar el efecto *flypaper* en las cuentas corrientes totales y de gastos de capital de los municipios brasileños, en relación con las transferencias voluntarias recibidas.

**Resultados:** Se pudo evidenciar el efecto *flypaper* para los gastos del presupuesto de capital, que se han incrementado por encima de la capacidad de la economía de los municipios para proveer recursos para el mantenimiento y costeo de los activos instalados. De manera asociada, las cuestiones políticas y partidistas tienden a dirigir los recursos a sus bases, sin realizar estudios técnicos que permitan mantener a futuro las inversiones resultantes de las reformas parlamentarias. Los resultados también sugieren que los cambios en la complejidad tributaria pueden favorecer la inversión en bienes estructurales.

**Aportes teóricos y prácticos:** El estudio del *flypaper*, en la gestión pública, confirma el análisis del Ministerio de Planificación, junto con el Gobierno Federal brasileño, sobre la efectividad de la aplicación de los recursos públicos; su efecto puede repercutir en generar un aumento del gasto público; favorece la incompetencia recaudatoria y los constantes déficits en las arcas municipales; promueve la nulidad del rendimiento financiero de los recursos públicos, quizás en forma de reducción de impuestos.

**PALABRAS CLAVE:** Gasto Público Municipal, Transferencias Voluntarias del país, Efecto *Flypaper* sobre el gasto público.

## INTRODUCTION

The *flypaper* effect is a phenomenon seen in public accounting, where an assumption that a government subsidy given to a municipality, increases public spending to a greater proportion in comparison to the evolution of regional income, or income elasticity (Ryu, 2017, Paz, Serrano & Ferreira, 2021; Bastida, Estrada & Guillamón, 2021).

The term *flypaper* effect was adopted in the scope of public finances, as it is directly linked to the transfer of government resources, public spending, and the promotion of income to municipalities.

The federal government, in order to reduce fiscal instability between the federative states which make up the less financially favored regions, and other members of the federation, can avail itself of voluntary

transfers to Brazilian municipalities. Voluntary transfers are defined in the Fiscal Responsibility Law (Law 101[Brazil], 2000), and thus determine the delivery of financial resources to another entity of the federation, in the form of cooperation, aid, or financial assistance, provided that it does not result from a constitutional or legal determination, or coming from resources destined to the Unified Health System (SUS).

However, despite these measures, the questionable behavior of the municipalities who receive the funds is noticeable, as voluntary transfers can increase budgetary expenses, especially when it comes to making investments that, in the end, need to be maintained with the municipalities' own resources (Rios & Costa, 2005; Matos, Rocha, & Arvate, 2011).

In line with studies by Sakurai (2013), Moutinho and Kiness (2017) and Bastida et al. (2021), a second approach, which is developed in this study, concerns the political coalition that may exist between the president of the republic and the mayor in regards to voluntary municipal transfers. Worldwide, the tax budget model establishes that the approved budget programming must be carried out mandatorily, that is, carrying out the approved expenditures is not optional, except for specific issues defined by law (Santos & Gasparine, 2020).

In Brazil, in an attempt to curb the dissipation of public resources, Constitutional Amendment (CA) No. of benches in the Brazilian parliament was passed in March of 2015, which made the execution of the budget programming related to the respective amendments mandatory. In addition to deliberating new rules for voluntary transfers of resources, (CA) 86 also sets a limit in the budget for individual and bench amendments (Brasil, 2016). The impact of the tax budget on the expenses of Brazilian municipalities, which receive the resources resulting from the approval of parliamentary amendments, via voluntary transfers, was the differential for reflection in this article, when compared to previous studies.

Rios and Costa (2005) reveal the increase in unconditional lump-sum transfers, where the amount is fixed and distributed all at once, that is, it is a factor that, proportionally, encourages more public expenditure increase. municipal government than the increase in the income of individuals in the community. The Ministry of Planning, Development and Management promoted the first edition of the Voluntary Transfers Forum (Brasil, 2016), in which it was pointed out that there are more than half a million proposals in the Federal Government Agreement System (Siconv) and more than R\$ 80 billion transferred to municipalities by the Union (Brasil, 2016).

Authors such as Tuckman and Chang (1991), Rios and Costa (2005), and Araújo and Siqueira (2015) studied factors such as fiscal “complexity” and “visibility” to explain the flypaper effect. Both are related to the difficulty of individuals in realizing their true tax burden, with the first blaming a more complex revenue collection system; and the second basing its view essentially on indirect taxes. In view of the above, this study aims to examine the occurrence of the flypaper effect in voluntary transfers from the Union to Brazilian municipalities, while analyzing the complexity and visibility factors explored by the authors Tuckman and Chang (1991), Rios and Costa (2005), Araújo and Siqueira (2015), plus the political coalitions factor. All in the context of the provisions of Constitutional Amendment 86/2015, amended by CA 95/2019.

To meet the purpose of the study, data was collected from the National Treasury Secretariat (STN), the Brazilian Institute of Geography and Statistics (IBGE) and the Superior Electoral Court (TSE), and an econometric model with fixed effects panel data was utilized to analyze the data. Through the results, it was possible to show that there is a financial flypaper effect among the municipalities, considering that there was an increase in current and capital budget expenses. These transfers are greater when there is a situation that favors the prevalence of political interest over the collective. Furthermore, it was possible to show that the analysis, based on CA 86/2015, was efficient to demonstrate changes in the process of transferring resources from voluntary transfers. In the case of capital budget expenditures, it was found that they have increased above the capacity of the municipalities' economy to provide resources for maintenance and costing of installed assets. And, in an associated way, partisan and political issues tend to direct resources towards their bases. The results also suggest that changes in tax complexity may favor investment in structural goods.

The present study contributes to the literature that deals with public spending in the form of voluntary transfers, by approaching the agreements present in these processes. The theoretical contribution of the research brings an empirical view not yet addressed in the Brazilian literature, separates current and capital expenditure, and explores aspects related to CA nº 86/2015, amended by CA nº 95/2019.

## THEORETICAL REFERENCE

### The Union's voluntary transfers

Among the transfers from the federal government to the municipalities, there are several sources of funds: constitutional transfers, legal transfers, transfers from the SUS and voluntary transfers through agreements. The work by Soares and Melo (2016) presents a detailed review of the concepts and purposes of each of these resource sources. However, this study is limited to voluntary transfers.

Pursuant to Decree No. 6,170 (2007), "voluntary transfers" represent transfers of treasury resources by the Union to the States, Federal District, and Municipalities, through the execution of agreements and/or transfer contracts, agreements, adjustments or other instruments similar. "Voluntary transfers" were intended to finance the performance of works and/or services of common interest within the three spheres of government (Brasil, 2016).

Ferreira and Bugarin (2007) analyzed intergovernmental transfers in 2090 municipalities in the period from 1995 to 2004, using the panel data method with fixed effects, and confirming the importance that voters attributed to the performance of the economy at the time of voting. The results also suggest that intergovernmental transfers in Brazil were influenced by party politics. This logic seems to suggest and guide the conduct of politicians who, in the exercise of power, try to demonstrate strength and economic development in times close to elections (Ferreira & Bugarin, 2007).

Veiga and Veiga (2013) analyzed increases in intergovernmental transfers and changes in votes associated with the Portuguese legislative elections, where the dataset used covered 278 municipalities in mainland Portugal, with annual data from 1979 to 2005. the Generalized Moments Method (GMM) for a panel of fixed effects specific to the municipality and the election, and thus, the results found suggest that the increase in transfers from the central government to municipalities, in an election year, guarantees additional votes, and that these transfers are targeted at jurisdictions where the government is at risk of losing support. Also in this direction, Bijos (2013) and Moutinho and Kniess (2017) analyzed the causes of voluntary transfers and found evidence that political-electoral motivation, although a significant element in the distributive process, is not justified as the only factor. Thus, Moutinho and Kniess (2017) concluded that the distribution of resources to Brazilian municipalities and states works as an announced rescue mechanism for those locations that need financial assistance and with preponderant political pressure power.

### The flypaper effect on public spending and voluntary union transfers

The term 'flypaper effect' emerged from the empirical work of Henderson (1968) and Gramlich (1969) in the United States, where they established demand equations, based on the utility of the representative citizen, subject to the restriction of their "total income", or that is, the sum of private income and the portion corresponding to intergovernmental transfers without counterpart (Almeida, 2016).

Rios and Costa (2005) confirm the existence of the flypaper effect in 308 Portuguese municipalities. Subsidy money tends to go to whoever joins first, that is, it is willing to increase public capital expenditures compared to current expenditures (Rios and Costa, 2005). Mattos, Rocha, & Arvate (2011) analyzed a reinterpretation of the flypaper effect in Brazilian municipalities and found evidence that higher transfers



from the federal government may induce less efficiency in local tax collection compared to increases in private income. Unconditional resource grants do not make municipalities more efficient, they also found evidence that municipalities also seek to increase their additional revenues through their own resources, including the implementation of new taxes, but in general, municipalities that receive more resources are less efficient (Mattos et al., 2011).

In Canada, Mehiriz and Marceau (2014) exposed those grants have a flypaper effect and asymmetric results for the municipalities of Quebec. In Brazil, Almeida (2016) notes the incidence of the flypaper effect in intergovernmental transfers related to Brazilian municipalities, between 2002 and 2010. Also in Brazil, Paz et al. (2021) analyzed data from 5,570 municipalities in the period from 2005 to 2018, and in the analysis of the flypaper effect, verified data such as tax revenue, current expenditure, current transfer, municipal population and GDP, and concluded that the economic and fiscal reality of the municipalities analyzed does not align with the precepts of the flypaper effect (Paz et al., 2021).

Regarding the flypaper effect, Bastida et al. (2021) developed a survey in Central America, which involved data from 298 Honduran municipalities from 2002–2015. Bastida et al. (2021) found evidence that their partisanship is considered the strongest explanatory factor for the allocation of resources, the electoral cycle did not prove to be significant, party alignment also had a weak and positive impact on transfers, but found a strong effect flypaper in Honduras (Bastida et al., 2021). In the study by Rios et al. (2021), evidence of the flypaper effect was also found in Turkey. Given the above, this study considered that expenses were classified separately as current expenses and capital expenses, and thus the first hypothesis is presented.

#### **H1 – The increase in voluntary transfers generates the flypaper effect on expenses.**

In the national literature, on the flypaper effect, studies by Sakurai (2013), Moutinho (2016), Soares and Melo (2016), Moutinho and Kniess (2017) and Paz et al. (2021).

Sakurai (2013) analyzed whether data from Brazilian municipalities in the period from 1989 to 2005 on variations in government transfers symmetrically affected the performance of municipal expenditures executed by the regional public administration. Thus, it sought to determine whether these expenditures were susceptible to the flypaper effect, and suggested, with the results obtained, that not only did government transfers had an asymmetric impact on regional public expenditures, but that, above all, this effect would generate a recomposition between current accounts and investments, in addition to being subject to the interference of political factors.

Moutinho (2016), in turn, found empirical evidence by pointing out partisan political determinants in the implementation of voluntary transfers, shown in the work structuring the classification of voluntary transfers from the Union to Brazilian municipalities, in 2012, via individual parliamentary amendments. For this, Moutinho (2016) used the method, or strategy, of documental research, which at the end of the analyzes, indicates that there are advantages gained by the influences of parties that are in power. And so, in municipalities where there is an electoral predominance of opposition parties, there is a lower volume of transfers (Moutinho, 2016),

Soares and Melo (2016) analyzed voluntary transfers from the Union via agreements on party-political, redistributive and technical criteria for Brazilian municipalities in the period between 1995 and 2010. The conclusions of this research indicated that the partisan position of mayors in relation to the Presidency of the Republic can decisively influence the number of transfers received, that is, voluntary transfers from the Union to municipalities are not redistributive, but associated with political and technical factors (Soares & Melo, 2016).

In this sense, Moutinho and Kniess (2017) also found that there is a strong correlation between the dimension of unencumbered resources and the confluence of voters (voters), between the dimension of unencumbered resources and the party cradle of local managers (mayors), who are struggling to obtain these resources. The investigation used official data from the Federal Government, and also prioritized the documental research method in order to analyze voluntary transfers, and other transfers that occurred

through Parliamentary Amendment, to Brazilian municipalities, referring to the proposals registered in the year 2012 Regarding partisanship and the flypaper effect, Bastida et al. (2021) found evidence that, in Central America, partisanship has a positive relationship with resource allocation.

In view of the empirical results on political coalitions, the second research hypothesis is presented.

**H2 - Political coalition between the party of the president of the republic and the party of the mayor increases the flypaper effect in Brazilian municipalities.**

Araujo and Siqueira (2015) evaluated the demand function for regional public goods and services, which included factors considering fiscal illusion based on the median voter theory, further supported by data concerning the year 2010 drawn from a sample of 5,249 municipalities. The authors also proposed to investigate the effects of fiscal illusion on the demand for municipal public spending in Brazil, and concluded that fiscal illusion, correlated to the tax system and fiscal subsidies, can cooperate with the understanding of the increase in public spending, defined by public expenditure, which would be the composite of expenditures made by public entities to subsidize public services (current expenditure) serving society or for the execution of investments (capital expenditure) (Araujo & Siqueira, 2015). In view of the above, the third and fourth hypotheses of this research are presented.

**H3 - The lower the tax complexity, the higher the expense.**

**H4 - The lower the fiscal visibility, the higher the expense.**

Following Araújo and Siqueira (2015) and Rios and Costa (2005), the variables complexity and fiscal visibility, referred to in the hypotheses, serve to emphasize the impact of the flypaper effect. For most of the literature, the indicator chosen to measure the degree of complexity and fiscal visibility of tax revenue is the Hirschman-Herfindahl index (HHI), as it is an accurate measure of revenue concentration, as seen since the studies by Tuckman and Chang. (1991) and by Araújo and Siqueira (2015).

Regarding the tax budget in Brazil, Menezes & Pederiva (2015) concluded that just making the budget tax (IO) will not solve Brazilian budget problems, since the analysis of the proposals for IO shows that, apparently, they aim to meet only the immediate interests of parliamentarians, by making the execution of their individual amendments mandatory. The authors argue that the implementation of the tax budget should still require changes in the relationship between the Executive and Legislative powers, because, in order to obtain the expected results, it would be important that the political system in which it will be inserted be modified.

In this scenario, considering that CA 86 and 95 were inserted into the Brazilian Constitution to improve the process of parliamentary amendments to the budget, which, in practice, made parliamentary amendments mandatory by limiting their discretion in handling the budget, in a way that is expected that, in the period after the aforementioned CA, there should be a reduction in the flypaper effect. In view of the above, the fifth hypothesis is presented.

**H5 - After Constitutional Amendment 86/2015, there was a reduction in the flypaper effect for municipal expenses.**

The five hypotheses tested in this study were formulated based on the flypaper effect theory, discussed and tested in research by Cossio and Carvalho (2001), Rios and Costa (2005), Inman (2008), Mattos et al. (2011), Parmagnani (2011), Sakurai (2013), Mehriiz and Marceau (2014), Araujo and Siqueira (2015), Almeida (2016), Ryu (2017), Paz et al. (2021), Bastida et al. (2021) and Rios et al. (2021). And all five hypotheses tested in this study take into account expenditure, with current expenditure and capital expenditure seen separately.

## METHODOLOGY

### Research typology, data collection, sample composition and empirical model

In order to verify the existence of the flypaper effect in voluntary transfers from the union to Brazilian municipalities, under the context of factors such as political coalitions, fiscal complexity, fiscal visibility and Constitutional Amendment 86, amended by CA 95/2019, data was collected from 5,484 Brazilian municipalities for the periods from 2008 to 2016, in a total of 49,356 initial observations. After eliminating missing values referring to the variables used in the study, a final sample was obtained with 26,619 observations referring to the municipalities, which was used to test the five research hypotheses.

Specifically, financial data was obtained from the publications of Finanças Brasil – Accounting Data for the Municipalities (FINBRA), a database linked to the National Treasury Secretariat (STN) and which contains detailed information on budget execution (income and expenses) and balance sheet for the municipalities. The political data referring to the parties and coalitions of the elected mayors were extracted from the Superior Electoral Court (TSE) and refer to the municipal executive elections that took place in 2004, 2008 and 2012. Finally, the data from the annual population estimates were taken from the Brazilian Institute of Geography and Statistics (IBGE).

All financial variables were corrected by the national consumer price index (IPCA), using the year 2008 as the base year. This procedure allows the temporal comparability of the financial information as all the variables started to be worked at the same price level (2008 current prices). The financial data were also winsorized at 1% in each tail in order to mitigate the possible influence of outliers and in order to guarantee comparability with other results in the literature.

The analyzes were performed with panel data to test the flypaper effect on current and capital expenditure accounts of Brazilian municipalities, according to models 1 and 2, respectively. The unbalanced panel data models relate the Brazilian municipalities  $i = 1, 2, 3, \dots, 5,484$  in the time period  $t = 2008, 2009, \dots, 2016$ , namely:

$$\frac{\Delta \text{despCap}_{it}}{\Delta \text{TVUCCapit}} = \beta_0 + \beta_1 \frac{\Delta \text{REND}_{it}}{\Delta \text{TVUCCapit}} + \beta_2 \text{PART}_{it} + \beta_3 \text{CF}_{it} + \beta_4 \text{VF}_{it} + \beta_5 \text{EC}_{it} + \beta_6 \text{POP}_{it} + \varepsilon_{it} \quad (1)$$

$$\frac{\Delta \text{despCor}_{it}}{\Delta \text{TVUCCorit}} = \beta_0 + \beta_1 \frac{\Delta \text{REND}_{it}}{\Delta \text{TVUCCorit}} + \beta_2 \text{PART}_{it} + \beta_3 \text{CF}_{it} + \beta_4 \text{VF}_{it} + \beta_5 \text{EC}_{it} + \beta_6 \text{POP}_{it} + \varepsilon_{it} \quad (2)$$

In order to verify whether the most appropriate panel estimator to estimate models 1 and 2 should be the fixed effects (EF) or random effects (EA) estimator, the Hausman test was used separately for each one of the specifications. The Hausman test consists, in this case, of estimating at the first moment using both estimators (EA and EA). In a second moment, through a statistic with chi-square distribution, it is then verified whether the joint difference between the coefficients of both estimated models is significant. If the null hypothesis of unsystematic differences between the coefficients is rejected, the EF estimator should be used instead of the EA estimator (EF is consistent and EA is inconsistent). On the other hand, if the null hypothesis of unsystematic differences between the coefficients is not rejected, the EA estimator should be used instead of the EF estimator (EA is consistent and more efficient) (Wooldridge, 2002).

The results obtained from the estimation of the Hausman test in each model indicate that the regression of model 1 must be estimated using the fixed (consistent) effect estimator, while the random effects estimator



must be used to estimate the regression of the model 2 (consistent and more efficient estimates). In both estimations, robust estimators were used for variance (Wooldridge, 2002; Hsião, 2014).

According to hypothesis H1, the increase in voluntary transfers is expected to generate the flypaper effect on expenditures, whether capital or current. In this case, it is expected that the coefficient  $\beta_1$  of models 1 and 2 are both positive. In these models, the variables represent changes in capital and current expenditures, in relation to changes in voluntary current transfers for each municipality, and the variable represents the variation of GDP per capita of the municipalities in relation to the variation of voluntary capital transfers.

The coefficients, in turn, respond to hypotheses H2, H3, H4 and H5, which refer to the sensitivity of the flypaper effect to the bloc variables between the party of the president of the republic and the party of the mayor, fiscal complexity, fiscal visibility and the institution of Constitutional Amendment 86 of 2015. According to these hypotheses, and are expected.

Chart 1: Description of the variables used

Acronym dependent variables	Description of variables	Description of variables	Source	Authors who used
Current expense		Public expenditure effectively paid, as represented by the change in current expenditure divided by the change in the current voluntary transfer.	FINBRA, STN	Ryu (2017), Almeida (2016), Araújo and Siqueira (2015), Mehirić and Marceau (2014), Sakurai (2013), Mattos et al. (2011), Parmagnani (2011), Inman, (2008), Rios and Costa, (2005)
Capital expense		Citizens' demand for public goods, as represented by the change in capital expenditure divided by the change in voluntary capital transfer.	FINBRA, STN	Ryu (2017), Almeida (2016), Araújo and Siqueira (2015), Mehirić and Marceau (2014), Sakurai (2013), Mattos et al. (2011), Parmagnani (2011), Inman, (2008), Rios and Costa, (2005), Cossio and Carvalho (2001)
Independent variables				
Acronym	Description of variables	Metric	Source	Authors who used
	Variation of income in relation to the variation of the Voluntary Capital Transfer	Variation in GDP per capita of municipalities divided by variation in Voluntary Capital Transfer.	FINBRA, STN 4422	Inman (2008), Soares and Melo (2016), Moutinho (2016), Simões and Orellano (2015)
	Variation of income in relation to the variation of the Current Voluntary Transfer.	Variation of GDP per capita of municipalities divided by variation of current voluntary transfer.		Inman (2008), Soares e Melo (2016), Moutinho (2016), Simões and Orellano (2015)
PART	Political alignment <i>dummy</i>	1 for the same party/coalition president and mayor and zero in the other cases (different parties).	TSE	Soares and Melo (2016), Moutinho (2016), Simões and Orellano (2015) and Inman (2008)
CF	Fiscal Complexity of the Municipality.	$[(Receipts\ from\ IRRF)^2 + (receipts\ from\ the)^2 + (Receipts\ from\ ITBI)^2 + (Receipts\ from\ ISSQN)^2] / [Taxes\ (IPTU,\ ITR,\ and\ ISS)^2 + (Voluntary\ Transfers)^2 + (FPM)^2]$ . Receipts from IRRF <sup>2</sup> + (receipts from the IPVA) <sup>2</sup> + (Receipts from the ITIPI) <sup>2</sup> + (Receipts from ISSNQN) <sup>2</sup> / [Taxes (IPTU, ITR, and ISS) <sup>2</sup> + (Voluntary Transfers) <sup>2</sup> + (FPM) <sup>2</sup> ].	FINBRA, STN	Araújo and Siqueira (2015) and Rios and Costa (2005)
VF	Visibility of Direct Taxes	$(IPTU,\ ITR,\ ITBI\ e\ ISSQN) + Rates\ (public\ services) + Improvement\ Contribution,\ Dues\ of\ public\ works + Contribution\ for\ the\ cost\ of\ public\ illumination\ Taxes\ (IPTU,\ ITR\ e\ ISS) + (Voluntary\ Transfers) + (FPM)$ . $(IPTU,\ ITR,\ ITBI\ e\ ISSQN) + Rates\ (public\ services) + Improvement\ Contribution,\ Dues\ of\ public\ works + Contribution\ for\ the\ cost\ of\ public\ illumination\ Taxes\ (IPTU,\ ITR\ e\ ISS) + (Voluntary\ Transfers) + (FPM)$ .	FINBRA, STN	Araújo and Siqueira (2015) and Rios and Costa (2005)
EC	Legislative Shock <i>Dummy</i>	1 for the period after Constitutional Amendment 86/2015 and zero in other cases.	TSE	Brasil (2015)
POP	Natural logarithm of the population	Control variable, as the size of the population can influence the level of expenditure. Logarithm of the population of municipality <i>i</i> at time <i>t</i> .	IBGE	Araújo and Siqueira (2015) and Rios and Costa (2005)

Based on the study by Inman (2008), the population of the municipality was included as a control variable, as the size of the municipality can influence public spending, which delimits its levels. Another point to be considered is the volume of resources needed to maintain the municipality with its structure in operation, as population growth may vary from municipality to municipality and over time.

## ANALYSIS OF RESULTS

### Descriptive statistics

Table 01 presents in a detailed way the descriptive statistics of the variables used in this work by year in the period from 2008 to 2016. Analyzing the independent variables referring to income and visibility of taxes, it appears that the average per capita income and visibility of direct taxes showed an upward trend in the period considered. Specifically, the average per capita income over the years presented an average growth of close to 4.5%, although it showed a drop in 2013. Current expenses follow a similar movement to population growth. Such movements initially suggest a certain stability in the growth of current expenses in relation to the increase in population demand, this stability can be explained by the pressures existing in the period due to the political and economic turmoil experienced by Brazil, in which the control of expenses became a constant agenda of analysis and annotation by the media, specialists, and the population. Despite this, the international literature (Lupu & Asandului, 2017; Trabelsi, 2018) and national literature (Bogoni et al., 2011; Degenhart et al., 2016) found evidence of a positive relationship between economic growth and public spending.

Regarding capital expenditures, there was a high average peak in 2010, with a sharp drop in 2011 and subsequent growth. This movement is similar to the variations in average capital transfers and is in line with attempts to formulate investment policies in infrastructure as a way to expand economic activity and contain the effects of declines in economic activity levels (Lupu & Asandului, 2017; Trabelsi, 2018; Bogoni et al., 2011; Degenhart et al., 2016).

Table 01: Descriptive Data Statistics

		Population	Current expenses	Capital expenditure	TVUC Current	TVUC Capital	CF	VF	Income
2008	Mean	27440	29087218	5827561	394553	865377	4,754	0,195	18,88
	Mean	27440	29087218	5827561	394553	865377	4,754	0,195	18,88
	Maximum	2434642	3688217856	917718656	83878552	66173788	16696,381	138,01	1312,1
	Minimum	1007	1192343	0	0	0	0,000	0,000	0,05
	Standard deviation	71382	91843542	23102406	2818946	2956796	263,918	2,315	71,27
2009	Mean	40109	46261111	5279888	397268	1026118	0,220	0,186	23,75
	Maximum	11037593	2100357529	2260142080	76085344	183206880	958,040	32,380	5842,23
	Minimum	837	0	0	0	0	0,000	0,000	0,01
	Standard deviation	234679	400820068	44813212	2193864	6013434	11,993	0,519	167,80
	Median	12201	12939036	1232015	50000	126844	0,000	0,070	7,97
2010	Mean	40391	53015841	25572389	380844	1131875	0,082	0,196	27,48
	Maximum	11316119	23723010048	13976587264	84165024	379736544	41,860	11,530	7297,99
	Minimum	806	0	0	0	0	0,000	0,000	0,02
	Standard deviation	237690	453875394	262806283	1968787	7527516	0,800	0,373	205,14
	Median	12468	14294202	6199279	42415	289921	0,000	0,080	9,24
2011	Mean	40989	61954067	7572353	497824	1664848	0,108	0,205	32,05
	Maximum	11376685	26553356288	3413688832	76909104	428217760	152,670	13,830	8542,57
	Minimum	807	0	0	0	0	0,000	0,000	0,02
	Standard deviation	241447	514379097	67076585	2234199	9264616	2,026	0,397	239,50
	Median	12099	16709141	1913241	67708	449177	0,000	0,080	10,72
2012	Mean	40946	47579559	11063048	497933	1399982	0,089	0,206	33,92
	Maximum	11253503	18742039872	5142034208	84837512	247912192	21,490	5,460	9038,28
	Minimum	805	0	0	0	0	0,000	0	0
	Standard deviation	242790	365229525	99449622	2238982	6004737	0,626	0,371	233,67
	Median	11788	14124618	2844218	77517	405170	0,000	0,080	12,06

2013	Mean	91035	187467622	18938365	1544729	3595328	103,237	0,554	19,69
	Maximum	11821873	32531499008	3953996032	75717384	411575008	144573,563	305,360	259,53
	Minimum	1463	5895151	62855	7	4	0,000	0,000	3,84
	Standard deviation	594058	1566705123	189433037	6285732	21797512	3857,001	8,161	15,46
	Median	13710	22354664	1895599	292719	877019	0,010	0,130	16,71
2014	Mean	76156	176846050	18840142	1585856	3316962	0,375	0,336	20,56
	Maximum	11895893	36235980800	5213933056	79207232	360050656	78,130	7,490	377,99
	Minimum	1206	6790364	76352	194	3315	0,000	0,000	3,77
	Standard deviation	510132	1488844381	209026178	6298507	15977124	2,537	0,628	19,86
	Median	14406	26517406	2622201	330037	1230741	0,010	0,130	16,67
2015	Mean	72760	173992208	15432475	1195592	2466929	0,388	0,343	21,44
	Maximum	11895893	39283793920	4641783296	56560108	344787296	80,990	15,870	229,66
	Minimum	1206	3113601	50303	0	8	0,000	0,010	4,17
	Standard deviation	471776	1475103702	169310399	3461303	13749747	2,864	0,698	17,54
	Median	14483	28086056	2154948	299673	934402	0,010	0,140	17,71
2016	Mean	83644	217902106	19718530	1447188	3446988	0,486	0,360	22,91
	Maximum	11967825	43149963264	4584098304	58601664	518777056	103,440	10,690	228,39
	Minimum	1217	6783953	69441	0	31	0,000	0,000	4,15
	Standard deviation	517069	1753303919	184033652	4664045	22604836	3,985	0,714	17,02
	Median	12955	28065867	2352877	320449	980426	0,010	0,140	19,68
T et al	Mean	47328	84111673	13203431	621440	1594899	4,624	0,237	26,41
	Maximum	11967825	43149963264	13976587264	83878552	518777056	144573,563	305,36	9038,28
	Minimum	805	0	0	0	0	0,000	0,000	
	Standard deviation	309218	866867414	156573149	3058299	10133761	758,526	1,828	177,44
	Median	12606	16485943	2497373	97528	390000	0,000	0,090	10,73

Source: Research data. D.V refers to the standard deviation. Max refers to the maximum value. Min refers to the Minimum value. Data were winsorized at 1% in each tail.

Both the maintenance of growth in government spending, and the maintenance of mandatory expenditure, limits the government's ability to alleviate taxation on companies and other taxpayers. In this case, although some proposals have emerged to simplify the tax model, there is still high taxation based on a tax system of relatively high complexity. These points are evidenced by the evolution of tax complexity and fiscal visibility, which had a similar behavior in terms of average growth over the years analyzed, with a high peak in 2013, a considerable drop in 2014, and growth in consecutive years.

Although such characteristics are observed in average terms, there is a great oscillation between the analyzed municipalities, evidenced not only by a matter of dispersion, but by the asymmetry present in the analyzed distributions. This portrait is common in the Brazilian scenario, since there are municipalities that demand a greater volume of resources, in addition to having a high population density and greater concentration of wealth, as is the case of the cities of São Paulo and Rio de Janeiro, among others (Instituto Brazilian Institute of Geography and Statistics - IBGE, 2018).

With such a discrepancy between the data, Barnett and Lewis (1994) recommend that the winsorization of the information used be carried out, which consists of replacing the data below and above a given percentage, respectively, with the highest and lowest remaining value. In this study, winsorization was performed at 1%.

Non-tabulated results show that the variables CF and FV have a positive Pearson correlation of 0.85, which indicates that fiscal complexity and visibility have moved very similarly over time. Although these variables showed a relatively high correlation, non-tabulated results for the Variance Inflation Factor (VIF) test showed a value of less than three for the VIF of the first regression and close to four for the second, thus not showing multicollinear implications for any of the regressions. regressions (Gujarati, Porter, & Gunasekar, 2011).

Results not tabulated on Pearson's Correlation also show an inverse relationship between per capita income and the level of current and capital transfers. Such results are in line with the constitution insofar as they reflect the assistential role of voluntary transfers, as recommended by legislation through the delivery of current or capital income to another entity of the Federation, as cooperation, aid or financial assistance (Law n. 101, 2000). In November 2016, the Voluntary Transfers Forum organized by the Ministry of Planning, Development and Management noted that: (i) there are more than half a million proposals for agreements

in the Agreement System (Siconv); (ii) in the last 15 years, the Union transferred more than BRL 80 billion to municipalities (Brasil, 2016).

## Hypothesis Test - Multivariate Regression Analysis

In Table 2 it is possible to visualize the results of the regression estimations that consider capital and current expenditures as dependent variables, respectively, as well as diagnostic evaluation tests of the regressions assumptions. The estimated models did not present multicollinearity problems as the mean VIF was less than 5 for all models (Wooldridge, 2002).

It was also found that in such estimates the data are heteroscedastic, so a robust estimator was used for the variance in both estimates. The Hausman test was used to verify whether the panel to be estimated should contain fixed or random effects. The results suggested that model 1 estimated with fixed effect is consistent, while consistent and more efficient results are obtained with random effects for regression 2, which considers current expenditures as a dependent variable.

Table 2: Results of the estimations

Regression 1 - Capital Expenditure	Coefficient	P-value	Regression 2 - Current Expense	Coefficient	P-value
Income/ TCUCCap	424761,1	0,000***	Income/TVUCCap	-25900000	0,000***
Political Parties	566,1678	0,000***	Political Parties	-519668	0,414
Constitutional Amendment 86	524,7481	0,000***	Constitutional Amendment 86	-118693	0,907
CF	-1,288933	0,002***	CF	31540.57	0,972
VF	156,3674	0,002***	VF	-2241195	0,167
Population	-0,0000499	0,588	Population	-0,01089	0,997
Constant	-451,877	0,000***	Constant	1808321	0,011**
N observations	26.619		N observations	26.259	
VIF	2,78		VIF	1,31	
Chow test	1,33	0,000***	Chow test	0,65	1,000
Breush-Pagan test	0,16	0,3425	Breush-Pagan test	0,00	1,000
Hausman test	13,32	0,0206**	Hausman test	8,62	0,1252
Wald – Heteroscedasticity	1,30E+49	0,000***	Wald – Heteroscedasticity	1,000	0,000***
Wooldridge – Autocorrelation	0,378	0,5385	Wooldridge Autocorrelation	0,209	0,6476
Jarque test - Very normal	1,00E+11	0,000***	Jarque test - Very normal	8,3e+11	0,000***

Source: Research data. Income/TVUC income and voluntary transfers from agreements, CF refers to fiscal complexity. VF refers to fiscal visibility. Models with fixed effects most indicated in regression 1 and random effects for regression 2. The term constant refers to the mean of the intercepts of the n municipalities for model 1. The symbol \*\*\* denotes significant at 1%; \*\* denotes significant at 5%; \* denotes significant at 10%.

The results shown in Table 2 indicate that the income/TVUC variable is significant in both estimates, although it shows opposite signs. Specifically, changes in income in relation to voluntary transfers have a negative association with current expenditures and a positive association with capital expenditures. Such analyzes suggest that the increase in income is associated with a reduction in the current expenditure of municipalities and an increase in capital expenditure. Therefore, there is a flypaper effect for capital expenditures and not for current expenditures. In this case, there is evidence that supports hypothesis H1 of



the presence of the flypaper effect within the perspective of capital expenditures, but not current ones, which is in line with the research by Araujo and Siqueira (2015) and Rios and Costa (2005).

Rios and Costa (2005) confirm the essence of the flypaper effect (that the money from subsidies tends to adhere to where it arrives first, that is, it is willing to increase public expenditure, as opposed to the values passed on to voters) in the analysis of intergovernmental transfers to 308 Portuguese municipalities. In their analyses, the authors conclude that this effect is more prevalent in capital expenditures than in current expenditures, which is in line with the results obtained for Brazilian municipalities. In this case, it appears that the flypaper effect in Brazil is a fact arising from the fixation of resources originating from lumpsum-type government transfers, which are applied to complement local public expenditure instead of promoting the return of resources to the population, for example, through tax relief (Inman, 2008).

The results of the estimation of model 1 and shown in Table 2 also indicate that in municipalities where the ruler is from the same party or coalition as the president, the transfers in capital expenditure are, on average, higher by R\$ 566.16 in relation to municipalities that do not show such a relationship. This result is in line with hypothesis H2, in which the coalition between the president's party and the mayor's party increases the volume of current and capital expenditures, concomitantly with the increase in voluntary transfers from agreements. The results presented in Table 2 corroborate the findings of studies by Soares and Melo (2016), Moutinho and Kniess (2017) and Bastida et al. (2021) regarding the effect of party-political criteria on voluntary transfers.

Together, the results on the income effect and the government alignment effect suggest that voluntary transfers from the Union may legally reflect political maneuvers with the legal subterfuge of financing the performance of works and/or services of common interest within the scope of the three spheres of government. (Brazil, 2011). This may even be one of the justifications for the initial evidence found in the literature that the increase in unconditional lump-sum transfers proportionally encourages more municipal public expenditure than the increase in income (Rios & Costa, 2005).

The results in Table 2 also indicate that greater fiscal complexity tends to reduce capital expenditures in the municipalities studied, as can be seen in the estimates of model 1. Specifically, an increase of 0.1 percentage point would tend to reduce capital expenditures by 1.28 percent of total transfers received, which supports hypothesis H3, in which lower fiscal complexity results in increased municipal capital expenditures. The same results are not obtained for current expenses, which remain unrelated to fiscal complexity. This result suggests that changes in tax complexity may favor investment in structural goods, since this demand has even been the target of legislation proposals with the aim of simplifying the tax system and reducing the negative externalities generated by different state and municipal legislation. The results about the effect of fiscal visibility on the variation of capital and current expenditures follow in an analogous way and support the evidence of fiscal complexity. Hypotheses H3 and H4, therefore, are still satisfied for capital expenditures, which corroborates the work of Araujo and Siqueira (2015).

Additional results also suggest that after the implementation of EC 86, which aimed to give greater responsibility to managers, there was no reduction in the volume of Capital and Current Expenses of the municipalities. In this case, hypothesis H5 is not satisfied, which suggests that EC86 may not have fully contributed to the improvement of the parliamentary amendments process in the budget. In addition, other analyzes suggest that the targeting of voluntary transfers from the Union may be taking place impartially as they continue to be related to the alignment between political parties. This result leads us to reflect that those new measures need to be taken in order to effectively control the distribution of regional public resources.

In general, the results presented provide evidence that contributes by empirically demonstrating that the coalition between the president's party and the mayor's party increases the volume of capital expenditures. The results also contribute by bringing evidence not yet recorded in the Brazilian literature on the fact that changes in tax complexity can favor investment in structural goods insofar as both fiscal complexity and fiscal visibility tend to reduce capital expenditures of studied municipalities. The same results are not obtained for

current expenses. An additional contribution is by empirically showing that, in Brazil, the implementation of EC 86, which aims to give greater responsibility to managers, did not reduce the volume of Capital and Current Expenses, as can be seen by the estimated non-significant coefficient in equation 2. Together, these results raise concerns as, in general, the results indicate that capital expenditures have increased above the economy's ability to provide resources and associated with partisan issues, in which laws have not been capable of halting such advances.

## FINAL CONSIDERATIONS

This study aimed to examine the occurrence of the flypaper effect in transfers of voluntary transfers from the Union to Brazilian municipalities. From the results of Tuckman and Chang (1991), Rios and Costa (2005), Araújo and Siqueira (2015), the political coalitions factor was added, in the scenario of the provisions of the Constitutional Amendment (EC) 86/2015 and CA 95/ 2019 Overall, the results suggest that there is a flypaper effect for capital expenditures, but not for current expenditures. Specifically, the increase in income is associated with a reduction in the current expenditure of municipalities and an increase in capital expenditure. However, tax complexity is still an obstacle to the development and reduction of public spending as it is verified that greater tax complexity tends to reduce capital expenditures in the municipalities studied. This result suggests that changes in tax complexity may favor investment in structural goods.

Although the literature shows that voluntary transfers represent a relevant instrument to mitigate imbalances between different levels of government, and between federative entities of a similar level in a federation, including Brazil, this work presents evidence that goes against the constitutional assumptions. Specifically, the results suggest that after the implementation of the constitutional amendment, which aimed to give greater responsibility to managers, the CA goal may not be being achieved on average by the municipalities. The result found leads us to reflect that those new measures need to be taken in order to achieve effective control in the distribution of regional public resources. The results obtained with the study give rise to future questions regarding the management of public resources based on direct transfers through agreements, in which we seek to contribute to the broad reflection on the control of these resources and also to mitigate the increase in expenses as suggested Araujo and Siqueira (2015) and Rios and Costa (2005), aiming to return such resources to the taxpayer through public policies and the long-awaited tax exemptions.

For future research, it is suggested to study why voluntary transfers increase public expenditures instead of promoting its stabilization. And for that, it is recommended that qualitative research be developed with public managers, on the characteristics of the economy, tax differences and federal dependence, as these may be factors that explain the increase in public expenditures due to the receipt of these transfers.

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