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On the interaction between own revenues and intergovernmental transfers. Evidence from Argentinean local governments.*

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Abstract

In this paper we study the interaction between intergovernmental transfers on the level and the structure of local own revenues. Based on a sample for Argentina's local governments, findings indicate that transfers facilitate local revenues collection. This *"crowding-in"* effect is more pronounced in urban local governments, with higher population density, poverty and demand for public services. In addition, transfers bias own revenues composition towards less distortionary taxation (i.e., property tax). Interestingly, this bias is stronger for local governments with higher share of indivisible public goods (that are less likely to be finance according to the *"benefit principle"*). Results are robust to a battery of different estimation methods, and can be rationalized with theory from public finance and political economy as well. As a whole findings might have important policy implications on local governments public finance.

JEL Codes: H25, H29, H41, H71, H77

Keywords: Intergovernmental transfers, Local tax structure, Argentina.

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1 Introduction

Local governments typically finance their expenditures via a mix of own revenues and intergovernmental transfers (henceforth transfers) from higher layers of government. The interaction between both sources of financing has been widely studied by the literature on local public finance from theory and empirical evidence. Both substitution and complementarity effects have been supported in the literature.[1] Some contributions suggest that transfers *"crowd out"* own revenues, whereby the inflow of external transfers can sap the incentive for local governments to collect their own dues (Zhuravskaya, 2000; Buettner & Wildasin, 2006; Mogues & Benin, 2012). On the contrary, other contributions suggest *"crowding-in"* effects, whereby grants expand local tax revenues (Skidmore, 1999; Dahlberg *et al.*, 2008; Caldeira & Rota-Graziosi, 2014; Masaki, 2018).

In this paper we study the interaction between transfers and own revenues. Our analysis is based on local governments of Argentina, a developing country at South America. Argentina is a federal country, with four levels of government: the National, the sub-national including 23 provinces, the Autonomous City of Buenos Aires, and more than 2300 local governments.[2] Argentina is an ideal country to study the aforementioned interaction for a number of reasons. First, Argentina's local governments (henceforth municipalities) are embedded in extensive fiscal equalization mechanisms that combine, in a stylised manner, many of the relevant features observed in other countries.[3] Second, as in many other countries, the importance of local governments in Argentina has been increasing in recent decades.[4] Actually, municipalities represent 7.4 percent

[1] See Bradford & Oates (1971) seminal contribution. Transfers can obviate the need for local revenue generation, which in turn undermines the fiscal autonomy of local governments. The second-generation theory of fiscal federalism (Weingast, 1995, 2009; Oates, 2005) remarks several perverse incentives of transfers (e.g., soft budget constraint). Yet, depending on how fiscal equalization is designed, transfers may provide incentives to increase rather than lower taxes (Smart, 1998). Along these lines, transfers can be used for public spending expansions instead of tax reliefs. This phenomenon is known as *"flypaper effect"* (Hines & Thaler, 1995; Bailey & Connolly, 1998; Vegh & Vuletin, 2015).

[2] Approximately 1,100 are municipalities and 1,200 are local governments without a municipal hierarchy.

[3] See Ahmad (1997); Martinez-Vazquez & Searle (2007); Blöchliger & Charbit (2008); Muñoz Miranda *et al.* (2017). Case studies on fiscal equalization and revenue sharing mechanisms can be found, among others, in Ferede (2017) for Canada, Holm-Hadulla (2020) for Germany, Wang & Herd (2013) for China, Masaki (2018) for Tanzania, and Taiwo (2021) for the case of Nigeria.

[4] Spain is probably the best example of this phenomenon (Lago-Peñas *et al.*, 2017). Central public sector spending in 1980 accounted for 89.5 percent of the whole, while in 2001, it had fallen to 60.5 percent. Regional government spending increased from 0 percent to 26.4 percent in the same period (Carrion-i-Silvestre *et al.*, 2008). In a more general trend, as remarked by Blöchliger & Kim (2016), between 1995 and 2013 the sub-central share of general government spending on all spending in OECD countries rose from 29 percent to 33 percent. These shares in federal

of aggregate public expenditure, equivalent to 3.2 percent of Gross Domestic Product (GDP).[5] In 1990 those figures were 6.1 percent and 1.6 percent respectively. The increasing importance of municipalities reveals a decentralization process, and in the Argentine case was accompanied by increasing transfers which represents 53.4 (38.6) percent of total local revenues in 2014 (1990).[6] Third, as in many other countries, municipalities have access to both distortionary (i.e., on mobile factors, such as taxation on business) and less distortionary (i.e., on immobile factors, such as taxation on property) taxation. Fourth, municipalities provide urban services (e.g., lighting, cleaning) which are essentially divisible goods, that can be mainly financed according to the *"benefit principle"* with prices and fees.[7] Complementary, municipalities play an active role in financing goods such as health and welfare programs which are essentially indivisible goods, with no possibility of fully financing through the prices and fees system. Fifth, municipalities present remarkable heterogeneity in expenditure per capita, productive structure, urbanization and social indicators (Porto, 2004). Finally, studies on fiscal federalism in Argentina have generally focused on the relation between the National and the sub-national level, with secondary attention to municipalities.[8]

We provide empirical results employing panel data for the 135 municipalities of Buenos Aires, the main province of Argentina. We first explore the relation between transfers and the level of own revenues. Our main results indicate that transfers facilitate local revenues collection. This finding is robust to a battery of different estimation methods, and consistent with standard theoretical arguments. Second, and given the aforementioned third reason for studying the Argentine case, we explore the effect of transfers on the composition of local taxation between business and property taxation. Here we find that transfers bias own revenues composition towards less distortionary taxation. We rationalize this finding with theoretical political economy arguments, based on the political costs of taxes. Third, given municipalities' heterogeneity, we explore previous effects conditional to the share of urban population finding that the *"crowding-in"* effect of transfers is more pronounced in more urbanized municipalities, which are poorer and present

and quasi-federal countries are above average and, in Canada, Denmark, and Switzerland exceed 50 percent of total government spending.

[5]In the municipalities the share of spending allocated to public good provision (93% of total expenditure) is greater than in the provinces (75%) and the Nation (25%); the rest are transfer payments.

[6]Similarly, since 2005 the share of grants in sub-central revenue rose in most OECD countries (Blöchliger & Kim, 2016).

[7]As remarked by Mankiw *et al.* (2009), in public finance the *"benefit principle"* states that a person's tax liability should be related to the benefits that individual receives from the government.

[8]Argentina is usually presented as an example of the "bad side" of fiscal decentralization and transfers (Prud'homme, 1995; Jones *et al.*, 2000; Nicolini *et al.*, 2002; Goodspeed, 2002; Oates, 2005; Weingast, 2009). However, this view focus on the relation between the National and the sub-national level of government.

higher population density. We do not find any effect of urbanization on own revenues composition. Last but not least, we show that the mix of locally provided public goods (i.e., divisible and indivisible) affects the composition of local taxation. The bias towards less distortionary taxation is more pronounced for those municipalities that exhibits higher share of indivisible public goods. The corollary of this is that those municipalities that provide relatively more indivisible goods -that are difficult to be financed according to the *"benefit principle"*- must resort on distortionary taxation.

We believe that our paper mainly contributes in two dimensions. First, to continue thinking on how transfers interact with local own revenues, not only on their level, but also on their structure. Also, on thinking that this interaction may be conditional to certain local governments characteristics, such as their degree of urbanization or the mix of locally provided public goods. Second, to provide new evidence on this interaction. As will be appreciated in Section 2, although the effect of transfers on the level of own revenues has been quite explored, less evidence is available on how transfers affect the composition of them. In this sense, we extend empirical evidence on this topic for developing countries. To the best of our knowledge, the is no evidence on the relation between provinces and municipalities in Argentina.[9] As a whole, we believe that our findings are useful to think not only about the Argentine case as they can guide the discussion on local governments financing in other countries with different levels of economic development.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes municipalities in Argentina. Section 4 presents the data and describes the empirical strategy. Sections 5 reports the main results. Section 6 concludes.

2 Related literature

This paper contributes to a better understanding of the incentives generated by transfers on the behavior of local governments and the implications for the global public sector performance (Prud'homme, 1995; Ahmad, 1997; Bird & Vaillancourt, 1999; Goodspeed, 2002; Brosio & Jiménez, 2012). Several contributions suggest that transfers *"crowd out"* local revenues, whereby the inflow of external transfers can sap the incentive for local governments to collect their own dues (Bradford & Oates, 1971). Also the second-generation theory of fiscal federalism (Weingast, 1995, 2009; Oates, 2005) remarks several perverse incentives of transfers. First, they can generate irresponsible

[9]See footnote 8.

behavior of recipient governments (e.g., excessive expenditure, tax laziness, soft budget constraint -Kornai (1986); Qian & Roland (1998)-, indebtedness). Second, central or sub-national government can depart from the normative theory of transfers by incorporating political criteria's[10] and use transfers to create financial and political dependence on local governments (Weingast, 2009). A strand of empirical contributions for developed and developing countries support with evidence this idea. Zhuravskaya (2000) suggests that local governments in Russia have no incentive to exert any tax-generating effort when transfers increase. Buettner & Wildasin (2006), for the United States, find that the adjustment of local governments to an increase in transfers results in reduced subsequent own revenue generation. Taiwo (2021) reveals that transfers crowd out own revenues of subnational governments in Nigeria. Mogues & Benin (2012) support that greater past external transfers to local governments do not encourage local revenue generation in Ghana, but instead have a depressing effect on own revenues. On the contrary, other contributions support the idea of *"crowding in"* effects of transfers. Skidmore (1999) analyzes local governments in United States and identifies a positive effect of transfers to local governments on locally generated revenues. Dahlberg *et al.* (2008) for the Swedish grant system, find that transfers do not reduced local tax rates, while Ferede (2017) indicates that transfers in Canada provide provincial governments an incentive to raise their business and personal income tax rates. Lewis & Smoke (2017) offer a mixed support for presumed perverse incentives of transfers in Indonesia. Transfers seem not to provide a disincentive for local governments to increase their own revenues but they incentive to increase local personnel spending. In a closely related contribution with our paper, Masaki (2018) shows strong evidence that transfers help expand local revenues in Tanzania. It argues that in places where the existing capacity of local government authorities to administer tax collection is weak and political costs of enforcing taxation are low transfers facilitate local revenue generation instead of undermining it. Masaki (2018) also shows that *"crowding in"* effects seem to be more pronounced in rural districts, where the existing fiscal capacity is low. This point is important given that one argument that explain differences on the effects' intensity is, to some extent, economic development. Local revenues generation requires robust monitoring and enforcement systems and qualified staff, who are costly to employ and maintain in developing countries (Besley & Persson, 2014). Although, as will be presented in Section 5, in our case *"crowding in"* effect is stronger in urban areas - and this is basically due to different characteristics of the local governments of Argentina and Tanzania -, economic development of local governments plays a key role in the interaction between transfers and own revenues.[11]

[10] Bennett & Mayberry (1979) were one of the first to make this point, also supported by Holcombe & Zardkoohi (1981), and Porto & Sanguinetti (2001) for the case of Argentina.

[11] In a model like Bradford & Oates (1971) the transfer has the same effects as an increase in income, so that the consumption of the private good and the local public good increases and, consequently, the local tax revenue

Our paper is also related with several contribution on how transfers can affect local revenues composition. As Holm-Hadulla (2020) clearly shows, theoretical arguments support the idea that transfers could induce more or less distortive taxation, depending on whether distributional or allocative criteria prevails. In presence of high mobility of economic agents, one strand of the literature suggests that local governments should fall back on less distortionary taxation in order to not alter the spatial allocation of economic activity (Oates, 1972; Zodrow & Mieszkowski, 1986; Wildasin, 1989). However, in the presence of externalities relying on distortionary taxation to alter this allocation may be appropriate. Distributive and political economy arguments are also crucial to understand tax structure composition. Distortionary taxation (e.g., capital taxation) redistributes income between regions as well as within regions. Hence, individuals with low capital endowment may favor these type of taxes, that may be chosen democratically (Borck, 2003). Political reasons for relying on different types of taxation also depend on their political cost. Hettich & Winer (1984) show that politicians choose tax structure so as to minimize those costs. Thus, for example there may be political reasons for relying on distortionary taxation even when less distortionary taxes are available, and vice versa (Borck, 2003). As Buettner & Krause (2021) remarks the empirical literature on the tax policy incentives of transfers is relatively scarce. The idea that transfers induce higher taxes is supported by Dahlby & Warren (2003) for the case of Australian states, and Smart (2007) for Canadian provinces. In terms of tax structure composition, also for Canadian provinces, Ferede (2017) provide empirical evidence on the incentive effects of transfers on tax policy focusing on business and personal income tax rates (i.e., distortive taxation). Results suggest that transfers provides an incentive to raise provincial business and personal income tax rates. The incentive effect works mainly through the equalization base effect (i.e., recipient provinces have the incentive to shrink their tax bases by raising tax rates in order to increase their equalization entitlements). Holm-Hadulla (2020), using a natural experiment from German municipal finance, empirically finds that transfers may act as a means to induce a less distortionary tax structure at the local layer of governments. This suggests that municipalities design their tax policy prioritizing allocative aspects over re-distributive ones.[12]

decreases. With a similar model, the transfer can increase both the public good and the local tax revenue, as it is shown in this paper (see Section 5). Both results are consistent with the normative theory and reflect different context of the local public finance.

[12]These empirical contributions measure local tax structure composition through tax rates. Our paper approximates it through tax collections since -unfortunately- there is no available data on tax rates and tax bases of the municipalities in Argentina. Tax rates are an instrument that can be manipulated by the policy maker while tax collection is the result of the interaction between the rate and the base (Riera-Crichton *et al.*, 2016). Thus, tax rate increases could not always correspond to tax collection increases and vice versa. Given that, some caution will be demanded when interpreting and comparing these studies with our paper.

3 Local governments in Argentina

In Argentina, National government accounts for 58.1 percent of total expenditure and collects 72.9 percent of the total revenues. In provinces and the Autonomous City of Buenos Aires these figures are 34.5 percent and 23.5 percent, respectively. For municipalities 7.4 percent and 3.6 percent, respectively.[13] These significant vertical imbalances are covered by transfers from the Nation to provinces and from provinces to the municipalities (Rezk, 1999; Vegh & Vuletin, 2015; Porto, 2019).[14]

Buenos Aires is the main province of Argentina. It accounts for 39.4 percent of the country's population and for 35.1 percent of national GDP. It contains 135 municipalities. The expenditures of municipalities are very sizeable being equal to the total provincial expenditures of Cordoba, the second main province in the country. The population of several municipalities is greater than the population of many provinces. In addition, municipalities exhibit a remarkable heterogeneity in many aspects such as population, population density, urbanization, social indicators and productive structure (Porto, 2004).[15]

The composition of municipal expenditures is mostly explained by the provision of two types of public goods. On the one hand, municipalities provides urban services (e.g., lighting, cleaning) which are essentially divisible goods. This type of goods can be mainly financed according to the *"benefit principle"* with prices and fees. Expenditure on divisible goods represents 38.4 percent of total local expenditure (see Panel A in Figure 1). On the other hand, municipalities play an active role in financing goods such as health, and welfare programs which are essentially

[13]Figures correspond to 2014. See here.

[14]Vertical fiscal imbalances is a common feature among many countries with multiple levels of government. See, for example, Blöchliger & Kim (2016) on this issue in OECD countries.

[15]Municipality of La Matanza contains 1.7 million inhabitants, more than any other province in the country with the exception of Cordoba, Santa Fe and Mendoza. Municipality of La Plata with 0.7 million inhabitants exceeds the population of 12 provinces in Argentina. On the opposite side of La Matanza is the municipality of Tordillo with 1,764 inhabitants (Census, 2010); municipality of Patagones has a surface of 13,600 km2 while municipality of Vicente López has only 39 km2. The population density ranges between 9,166 inhabitants per km2 in municipality of Lanus and 1.1 inhabitants per km2 in municipality of Pila. The dispersion of social indicators is also remarkable: 17 percent of Florencio Varela's population had unsatisfied basic needs in 2010, while in municipality of Puan was only 1 percent. Economic activities are also very heterogeneous: a large number of municipalities specialize in agricultural activities, but there are mining-based municipalities (Olavarria), tourism-based (General Pueyrredon, Pinamar, etc.), industrial-based (Campana, Ensenada) and services-based (La Plata). This diversity is reflected in the fiscal data. Less populated municipalities registered a per capita expenditure of 8,485 pesos, while highly populated had one of 3,508 pesos (in 2007 pesos).

indivisible goods. For them there is no possibility of fully financing through the prices and fees system, and the *"benefit principle"* becomes more diffuse.

Municipal revenues include own revenues (i.e., local taxation) and transfers. Own revenues represents 43.4 percent of total revenues (see Panel B in Figure 1), including distortionary and less distortionary taxation. Distortionary taxes are essentially turn-over taxes on business and represent 6.2 percent of total municipal revenues (or 14.2 =6.2/43.4 percent of own local revenues).[16] Less distortionary taxation are essentially direct taxes on property and represent 22.4 of total municipal revenues.[17] Jointly, represent around 65.9 percent of local own revenues. A wide variety of other fees and taxes completes the local tax structure.[18]

As mentioned, municipalities are embedded in extensive fiscal equalization mechanisms. According to the revenues sharing system of the province of Buenos Aires, the municipalities receive 16.14 percent of total revenues (own revenues and transfers from the National government; Law 10.559).[19] 58 percent of this 16.14 is distributed among all municipalities according to population, tax capacity, and surface.[20] 37 percent is distributed among the municipalities that have official establishments for health care. Finally, 5 percent among the municipalities that covered other (than health) services or functions transferred. Transfers represents 56.6 percent of total revenues (see Panel B in Figure 1). Interestingly, transfers (as a share of local total revenues) have increased their relative participation during recent decades. They represented around 47 percent in 1991 and 63 in 2007. As Figure 2 shows the greater transfer-dependence has been a common phenomenon to most municipalities.

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[16]Among them, the most relevant are: the Fee for Inspection, Safety and Hygiene (TISH); and the Fee for Trademark and Signals (MARCAS). In Spanish, TISH: Tasa por Insepeccion Seguridad e Higiene; MARCAS: Tasa por Marcas y Señales.

[17]Among them, the most relevant are: i) the Fee for Lighting, Sweeping and Cleaning (ABL); and the Fee for Maintenance of the Road Network (RED). In Spanish, ABL: Tasa por Alumbrado, Barrido y Limpieza; RED: Tasa por Mantenimiento the Red Vial.

[18]This category includes Fees for commercial authorization, peddling, publicity and propaganda, construction rights, fees for public events, for the use of beaches and other public spaces, quarry exploitation right, patents, office rights, cemetery rights, fee for various services, fee for antenna inspection, fee for antenna installation, fee for care services, veterinary inspection, food science and disinfection. The art. 226 of the Organic Law of Municipalities details the taxes that municipalities can collect.

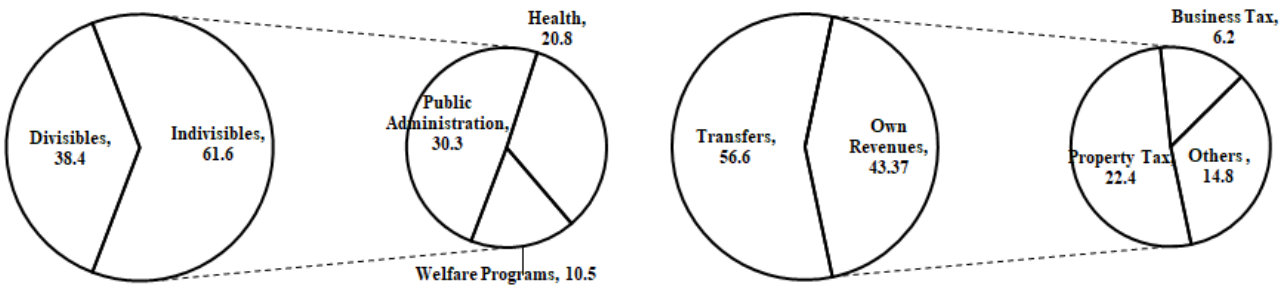
[19]Provincial tax collection is -mainly- explained by four taxes: i) taxes on Gross Income -turn over tax-, Real Estate Tax, Vehicles Tax, and Stamp Tax.

[20]Shares are defined as follows: i) direct proportion to the population (62 percent); ii) inverse proportion to "per capita" tax capacity, weighted by the population (23 percent); and iii) direct proportion to the surface of the municipality (15 percent).

Figure 1: Fiscal structure of municipalities. Expenditures and revenues. In percentage. Average 1991-2007. Province of Buenos Aires, Argentina.

Panel A. Expenditure

Panel B. Revenues

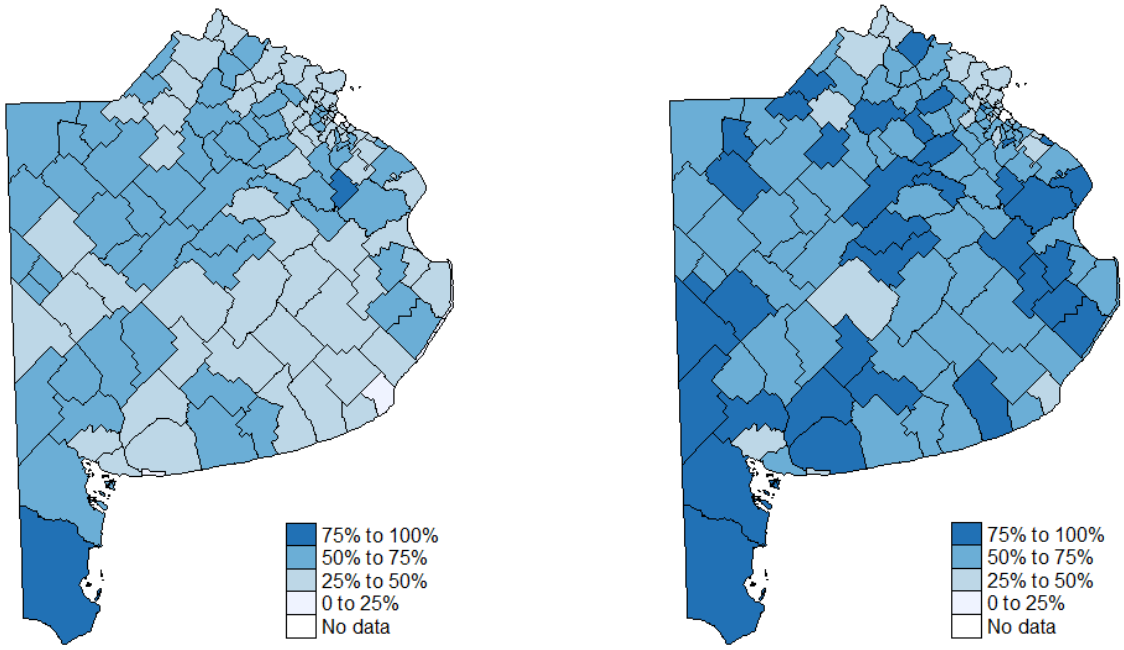


Source: Authors' elaboration based on on the Ministry of Economy of the Province of Buenos Aires.

Figure 2: Intergovernmental transfers. As a share of municipal revenues. Evolution between 1991 - 2007. Province of Buenos Aires, Argentina.

Panel A. 1991

Panel B. 2007



Source: Authors' elaboration based on on the Ministry of Economy of the Province of Buenos Aires.

4 Methodology and data

We began by analyzing the response of own revenues against variations in transfers. For this purpose, the basic set-up closely follows Masaki (2018):

$$OWNREV_{i,t} = \beta_1 TRANS_{i,t} + \gamma X_{i,t} + \phi_i + \rho_t + \epsilon_{i,t} \quad (1)$$

where i and t index municipality and year, respectively; $OWNREV_{i,t}$ refers to local own revenues; and $TRANS_{i,t}$ denotes transfers. Both variables are in real and per capita terms. In addition, as standard in the literature (Jones *et al.*, 2000; Jimenez, 2015; Lewis & Smoke, 2017), a vector of additional variables ($X_{i,t}$) is included to control for potential omitted variable bias. Specifically, we use per capita consumption of electricity as a proxy for local personal income indicator. The ratio of effective-to-potential voters is included to measure electoral participation. Population dependence, defined as the ratio between the number of people under 15 and over 64 years old over people from 15 to 64 years old, is included to address potential demographic trends. ϕ_i and ρ_t are municipality-fixed and year-fixed effects. $\epsilon_{i,t}$ is the usual error term. β_1 is our relevant parameter. A positive (negative) value indicates *"crowding-in"* (*"crowding-out"*) effect. In other words, local own revenues and transfers are complements (substitutes).

We firstly use Ordinary Least Squares (OLS) to estimate Equation 1. However, these estimates are likely to be biased because the flow of transfers is expected to be endogenous to local own revenues.[21] To alleviate endogeneity concerns, we use the surface of each municipality (in km2). As mentioned in Section 3, transfers allocation is basically determined by population, tax capacity, and surface. Naturally, surface becomes relevant to explain the allocation of transfers (condition of relevance) while is not manipulable by municipalities (condition of exogeneity).[22] Secondly, we explore the dynamic relationship between transfers and local own revenues by introducing the lagged levels of both variables in the right-hand side of the equation. As Masaki (2018) remarks, dynamic model may be more appropriate for this analysis because the level of tax collection is likely to be highly persistent over time. In addition, can be used as an indirect test of different causal mechanisms such as fiscal stimulus, public services, and tax enforcement. Some of

[21] Lagging the level of transfers does not alleviate endogeneity concerns because there are a number of potential unobservable variables that may be persistent over time, which would confound the relationship between the dependent variable and the lagged endogenous variable (Bellemare *et al.*, 2017; Masaki, 2018).

[22] Due to the use of surface as an instrumental variable, we do not include it as a control variable, as for example Masaki (2018) does. In any case, the results hold even when including this variable. Additionally, it is worth noting that in any estimate (either OLS or IV) where the surface is included as a regressor, the fixed effects is dropped.

these effects are observed immediately after transfers are disbursed while others may be delayed. For instance, after transfers are disbursed, there is likely some temporal lag before they stimulate economic activities (Weingast, 1995; Qian & Weingast, 1997), which are then expected to increase the value of the tax base. In contrast, local administrators need transfers to pay for the fixed costs of tax enforcement and service delivery, which should then have immediate positive effects on the amount of revenues they can tap at the same time period.[23] Thus, it is reasonable to assume that the current level of own revenues depends on the amounts of own revenues and transfers received in the past. To capture this, we estimate the following dynamic equation:

$$OWNREV_{i,t} = \alpha_1 OWNREV_{i,t-1} + \beta_1 TRANS_{i,t} + \beta_2 TRANS_{i,t-1} + \gamma X_{i,t} + \phi_i + \rho_t + \epsilon_{i,t} \quad (2)$$

Arellano & Bond (1991) show that the estimation of dynamic panel data models lead, by construction, to inconsistent standard estimators as the unobserved panel-level effects are correlated with the lagged dependent variables. To overcome this limitation Arellano & Bond (1991) and Blundell & Bond (1998) propose the use of alternative consistent GMM estimators based on the use of internal instruments. However, these estimators do not come free of limitations as the initial conditions and moment requirements are not necessarily satisfied in all cases. Relying on Monte Carlo simulations these authors also show that this bias rapidly decreases as the number of observations per group (municipalities in our case) increases; in particular when reaching about 20 observations of the dependent variable. The average number of observations per municipality in our regression analyses is 17 observations. Then we employ both Blundell-Bond system GMM estimators (SGMM) and dynamic OLS estimates. For the first, and also for robustness, we report results from the one-step and two-step GMM estimation.[24]

Finally, we explore the effect of transfers on the composition of local taxation by distinguishing between business and property taxation. For this purpose, we use the basic set up from Equation 1, with alternative dependent variables that captures own revenues composition. We grouped revenues from local property taxation ($PROPERTY_{i,t}$), and those from local business taxation ($BUSINESS_{i,t}$). These variables are also in real and per capita terms. For completeness, we include $OTHER_{i,t}$ as a category that groups the rest of local taxation. Alternatively, we use the ratio business-to-property taxation ($RATIOBP_{i,t}$) to capture relative changes in own revenues composition.[25]

[23] As we will show in Figure 3.

[24] See Hwang & Sun (2018) for a discussion and an accurate comparison of one-step and two-step estimators.

[25] As remarked in footnote 12 related empirical contributions measure local tax structure composition through

Data used in the empirical examination are for the period 1991 – 2007.[26] Fiscal variables were obtained from Ministry of Economy of the Province of Buenos Aires (Mecon PBA). They are expressed in constant (2007) Argentinean pesos.[27] Total electricity consumption draws from Ministry of Energy of Argentina. Data on population, population dependency and surface were obtained from Provincial Direction of Statistics of the Mecon PBA. Electoral participation data draws from the Electoral Board of the Province of Buenos Aires. Table A1 (Appendix) presents descriptive statistics. Table A2 (Appendix) lists the municipalities of Buenos Aires.

5 Results

5.1 Effects of transfers on the level of own revenues

Table 1 shows the results from the specification in Equation 1. We find that transfers increase local own revenues. Models 1 and 2 employ the OLS estimation without accounting neither fixed effects by municipality nor control variables. Models 3 includes municipal fixed effects. Model 4 by including also control variables represents our fully controlled specification. It can be appreciated that own revenues rise around 0.22 pesos against 1 peso of additional provincial transfers. In Model 5 we present the IV estimation and our main result still holds when addressing potential endogeneity concerns. The first-stage results show a strong correlation between the surface and transfers, suggesting that the IV strategy is relevant. See Column [1] in Table A3 (Appendix). At the same time, the Kleinbergen-Paap F-stat in Table 1 indicates the results are not affected by a weak instrument problem. We then move to the dynamic specification in Equation 2. Models 6 and 7 summarizes results from the SGMM models.[28] Again, own revenues rise around 0.30 against 1 peso of additional provincial transfers. The lagged effect of transfers is negative and statistically significant. The lagged effect of own revenue is positive and statistically significant indicating that own revenues are serially correlated over the period. The long run effect is 0.21 (not shown in

tax rates instead of tax collection. This should be considered when interpreting and comparing related studies with our paper.

[26]This period is used since data on the composition of own revenues and municipal expenditure is available up to 2007. The regression analysis includes 134 municipalities instead of 135, since the municipality of Lezama was created in 2009.

[27]The exchange rate between the Argentine peso and the US dollar in 2007 was 3.15 pesos per dollar.

[28]The Hansen J test fails to reject the null of the joint exogeneity of all instruments (p-value > 0.05), which brings some confidence that our instruments are jointly valid (p-value > 0.05). The difference-in-Hansen test also indicates that the GMM-type internal instruments are also valid (p-value > 0.05).

Table 1), with a standard error of 0.07, suggesting a persistent effect of provincial transfers on own revenues.[29] Similar results can be appreciated when analyzing the dynamic OLS in Model 8. As mentioned, the contemporaneous effects of transfers mostly capture their direct and immediate impact on local revenue generation by financing the fixed costs of tax enforcement and service delivery. In contrast, the lagged effects of transfers capture the indirect effects of transfers on local revenues through stimulating local economies, which, after some temporal lag, affect the value of the local tax base (Masaki, 2018). Our findings seem to provide some support that a larger proportion of increases in local revenues may be explained by the direct effects of transfers on tax enforcement and public services, instead of fiscal stimulus.

Based on these results we support *"crowding-in"* effects of transfers in municipalities of Buenos Aires, whereby grants expand local own revenues. Figure 3 represents this phenomenon, that can be considered an special case that rationalize our findings. Y denotes local income; C is a private good; G is a locally provided public good; CF is fixed cost associate with the provision of the public good; and Tr is the intergovernmental transfer. All variables are supposed to be in per capita terms. The slope of budget restriction is at 45°, assuming that the relative price between C and G is 1. Without Tr, there is a corner solution (equilibrium) where $Y = C$, with higher utility ($U1 > U0$) without public good provision. With Tr ($\overline{\text{bd}}$), the solution is at point d and utility increases from $U1$ up to $U2$ and the public good can be provided. Note that Tr allows the public good provision ($\overline{\text{OG}*}$) using this transfer ($\overline{\text{bd}}$) and own revenues ($\overline{\text{ab}}$).[30] In order to test this explanation empirically, we use the IV strategy of Model 5 and replicate the regression but using per capita total municipal spending as dependent variable (instead of own revenues).[31] The coefficient associated with transfers is positive, greater than 1, and statistically significant (See Column [2] in Table A3 in the Appendix). Thus, we can reinforce our findings and its rationalization. In another branch of the literature this result is known as *"flypaper effect"* (Hines & Thaler, 1995; Vegh & Vuletin, 2015), and has been interpreted differently as evidence that politicians deviate from the preferences of the median voter (Oates, 1994).

[29] From Equation 2 and Table 1 we obtain this 0.21 ($= (\beta_1 + \beta_2)/(1 - \alpha_1) = (0.307 - 0.142)/(1 - 0.203)$). We use the delta method to estimate the long-term coefficient. The equality between the short-run and long-run coefficients cannot be rejected at the usual confidence levels.

[30] Note that the transfer allows to provide some particular good that was not provided without it. In the extreme, it can be interpreted that it is the existence of the municipality itself.

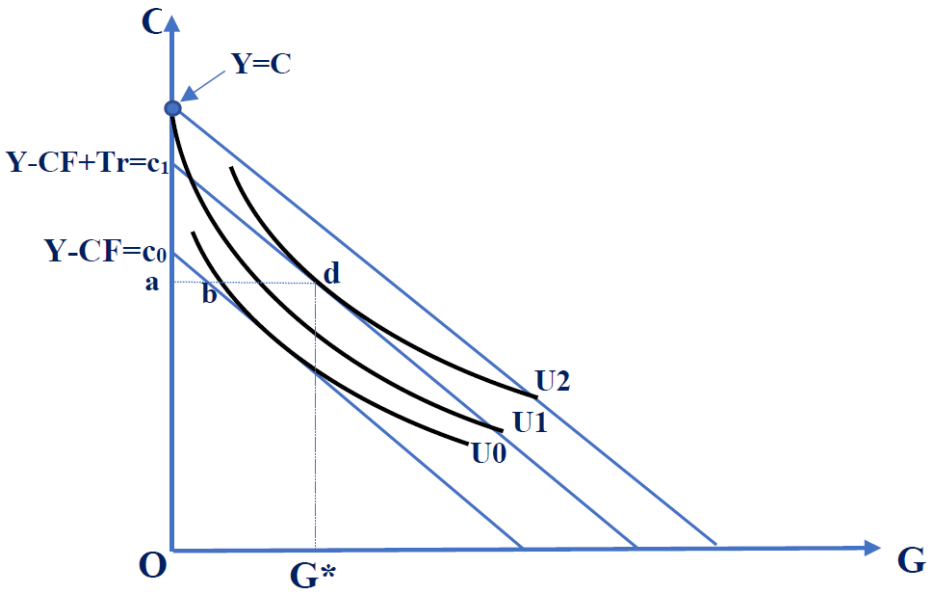
[31] Note that we use IV strategy to address potential endogeneity between transfers and public spending (e.g., fixed preferences for public spending that are correlated with transfers (Vegh & Vuletin, 2015)).

Table 1: Baseline panel regressions: effects of transfers on the level of own revenues.

	Dependent Variable: own revenues							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	OLS				IV	SGMM One	SGMM Two	OLS
Transfers	0.300***	0.337***	0.222***	0.221***	0.239*	0.307***	0.305***	0.289***
	(0.0356)	(0.0388)	(0.0541)	(0.0549)	(0.142)	(0.100)	(0.101)	(0.0860)
Economic Activity				-4.054	9.374	-9.044	-9.073	-5.975
				(4.465)	(6.594)	(8.928)	(9.561)	(5.183)
Electoral Participation				-22.98	413.8	422.9	401.1	-58.75
				(241.1)	(481.6)	(324.5)	(318.3)	(173.8)
Population Dependence				1.447	-11.10**	-9.506*	-9.690*	2.057
				(3.455)	(5.556)	(5.199)	(5.828)	(2.750)
Own-revenues (t-1)						0.203**	0.201**	0.312***
						(0.0826)	(0.0832)	(0.0834)
Transfers (t-1)						-0.142**	-0.140**	-0.181**
						(0.0647)	(0.0644)	(0.0756)
Observations	2,183	2,183	2,183	2,183	2,183	1,925	1,925	2,059
R-squared	0.187	0.232	0.180	0.181	0.249			0.283
Fixed Effect	No	No	Yes	Yes	No	Yes	Yes	Yes
Time Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
♯ of Municipalities	134	134	134	134	134	134	134	134
AR1 (p-val)						0.000	0.006	
AR2 (p-val)						0.441	0.408	
Hansen J test (p-val)						1.000	1.000	
Diff in Hansen test (p-val)						1.000	1.000	
♯ of Instruments						258	258	
Underidentification Test					18.43			
Chi-sq p-value					0.000			
Weak Instrument Test					39.96			

Source: Authors' elaboration. *Notes*: Robust cluster standard errors in brackets. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts are included but not reported for briefness. Underidentification Test: Kleibergen-Paap rk LM statistic. Weak Instrument Test: Kleibergen-Paap rk Wald F statistic. Stock-Yogo weak ID test critical values (maximal IV size): 10% = 16.38; 15% = 8.96; 20% = 6.66; 25% = 5.53.

Figure 3: Effects of transfers on own revenues. A theoretical explanation for the *"crowding-in"* effect of transfers on local own revenues.



Source: Authors' elaboration.

5.2 Effects of transfers on the composition of own revenues

Table 2 shows the results from the specification in Equation 1, but now using the main component of local tax collection as dependent variables.[32] The empirical estimates point to a positive and significant response of different types of taxation to transfers. For the local property taxation, 1 peso of additional transfers produces an increase of around 0.12 pesos (Column 1). For the local business taxation, the same increase is 0.02 pesos (Column 2). Accordingly with the greater responsiveness of less distortionary taxation, the ratio business-to-property taxation reduces by 0.016 points (Column 4). Other non-classified taxation increase by around 0.08 pesos against 1 peso of additional provincial transfers (Column 3).

[32]Here in Table 2, we estimate our fully controlled specification (Model 4 in Table 1) but changing the left hand side variable.

Table 2: Baseline panel regressions: effects of transfers on own revenues composition.

	Dependent Variable			
	Property	Business	Other	Bus/Prop
	[1]	[2]	[3]	[4]
Transfers	0.121***	0.0191***	0.0817***	-0.0160***
	(0.0266)	(0.00552)	(0.0271)	(0.00500)
Economic Activity	-2.245	0.965	-2.774	1.907**
	(1.415)	(0.615)	(3.106)	(0.853)
Electoral Participation	171.7	-108.4***	-86.32	-67.08***
	(191.6)	(34.97)	(79.01)	(19.57)
Population Dependence	1.620	-0.178	0.00475	-0.752
	(2.331)	(0.750)	(1.424)	(0.498)
Constant	-105.4	147.0***	168.1	143.5***
	(228.7)	(52.13)	(110.7)	(35.57)
Observations	2,183	2,183	2,183	2,127
R-squared	0.146	0.113	0.126	0.155
♯ of Municipalities	134	134	134	134
Fixed Effect	Yes	Yes	Yes	Yes
Time Effects	Yes	Yes	Yes	Yes

Source: Authors' elaboration. *Notes*: Robust cluster standard errors in brackets. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts are included but not reported for briefness.

Based on these results we support that transfers tilts the municipal tax collection towards less distortionary taxation. Figure 4 represents a theoretical case that rationalize our findings in a context of partial equilibrium in which it is assumed that the total expenditure to be financed with own revenue and transfers is constant. It is based on Hettich & Winer (1984) model, on political determinants of a tax structure.[33] It is assumed that both distortionary (i.e., business) and less distortionary (i.e., property) taxes have increasing marginal political costs. For lower levels of property taxation the political cost can be considered low if residents fully perceives a real benefit (e.g., garbage collection, lighting, public spaces maintenance, etc.).[34] So, this taxation

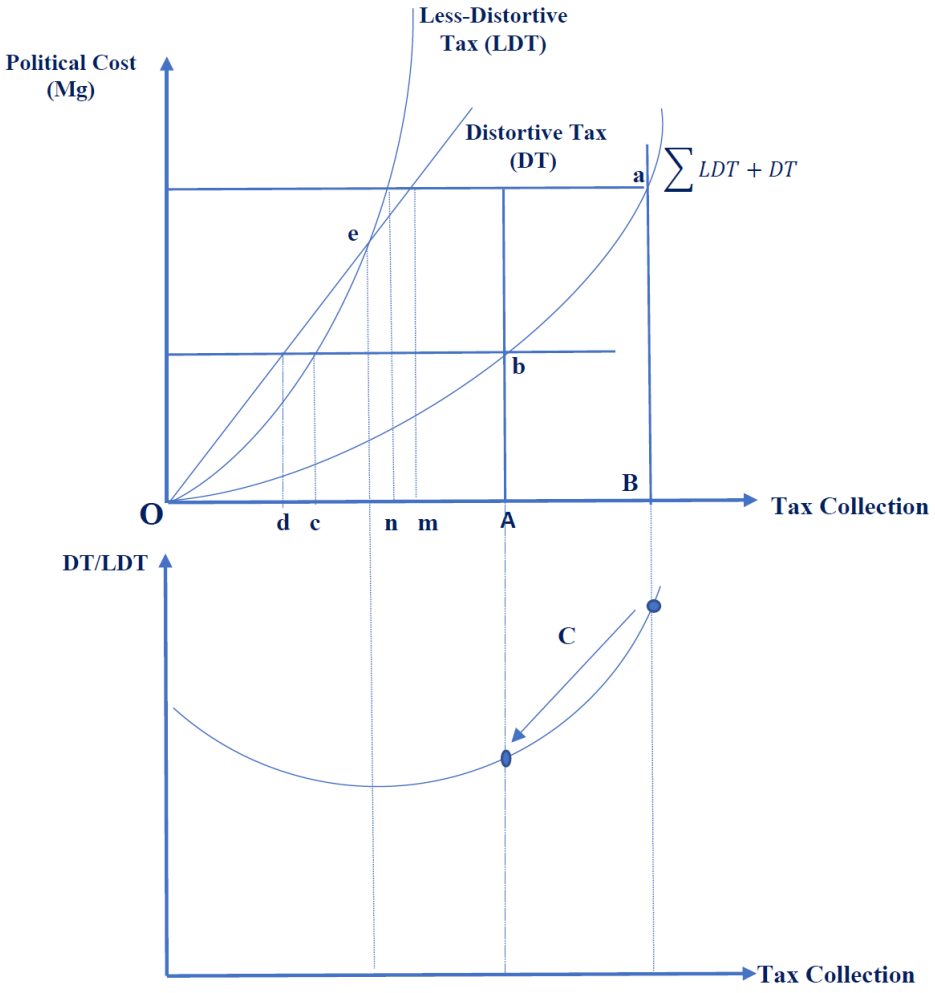
[33]The model assumes that the government minimizes the political cost of obtaining a certain collection. The tax structure results endogenously from the maximizing behavior of the political agent. The political cost is measured in terms of lost votes, which is a function of the share of each tax in total revenue and other variables that influence the political cost. For simplicity, the political costs of taxes are assumed to be independent. Here the case is adapted to two taxes with increasing marginal political costs in collection. The marginal political cost of total collection is equal to the horizontal sum of those corresponding to the two taxes.

[34]Anecdotal evidence on low political cost of property taxes when residents fully perceives a real benefit can be found in some municipalities of the province of Buenos Aires. For example, the case of the Municipality of General Pueyrredon where in 1996 the Mayor - Blas Aurelio Aprile - proposed to residents to contribute with a lump-sum tax on property for 8 years to carry out 25 infrastructure works. Specifically, the citizens were asked -through a plebiscite- if they are willing to pay more taxes to finance infrastructure works? There were 53.74% of the voters who voted for the affirmative. See here. There is also evidence of the relationship between the benefit and compliance

approximates a price (*"benefit principle"*). The connection between business taxation and its benefit is often diffuse and in general, is a tax rather than a price. Based on these arguments, it can be assumed that the marginal political cost of the property tax (DT in Figure 4) is lower than of the business tax (LDT in Figure 4) for lower levels of taxation (i.e., when it reflects the cost of services). As the property taxation increases, the residents' resistance will be greater given the visibility and other factors that can complicate its payment. Thus, from a certain level of tax collection there is a reversion of the marginal political cost functions (point e in Figure 4). To the right (left) of e, the marginal political cost of the property tax is higher (lower) than that of the business tax. With this structure in mind suppose that the required collection is $R_0 = \overline{\text{OB}}$. At point a the tax structure is determined by $\overline{\text{Om}}$ of business taxation and $\overline{\text{On}}$ of property taxation. If the municipality receives a transfer from $\overline{\text{AB}}$, its own tax collection goes to $\overline{\text{OA}}$, where $\overline{\text{OA}} + \overline{\text{AB}} = \overline{\text{OB}}$, which is the necessary financing that is supposed to be exogenous. The transfer has a political cost equal to zero for the municipality. The new required own collection ($\overline{\text{OA}}$) corresponds to the tax structure that results from point b with $\overline{\text{Od}}$ from business and $\overline{\text{Oc}}$ from property. Thus, the transfer can reduce the importance of the most distorting taxation in the municipal tax structure. This is represented in point C at Figure 4, and to some extent rationalizes the transfer's coefficient in Table 2, Column 4.

with the property tax in several municipalities of Buenos Aires (e.g., See here for the case of Coronel Suarez; and here for the case of Capitan Sarmiento). In the same vein Wallis (2000) suggests that in the USA *"... property taxes work best when they can be tightly focused on specific groups and interts..."*

Figure 4: Effects of transfers on own revenues composition. An explanation based on political determinants of a tax structure.



Source: Authors' elaboration.

5.3 Conditional effects of transfers on own revenues

We extend the baseline results by asking whether broader features of municipalities influence the effect of transfers on the level and the composition of local own revenues. Given that municipalities of Buenos Aires present remarkable heterogeneity between urban and rural areas (Porto, 2004), we focus on the effects of transfers conditional to the share of urban population. Urban municipalities have a higher population density and are relatively poorer than rural ones (see Table A1 in the Appendix). On the one hand, this features can turn generation of local revenues being less likely in this areas. On the other, this may raise public services demand. For example, higher poverty generates demand for welfare programs. Higher population generates greater demand for security.

In this context, and given our unconditional results, transfer can facilitate the compliance with these demands. Then, the effects of transfers on own resources could be non-linear (increasing in this case) in the share of urban population. Additionally, we focus on the effects of transfers conditional to the share of indivisible public goods. In this context, the higher share of indivisible goods, the higher tax revenues collected from distortionary taxation, since they are more difficult to finance according to the *"benefit principle"*. Then, the effects of transfers on ratio business-to-property taxes could be non-linear (increasing in this case) in the share of indivisible goods. To test for these conditional effects of transfers, we add interaction terms in Equation 1. Specifically, between transfers and the share of urban population, and between transfers and the share of indivisible public goods.[35] As dependent variables we use both the level of own revenues and its relative composition (i.e., the ratio business-to-property taxes). Figure 5 plots the marginal effects with one standard error confidence bands.

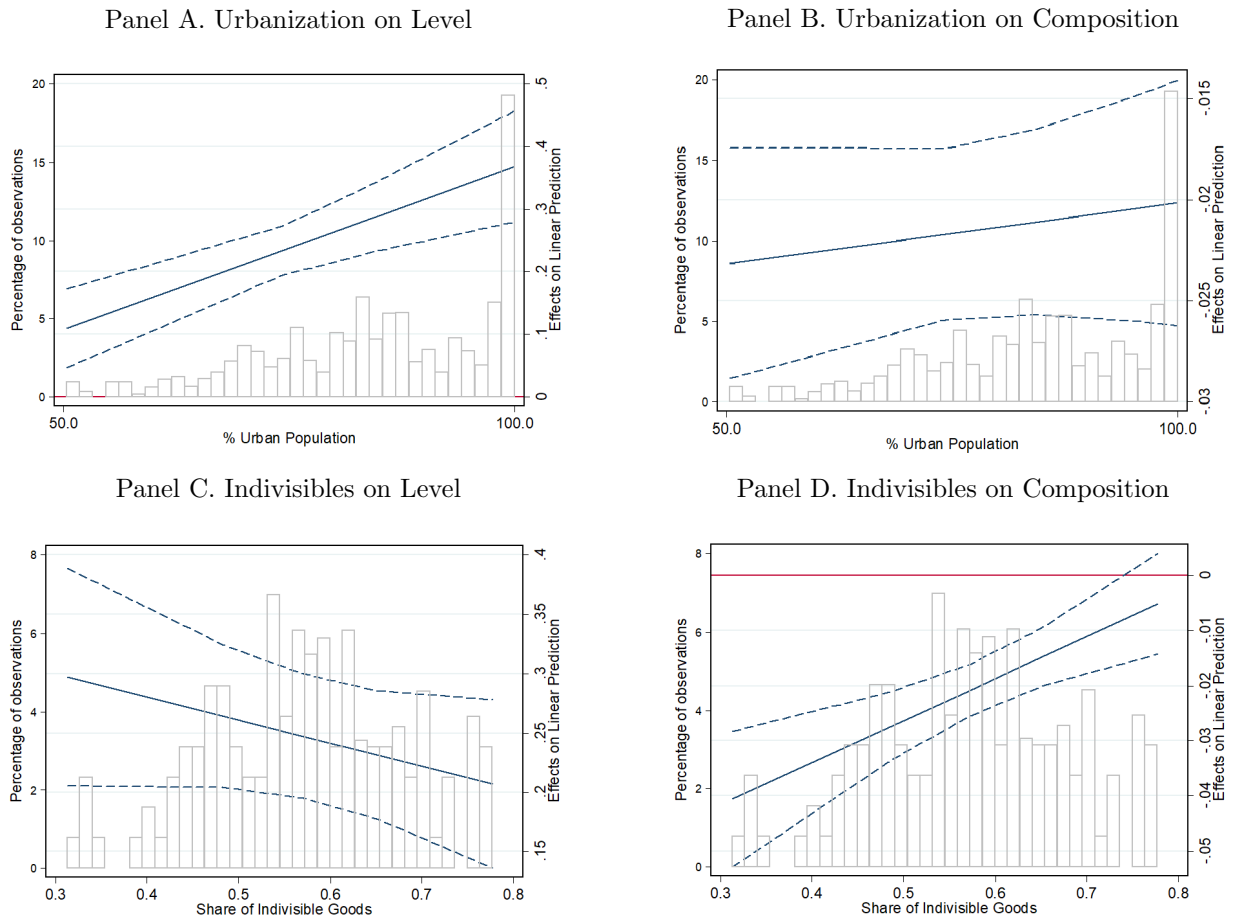
Panel A shows the effects of transfers on the level of own revenues as a function of different shares of urban population. Transfers increase local revenues for all values of urban population, but the effect is increasing as the share of urban population increases. For municipalities with more than 95 percent of urban population own revenues rise around 0.36 pesos against 1 peso of additional provincial transfers. This increase is around 0.11 for municipalities with 50 percent of urban population. In addition, this difference is statistically significant, suggesting that transfers facilitate own revenues generation in those municipalities where tax collection is more difficult and demand for public services is relatively higher. Panel B shows the analogous effects but on the composition of own revenues. Urbanization does not seem to generate differences in the composition of local tax collection. Transfers equally tilts the municipal tax structure towards less distortionary taxation for any values of urban population.

Panel C continues with the effects of transfers on the level of own revenues as a function of the share of indivisible goods. Transfers increase local revenues for all values of this variable. Although the effect is decreasing as the share of indivisible goods improves, differences along the distribution are not statistically significant. This suggests that transfers facilitate own revenues generation regardless of how much indivisible goods a municipality has to provide. Yet, the relative quantity of this type of goods seems to be relevant for the composition of local tax collection. Panel D shows that transfers tilts municipal tax structure towards less distortionary taxation on those municipalities with lower provision of divisible good. For example, in a municipality that allocates

[35] As a share of total local expenditure. As presented in Figure 1 indivisible good includes health, public administration and social assistance. In the estimation we include the value of this share on 1991 to control for potential reverse causality (i.e., expenditure composition responding to changes in own revenues). Any case, our results hold even when including the contemporaneous value of this share.

40 percent of its expenditure to provide indivisible goods, an additional peso of transfers reduces the ratio business-to-property taxation by 0.034 points. The bias toward less distortionary taxation seems not to be an option for municipalities that need to provide relatively more (above 77 percent of expenditure) indivisible goods. This is in line with the idea that municipal goods where the benefit for taxpayers is diffuse tend to be financed with taxes where the *"benefit principle"* is also diffuse.

Figure 5: Conditional effects of transfers on the level and the structure of local revenues. Average marginal effects.



Source: Authors' elaboration. *Notes*: Notes: Figures plot the marginal effects of transfers on the level (Panel A and C) and the composition (Panel B and D) of local own revenues, respectively. Panel A and B are conditional to the distribution of the urbanization rate. Panel C and D are conditional to the share of indivisible public goods. The histograms in the background present the distribution of the sample according to each variable, respectively. Dashed lines indicate one standard error bands confidence interval.

6 Conclusions

This paper contributes to the study on the interaction between transfer and local own revenues, by providing evidence for Argentina, a federal and developing country at South America. The empirical findings are that transfers increase own revenue and that comes from raising less distortive taxation, suggesting that local governments increase taxation according to the *"benefit principle"*. Both findings on the level and the composition of own revenues can be rationalized with theory from public finance and political economy as well. As a novelty, we explore non-linearities of these effects. One suggests that the increase in own revenues against higher transfers is increasing on the share of urban population. Other indicates that the bias towards less distortive taxation decreases on the share of indivisible goods. Thus, we emphasize broader features of municipalities that influence the effect of transfers on the level and the composition of local own revenues.

We think that these results help to think about the effects of transfers not only on the level but also on the structure of local revenues. They contribute to reasoning about what type of tax instruments local governments can choose against higher transfers, how political economy aspects play, and how the effects can be conditioned by variables as relevant as the share of urbanization or the relative share of the different locally provided goods. Beyond its application to the case of Argentina, the evidence may be useful to think about the effect of transfers in other developing countries.

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Appendix

Table A1: Descriptive Statistics. Urban versus Rural Municipalities

	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max	N	Unit
			All						Urban					Rural		
Total Expenditure	885.8	476.4	150.9	5423.8	2183.0	681.2	367.2	150.9	2679.1	940.0	1027.6	476.0	253.3	5423.8	1243.0	$
Indivisibles	545.3	316.0	81.5	2226.1	2183.0	410.6	252.8	81.5	1678.0	940.0	645.9	318.7	130.8	2226.1	1243.0	$
Public Administration	268.2	178.0	46.9	1315.9	2183.0	226.7	168.1	52.3	1315.9	940.0	299.3	178.4	46.9	1309.1	1243.0	$
Health	184.1	113.4	0.4	607.6	2183.0	129.5	88.2	1.6	470.7	940.0	225.1	113.0	0.4	607.6	1243.0	$
Welfare Programs	93.0	92.1	3.2	1005.6	2183.0	54.4	47.7	3.2	550.4	940.0	121.5	105.6	8.7	1005.6	1243.0	$
Divisibles	340.5	196.8	34.1	3197.7	2183.0	270.6	164.9	34.1	1383.9	940.0	381.7	198.4	84.4	3197.7	1243.0	$
Urban Services	340.5	196.8	34.1	3197.7	2183.0	270.6	164.9	34.1	1383.9	940.0	381.7	198.4	84.4	3197.7	1243.0	$
Total Revenues	836.2	486.3	19.2	1808.8	2183.0	629.6	412.0	176.4	2797.1	940.0	992.5	480.0	464.4	5127.2	1243.0	$
Transfers	473.6	336.9	18.7	1147.4	2183.0	289.1	221.1	45.8	1782.8	940.0	613.1	342.4	236.5	4221.0	1243.0	$
Own Source Revenues	362.7	234.0	46.7	830.7	2183.0	340.5	281.8	30.6	2096.8	940.0	379.4	188.5	172.0	1511.5	1243.0	$
Property Tax	187.4	157.3	14.3	502.0	2183.0	170.2	194.6	33.9	1581.4	940.0	200.4	120.2	116.3	815.4	1243.0	$
Business Tax	51.5	39.1	8.5	129.7	2183.0	49.9	39.4	6.5	236.0	940.0	52.7	38.8	10.0	317.0	1243.0	$
Others	123.8	93.9	20.5	311.6	2183.0	120.5	108.6	1.0	698.1	940.0	126.3	80.9	37.2	955.2	1243.0	$
Ratio Bus/Prop	35.1	35.4	1.6	153.4	2183.0	42.0	38.1	1.6	103.4	940.0	29.9	32.4	3.8	453.4	1243.0	%
Electricity Consumption	1.6	1.3	0.0	17.6	2183.0	1.8	1.5	0.1	17.6	940.0	1.4	1.1	0.0	11.6	1243.0	MWh
Electoral Participation	83.2	5.5	64.0	93.0	2183.0	82.1	6.6	64.0	92.0	940.0	84.0	4.4	69.0	93.0	1243.0	%
Population Dependency	62.7	4.0	49.4	73.4	2183.0	60.8	4.4	51.4	73.4	940.0	64.1	3.0	49.4	72.3	1243.0	%
Unsatisfied Basic Needs	10.5	4.3	2.5	28.4	2183.0	12.3	5.3	3.0	28.4	940.0	9.1	2.7	2.5	19.1	1243.0	%
Population Density	768.8	1976.5	0.9	11562.2	2183.0	1772.0	2703.4	5.4	11562.2	940.0	10.1	10.3	0.9	59.2	1243.0	Pop/Km2
Urban Population	81.1	18.9	0.0	100.0	2183.0	95.2	5.2	82.5	100.0	940.0	70.4	18.5	0.0	88.0	1243.0	%
Surface	2354.6	2277.5	33.8	13569.7	2183.0	1100.5	1626.3	33.8	7658.8	940.0	3303.1	2241.2	634.2	13569.7	1243.0	Km2
Population	101.8	175.1	1.4	1581.9	2183.0	206.0	227.5	3.6	1581.9	940.0	22.9	16.5	1.4	102.8	1243.0	Thousand

Source: Authors' elaboration. *Notes*: $ denotes constant (2007) pesos. The exchange rate between the Argentine peso and the US dollar in 2007 was 3.15 pesos per dollar. Monetary variables are expressed in per capita terms. Population Density is measured as population over surface in Km2. Electricity Consumption is measured in Megawatt hour.

Table A2: Municipalities of province of Buenos Aires. Population-based classification.

High Population (>340 thousand inhabitants)	Average Population (>65 thousand inhabitants)	Small Population (<65 thousand inhabitants)		
Almirante Brown	Azul	25 De Mayo	General Las Heras	Pinamar
Avellaneda	Balcarce	Adolfo Alsina	General Lavalle	Puan
Bahia Blanca	Bragado	Alberti	General Madariaga	Punta Indio
Berazategui	Campana	Arrecifes	General Paz	Ramallo
Berisso	Chacabuco	Ayacucho	General Pinto	Rauch
Ensenada	Chivilcoy	Baradero	General Sarmiento	Rivadavia
Esteban Echeverria	Coronel Rosales	Bartolome Mitre	General Viamonte	Rojas
Ezeiza	Escobar	Bolivar	General Villegas	Roque Perez
Florencio Varela	General Rodriguez	Brandsen	Gonzales Chaves	Saavedra
General Pueyrredon	Junin	Cañuelas	Guamini	Saladillo
General San Martin	Lujan	Capitan Sarmiento	Hipolito Yrigoyen	Salliquelo
Hurlingham	Marcos Paz	Carlos Casares	Juarez	Salto
Ituzaingo	Mercedes	Carlos Tejedor	L. N. Alem	San Andres De Giles
Jose C. Paz	Necochea	Carmen De Areco	La Costa	San Antonio De Areco
La Matanza	Olavarria	Castelli	Laprida	San Cayetano
La Plata	Pehuajo	Chascomus	Las Flores	Suipacha
Lanus	Pergamino	Colon	Lezama	Tapalque
Lomas De Zamora	Pila	Coronel Dorrego	Lincoln	Tordillo
Malvinas Argentinas	San Nicolas	Coronel Pringles	Loberia	Tornquist
Merlo	San Pedro	Coronel Suarez	Lobos	Trenque Lauquen
Moreno	San Vicente	Daireaux	Magdalena	Tres Lomas
Moron	Tandil	Dolores	Maipu	Villa Gesell
Presidente Peron	Tres Arroyos	Exaltacion De La Cruz	Mar Chiquita	Villarino
Quilmes	Zarate	Florentino Ameghino	Monte	
San Fernando		General Alvarado	Monte Hermoso	
San Isidro		General Alvear	Navarro	
San Miguel		General Arenales	Nueve De Julio	
Tigre		General Belgrano	Patagones	
Tres De Febrero		General Guido	Pellegrini	
Vicente Lopez		General Lamadrid	Pilar	

Source: Authors' elaboration.

Table A3: Panel Regressions: First Stage Regression of Model 5 in Table 1 and Auxiliary Regression for Figure 3

	Transfers	Total expenditure
	[1]	[2]
Surface (Km2)	0.0480***	
	(0.00759)	
Economic Activity	-15.78	7.927
	(17.42)	(7.457)
Population Dependence	16.24***	-12.35*
	(4.520)	(6.346)
Electoral participation	2,598***	316.9
	(533.9)	(553.4)
Transfers		1.321***
		(0.158)
Observations	2,183	2,183
R-squared	0.395	0.769
Fixed Effect	No	No
Time Effects	Yes	Yes
Underidentification Test		18.43
Chi-sq p-value		0.000
Weak Instrument Test		39.96

Source: Authors' elaboration. *Notes*: Robust cluster standard errors in brackets. Significance level * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, respectively. Intercepts are included but not reported for briefness. Underidentification Test: Kleibergen-Paap rk LM statistic. Weak Instrument Test: Kleibergen-Paap rk Wald F statistic. Stock-Yogo weak ID test critical values (maximal IV size): 10% = 16.38; 15% = 8.96; 20% = 6.66; 25% = 5.53.