On the fiscal behavior of subnational governments. A long-term vision for Argentina[1]

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PRELIMINARY AND INCOMPLETE VERSION – DO NOT CITE

Abstract. This paper analyzes the evolution of subnational fiscal variables in Argentina with a long-term vision. The period covers 1959-2019. The first part shows stylized facts of the main provincial fiscal variables over time. The second part studies the interaction between intergovernmental transfers on the level and the structure of provincial own revenues and expenditures. Econometric analysis, that controls for typical endogeneity problems, indicates that higher transfers do not reduce provincial own revenues and increase public expenditure. Higher transfers also bias the composition of their own resources towards non-distortive taxes and towards higher capital expenditure. The remarkable heterogeneity of the subnational governments in Argentina plays a key role when determining the results. As a whole findings might have important policy implications on subnational governments' public finance.


Introduction

Subnational governments typically finance their expenditures via a mix of own revenues and intergovernmental transfers (henceforth transfers) from the national government. The interaction between both sources of financing has been widely studied by the literature on fiscal federalism from theory and empirical evidence. Both substitution and complementarity effects have been supported in the literature.[2] Some contributions suggest that transfers substitute own revenues, whereby the inflow of external transfers can sap the incentive for subnational governments to collect their own dues (Zhuravskaya, 2000; Buettner and Wildasin, 2006; Mogues and Benin, 2012). On contrary, for other contributions transfers complement own revenues, whereby grants expand subnational tax revenues (Skidmore, 1999; Dahlberg et al., 2008; Caldeira and Rota-Graziosi, 2014; Masaki, 2018; Porto and Puig, 2021).

Argentina is a federal country, with four levels of government: the National, the sub-national including 23 provinces, the Autonomous City of Buenos Aires (CABA), and more than 2300 local governments In Argentina. Provinces play a very relevant role in terms of fiscal policy and have been subject to a strong process of fiscal decentralization during the last six decades. In the early 1960s, the provinces executed 30 percent of total expenditures (i.e., consolidated) while collected 16 percent of total taxes. Arriving at the year 2020, they executed 42 percent of the expenditures while collected 17 percent of the taxes (Figure 1). In addition, when measured as a share of geographic gross product (GGP) – provincial expenditures, own revenues, and transfers have increased. At the same time, provinces experienced changes in the composition of their resources and their expenditures. While increase in both sources of revenues (own-revenues vs. transfers) was similar, the composition of own resources was biased towards distortionary taxation.[3] Regarding the composition of public spending, provinces experienced a bias against capital spending.

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[2] See Bradford and Oates (1971) seminal contribution. Transfers can obviate the need for subnational revenue generation, which in turn undermines the fiscal autonomy of subnational 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 and Thaler, 1995; Bailey and Connolly, 1998; Karnik and Lalvani, 2005; Deller and Maher, 2006; Vegh and Vuletin, 2015)

[3] As in many other countries, provinces 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. The classification between distortionary and less distortionary taxation follows Holm-Adulla (2020), based on Oates (1972)'s idea regarding the mobility of tax bases as a source of inefficiencies: ``[i]nter-jurisdictional mobility of (…) economic units provides an avenue of escape from local taxation with the resulting inefficiencies in resource use and frustration of distributional objectives. To avoid these difficulties, decentralized governments can try to seek out immobile bases for taxation.''

Figure 1. Decentralization of resources and expenditures in Argentina. Evolution 1961-2018.
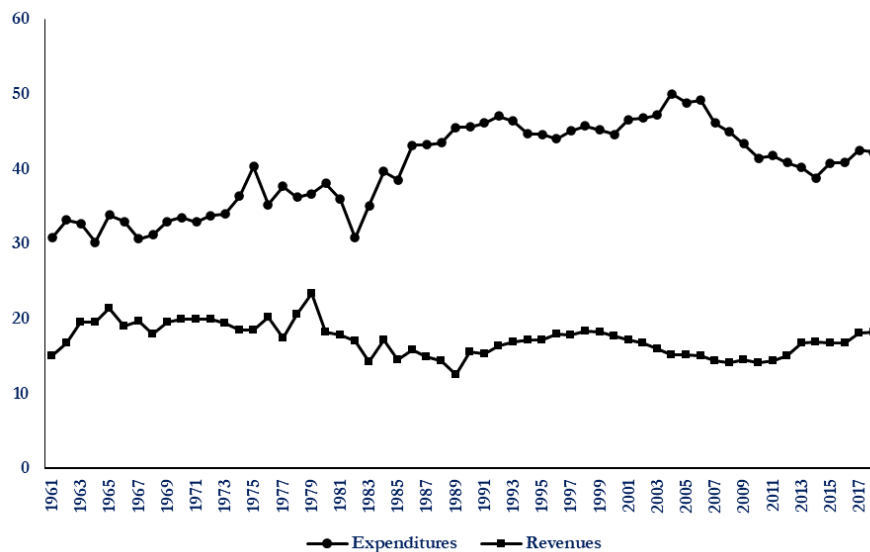
Given the aforementioned trends, Argentina presents an undoubtable attractiveness of studying subnational fiscal behavior with a long-term vision. In this paper we provide empirical analysis employing panel data for the 23 provinces of Argentina. The analysis covers the six decades from 1959 to 2019 and includes two parts. The first one shows stylized facts of the main provincial fiscal variables over time. The second studies the interaction between transfers on the level and the structure of provincial own revenues and expenditures. Given that the provinces present remarkable heterogeneity in expenditure per capita, productive structure, urbanization, and social indicators, previous effects are analyzed taking this heterogeneity into account.

The main results of the paper can be summarized as follows. The fact that transfers have been increasing over time did not generate "fiscal laziness" in the Argentine provinces. In this paper there is complementarity between own revenues and transfers. The higher transfers also generated increases in expenditure. Transfers tend to reduce the share of own revenues collected through distortionary taxation (i.e., the turnover tax and the stamp tax) over total own revenues (i.e., total taxation and royalties). Also, transfers tend to increase the share of capital expenditures over total expenditures. These findings are heterogeneous on the provincial level of development. The Patagonian provinces (highly dependent on royalties) increase their own revenues against higher transfers, while the rest of the provinces do not show a statistically significant relationship between these variables. The increase in spending against higher transfers decreases on the level of provincial income. The bias towards non-distortive taxation is more pronounced in higher-income provinces. It does not seem to be an option for low income provinces. Interestingly, the increase in capital spending share presents an inverted "u-shaped". Only middle-income

provinces seem to increase capital spending against higher transfers. This findings are robust to a battery of different estimation methods and consistent with standard theoretical arguments.

The remainder of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes subnational governments in Argentina and provides stylized facts on the main provincial fiscal variables over time. Section 4 presents the data and describes the empirical strategy to address the effects of transfers on the level and structure of provincial own revenues and spending. 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 and Vaillancourt, 1999; Goodspeed, 2002; Inman, 2003; Brosio and Jimenez, 2012).

Argentina is usually presented as an example of the "bad side" of fiscal decentralization and transfers. For example: "Argentina provides a good illustration of ….the "fiscal perversity" of subnational governments" Prud'homme (1995); "…the adjustment by national government has not been accompanied by a similar process at the provincial level. In countries such as Argentina….." Jones et al. (2000); "The recent move towards decentralization…..and the difficulties that central governments have had in dealing with fiscal irresponsibility on part of regional governments in countries such as Argentina…." Goodspeed (2002); "The recent financial crises in Argentina …, largely precipitated by excessive local government borrowing, are prominent recent examples of how a fiscally irresponsible local sector can impose significant costs on a national economy", Inman (2003); "The issue of soft budget constraint and the perverse incentives they create is a major theme in much of the recent literature in fiscal federalism…Indeed, we have seen intergovernmental fiscal behavior in some countries (like Argentina and Brazil) reach such proportions as to destabilize the entire fiscal system and the economy as we" (Oates, 2005); "In contrast, subnational governments facing a soft budget constraint have incentives to spend beyond their means…Argentina in the 1980s and Brazil in the 1990s both experienced hyper-inflation as their state governments spend without limits…" (Weingast, 2009).

An alternative view attributed this supposed "fiscal perversity" to fiscal externalities from the National level that impacted on provincial finances in an amount equal to or greater than "provincial excessive indebtedness" (Porto and Di Gresia, 2007). "A related problem in the developing world is that decentralization in a truly predatory state is not likely to succeed. A central government that is not committed to decentralization has numerous ways to undermine subnational government performance" (Weingast, 2009).

Several contributions of the normative theory of fiscal federalism suggest that transfers and own revenue are perfect substitutes in the budget constraint, so they have a negative relation (for instance Bradford and Oates, 1971). The second-generation theory of fiscal federalism (Weingast, 1995, 2009; Oates, 2005) remarks perverse incentives to explain the negative relation: transfers can generate irresponsible behavior of recipient governments (e.g., excessive expenditure, tax laziness, soft budget constraint -

Kornai (1986); Qian and Roland (1998)-, indebtedness).[4] A strand of empirical contributions for developed and developing countries support with evidence this idea (Zhuravskaya (2000); Buettner and Wildasin (2006); Taiwo (2021). On contrary, other contributions support the idea of complementarity between transfers and own revenues. Skidmore (1999); Dahlberg et al. (2008) ; Ferede (2017) ; Lewis and Smoke (2017) ; Masaki (2018); Porto and Puig (2021).

Our paper is also related to contributions on how transfers can affect subnational revenues composition. As Holm-Hadulla (2020) clearly shows, theoretical arguments support the idea that transfers induce more or less distortive taxation depending on whether distributional or allocative criteria prevail. 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 and Mieszkowski, 1986; Oates and Schwab, 1988; 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 understanding 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 types of taxes, which may chosen democratically (Borck, 2003). Political reasons for relying on different types of taxation also depend on their political cost. Hettich and 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 and Krause (2021) remarks the empirical literature on the tax policy incentives of transfers is relatively scarce.[5]

Porto and Puig (2021) 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 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. That is, higher transfers lead to higher local tax collection, which is obtained through less distortionary taxation (i.e., property tax). Interestingly, this bias is stronger for local governments with a higher share of divisible public goods (that are likely to be financed according to the ``benefit principle'').

In addition, our paper is closely related to Vegh and Vuletin (2015) that provide a novel explanation for the flypaper effect based on insurance arguments using an empirical analysis of Argentinean provinces for the period 1963–2006. In this contribution, the flypaper effect arises due to the differential response of precautionary savings to private income or fiscal transfers shocks in an uncertain world with incomplete markets. Specifically, the flypaper effect is a decreasing function of the correlation between fiscal transfers and private income, and such relationship is stronger the higher is the volatility of fiscal transfers and/or private income. Also, based on the fiscal regime that prevailed in Argentina from 1988 to 2003, Besfamille et al. (2021) estimate the effects that changes in intergovernmental transfers and hydrocarbon

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[4] Also, the central government can depart from the normative theory of transfers by incorporating political criteria's and use transfers to create financial and political dependence on subnational governments (Weingast, 2009)

[5] The idea that transfers induce higher taxes is supported by Dahlby and 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 provide 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).

royalties had on provincial public consumption and debt. From a one-peso increase in intergovernmental transfers, all provinces spent 76 centavos on public consumption and decreased their debt by 22 centavos. However, when hydrocarbon-producing provinces faced a one-peso increase in royalties, they saved 95 centavos.

3. Subnational governments in Argentina

Argentina is a federal constitutional republic and representative democracy. Each province has the constitutional power to run an autonomous fiscal policy. The size of the overall government, measured by the ratio of consolidated government expenditure to the gross domestic product (GDP), averages 35 percent of GDP. Government spending is highly decentralized; on average, Argentinean provinces are responsible for about 40 percent of consolidated fiscal spending. On the other hand, tax collection is highly centralized at the federal level. These vertical imbalances are financed by a system of intergovernmental fiscal transfers from the federal government which represent, on average, about 60 percent of provincial expenditure. The most important component of intergovernmental transfers (about 65 percent) is based on a tax-sharing law called "Coparticipación" which dates from 1935. Such tax-sharing law established: (i) the taxes to be shared (most direct and indirect domestic taxes), (ii) how shared tax collection would be distributed between the federal government and provinces (which is referred as primary distribution), and (iii) how provincial funds would be distributed between provinces (which is referred as secondary distribution). It is important to note that these fiscal transfers from federally-collected taxes to provinces are unconditional (and automatic) in the sense that, by law, provinces are entitled to them based on their mere existence. Periodically, typically every ten years to allow the system to adjust, new modifying laws were enacted to regulate the primary and secondary distribution of funds. The tax-sharing law established that secondary shares were to be determined using formulas that weighed various time-varying indicators such as each province's contribution to total tax collection (proxied by population), cost of providing public goods (proxied by population density), and redistributive considerations favoring low-income provinces. Since 1988, primary distribution coefficients have not changed, and secondary distribution coefficients have been fixed and not determined by any explicit formula.

As in many other developing countries, population and production are highly concentrated in a few provinces. When excluding the CABA, four provinces (Buenos Aires, Cordoba, Santa Fe, and Mendoza) account for 66 percent of total population (column 1, Table 1). Also, more than half of Argentina's GDP is concentrated in those four provinces, and just one province (Buenos Aires) accounts for about 44 percent of the country's output (column 2, Table 1). The remaining 19 provinces (i.e., more than 80 percent of the total number of provinces) are typically sparsely populated. Importantly for our purposes, these 19 provinces show a very high degree of heterogeneity in many aspects, including their levels of GDP per capita, productive structure, economic development, and social indicators. Some provinces like Catamarca, Chaco, Corrientes, Formosa, Jujuy, La Rioja, Misiones, and Santiago del Estero have had, historically, GDP per capita of about a half of the national average (column 3, Table 1). In contrast, some provinces like Neuquén, Santa Cruz, and Tierra del Fuego have the highest GDP per capita, of about twice the national average (column 3, Table 1).

Table 1. Descriptive statistics for Argentine provinces. Demographic, economic, and fiscal variables. Average for the period 1959-2019.

Province	% Population	% GDP	GDP per capita (constant $ 2001)	Population Density (inhab/km²)	Own-Revenues per capita (constant $ 2001)	Transfers per capita (constant $ 2001)	Total Expenditure per capita (constant $ 2001)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Buenos Aires	42.0	44.3	7649.3	39.4	279.9	217.3	627.1
Catamarca	0.9	0.7	5534.1	2.6	199.0	1079.0	1468.7
Chaco	2.9	1.4	3323.8	8.3	125.0	665.4	1025.3
Chubut	1.1	2.2	13481.5	1.5	672.1	617.6	1551.8
Cordoba	9.5	9.3	7185.1	16.4	263.9	372.0	836.9
Corrientes	2.7	2.0	5389.5	8.9	107.9	587.1	839.1
Entre Rios	3.7	3.2	6671.9	13.1	242.4	554.6	982.9
Formosa	1.3	0.7	3854.3	5.3	97.0	970.6	1378.9
Jujuy	1.7	1.2	5164.4	9.3	146.2	670.7	1069.7
La Pampa	0.9	1.1	8699.5	1.8	483.3	884.0	1608.6
La Rioja	0.8	0.7	6926.1	2.6	110.2	1174.6	1630.1
Mendoza	4.8	5.3	8018.3	9.2	348.9	382.0	822.9
Misiones	2.6	1.4	3769.3	25.8	140.4	498.4	803.2
Neuquen	1.2	2.5	14532.9	3.9	1059.4	641.9	2071.0
Rio Negro	1.6	1.9	8669.2	2.3	394.7	644.8	1200.3
Salta	2.9	2.1	5195.1	5.5	192.1	517.2	821.6
San Juan	1.9	1.3	5001.7	6.0	181.3	739.3	1057.0
San Luis	1.0	1.5	10799.7	3.9	227.3	855.7	1192.3
Santa Cruz	0.5	1.2	15916.4	0.7	1371.7	1280.6	3400.6
Santa Fe	9.6	11.3	8621.0	20.4	269.5	394.7	809.4
Santiago del Estero	2.4	1.1	3362.7	5.0	93.6	695.1	885.8
Tierra del Fuego	0.2	0.6	20055.0	0.1	1367.9	1676.2	3682.9
Tucuman	4.0	3.2	5920.7	50.5	182.9	480.7	773.3

Source: Own elaboration based on Porto (1990,2003 y 2004), INDEC, and National Department of Provincial Affairs. **Note.** Own-revenues include only the provincial current tax revenues. Thus, Non-tax revenues, capital revenues and indebtedness are not included in this definition.

As shown in Figure 2, provincial public spending represented less than 10 percent of GGP in 1959, while in 2019 exceeded 25 percent. Provincial own-revenues (i.e., provincial taxes and royalties) were slightly above 2 percent of GDP in 1959 while in 2019 were close to 6 percent. The ratio own-revenues-to-expenditure was of the order of 33 percent in 1959 while in 2019 largely exceeded 25 percent (not shown in Figure 2). Transfers from the national government rose from 5 percent of GDP to 15 percent between 1959 and 2019. Interestingly, the ratio of transfers to total provincial revenues remained constant throughout the period at around 60 percent (See Figure A1 in the Appendix 1). In short, all fiscal variables have increased -as a share of GGP-, and the increase in both sources of revenues (own-revenues vs. transfers) was similar.

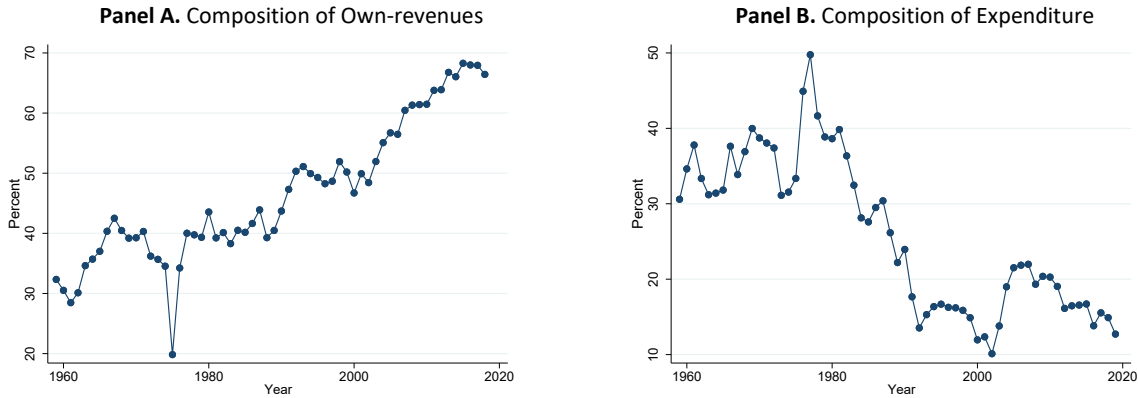**Figure 2.** Decentralization of resources and expenditures in Argentina. Evolution 1959-2019.
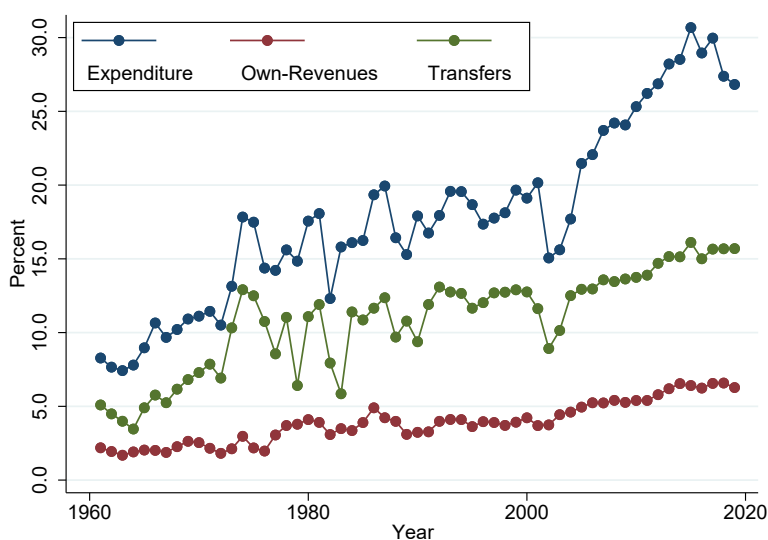
Source: Author´s elaboration. Data on expenditure comes from the National Direction of Fiscal Policy and Revenue - Secretary of Economic Policy on the basis of the Ministry of Finance and SIDIF. Data on revenues comes from the National Direction of Fiscal Investigations and Analysis, Ministry of Finance, based on data from the National Direction of Provincial Affairs, the National Budget Office. **Note.** Own-revenues include only the provincial current tax revenues. Thus, Non-tax revenues, capital revenues and indebtedness are not included in this definition.

In addition to the evolution in the levels of fiscal variables, there are interesting trends in the evolution of the composition of provincial own revenues and expenditures. The composition of the provincial own revenues shows an interesting feature: the share of own revenues collected through distortionary taxation (i.e., turn-over tax and the stamp tax) has been increasing in the last six decades, from 30 percent to more than 65 percent (Figure 3, Panel A).[6] The evolution of capital expenditures composition is no less interesting: in 1959, it accounted for nearly to 30 percent of total provincial expenditure, whereas in 2019 it accounted for only 12 percent -on average- . (Figure 3, Panel B).

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[6] Non-distortive taxes (e.g., property tax) were 80 percent of distortionary taxes (e.g., turnover tax on economic activity) in 1959, compared to less than 20 percent in 2019. This accounts for a bias towards distortionary taxation during the period under analysis (Porto, Garriga, and Rosales, 2014).

Figure 3. Trends in the composition of own revenues and public expenditure. Argentine provinces. Evolution 1959-2019

Panel A. Composition of Own-revenues

Panel B. Composition of Expenditure

Source: Author´s elaboration. Data on expenditure comes from the National Direction of Fiscal Policy and Revenue - Secretary of Economic Policy on the basis of the Ministry of Finance and SIDIF. Data on revenues comes from the National Direction of Fiscal Investigations and Analysis, Ministry of Finance, based on data from the National Direction of Provincial Affairs, the National Budget Office. **Note:** Panel A measures the share of own revenues collected through distortionary taxation (i.e., turn-over tax and the stamp tax) over total own revenues (i.e., total taxation and royalties). Panel B measures the share of capital expenditure over total expenditure.

4. Methodology and data

We begin by analyzing the response of own-revenues and expenditure to variations in transfers. For this purpose, the basic setup follows Masaki (2018):

$$Y_{i,t} = \beta_1 * Tr_{i,t} + \gamma * X_{i,t} + \varphi_i + T_t + T_t^2 + \varepsilon_{i,t} \tag{1}$$

where i and t index provinces and year, respectively; $Y_{i,t}$ refers to provincial own revenues and provincial expenditure in per capita terms; $Tr_{i,t}$ denotes transfers per capita. All variables are in real terms and in logarithms. Furthermore, as standard in the literature (Jones et al., 2000; Jimenez, 2015; Lewis and Smoke, 2017), a vector of additional variables ($X_{i,t}$) is included to control for possible omitted variable bias. Specifically, private GGP (i.e., GGP net of public expenditure) is used as an indicator of provincial personal income. The percentage of households with Basic and Unsatisfied Needs (NBI) is also included. Population dependency, defined as the ratio of the number of people under 15 to over 64 to people aged 15 to 64, is included to address possible demographic trends. φ_i are province fixed effects, while T_t and T_t^2 control for possible temporal trends in the data. $\varepsilon_{i,t}$ is the usual error term. β_1 is the relevant parameter. When using provincial own revenues, a negative value indicates the operation of perverse incentives or the "crowding-out" effect, while a positive value indicates "crowding-in" (that is, the provincial own revenues and the transfers are complements).

First, ordinary least squares (OLS) are used to estimate equation (1). These estimates are likely to be biased because the flow of transfers is expected to be endogenous to provincial own revenues or

expenditure.[7] We tackle this issue with the instrumental variable strategy developed by Porto and Sanguinetti (2001) and also implemented in Vegh and Vuletin (2015). The instrument is the unbalanced representation (i.e., malapportionment) in National Congress of subnational governments in Argentina. We explain this strategy in Appendix 2.

Second, the dynamic relationship is explored by introducing the lagged levels of dependent and independent variables on the right side of the equation, estimating the following dynamic equation:

$$Y_{i,t} = \alpha_1 * Y_{i,t-1} + \beta_1 * Tr_{i,t} + \beta_2 * Tr_{i,t-1} + \gamma * X_{i,t} + \varphi_i + T_t + T_t^2 + \varepsilon_{i,t} \qquad (2)$$

Arellano and Bond (1991) show that estimation of dynamic panel data models leads, by construction, to inconsistent standard estimators, since unobserved panel-level effects are correlated with lagged dependent variables. To overcome this limitation, Arellano and Bond (1991) and Blundell and Bond (1998) propose the use of alternative consistent GMM estimators based on the use of internal instruments. However, these estimators are not free from limitations since the initial conditions and moment requirements are not necessarily met in all cases. Based on Monte Carlo simulations, these authors also show that this bias decreases rapidly as the number of observations per group increases, allowing dynamic OLS estimation. Thus, we use GMM (SGMM) estimators of the Blundell-Bond system and dynamic OLS estimates. For the former, and also for robustness, the results of the one-stage and two-stage GMM estimation will be reported.

We then perform a series of extensions on equation (1) to capture effects on the composition of expenditures and own revenues as well as heterogeneities between provinces. The composition of the resources is measured by the share of own revenues collected through distortionary taxation (i.e., turn-over tax and the stamp tax) over total own revenues (i.e., total taxation and royalties). That is, the share presented in Figure 3, Panel A. The composition of expenditure is measured by the share of capital expenditure in total expenditure. That is, the share presented in Figure 3, Panel B. Finally, to address heterogeneities by group of provinces we classify them following the criteria of Nuñez Miñana (1972). This criteria establishes 4 categories: High-income (Bs As, Córdoba, Mendoza, Santa Fe); Patagonic (Chubut, La Pampa, Neuquén, Rio Negro, Santa Cruz, Tierra del Fuego); Middle-income (Entre Ríos, Salta, San Juan, San Luis, Tucumán); and Low-income (Catamarca, Chaco, Corrientes, Formosa, Jujuy, La Rioja, Misiones, Santiago del Estero).

The data used in the empirical analysis correspond to the period 1959-2019. Total provincial public expenditure, provincial own revenues, and total transfers from the federal government to the provinces come from Porto (2004) for the period 1959-2000. Then, for the period 2001-2019, information from the National Directorate of Fiscal Coordination with the Provinces, dependent on the Ministry of Economy and Public Finance of the Argentine Republic, was used. The provincial PBG comes from Porto (2004) for the period 1959-2000. For the period 2001-2019, data from the Center for Production Studies (CEP), dependent on the National Ministry of Industry, was used. The years not registered by the CEP for this period were completed with data from the Provincial Statistical Directorates of each province and information from the Secretariat of Economic Policy and Development Planning, dependent on the Ministry of Economy and Public Finance of the Argentine Republic.

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[7] Delaying the level of transfers does not alleviate endogeneity concerns because there are a number of possible 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).

The provincial population comes from Porto (2004) for the period 1959-2000 and from the National Institute of Statistics and Census (INDEC) for the period 2001-2019. The NBI and population dependency data come from INDEC for the period 1959-2019. The data referring to the composition of the Congress of the Argentine Nation were obtained from the Electoral Atlas of Andy Tow.

5. Results

5.1. Effects of transfers on the level of own revenues

Table 2 shows the results from the specification in Equation 1 when using own revenues as dependent variables. We find that transfers increase local own revenues. Models 1 employs the OLS estimation without accounting for provincial, time trends or control variables. Model 2 includes provincial fixed effects while model 3 adds time trends. Model 4 and 5 by including also control variables represent our fully controlled specification. It can be appreciated that own revenues rise around 0.21 percent against 1 percent of additional national transfers. In Model 6 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 transfers and the imbalance in the legislative representation of the provinces in the National Congress. Thus, our IV strategy is relevant (See Appendix 2). At the same time, the Kleinbergen-Paap F-stat in Table 2 indicates the results are not affected by a weak instrument problem. We then move to the dynamic specification in Equation 2. Models 7 and 8 summarize results from the SGMM models.[8] Again, own revenues rise around 0.21 percent against 1 percent of additional national 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 0.31 (not shown in Table 2), with a standard error of 0.14, suggesting a persistent effect of provincial transfers on own revenues.[9] Similar results can be appreciated when analyzing the dynamic OLS in Model 9. As mentioned, the contemporaneous effects of transfers mostly capture their direct and immediate impact on provincial 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 provincial revenues through stimulating provincial economies, which, after some temporal lag, affect the value of the provincial tax base (Masaki, 2018). Our findings seem to provide some support that a larger proportion of increases in provincial revenues may be explained by the direct effects of transfers on tax enforcement and public services, instead of fiscal stimulus.

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[8] We reject the null hypothesis of no first-order serial correlation in first differences (AR (1) test) and do not reject the null hypothesis of no higher-order serial correlation in first differences (AR (2) test). This is important since lagging independent variables does not solve endogeneity problems if there is autocorrelation in the error term. 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).

[9] From Equation 2 and Table 2 we obtain this 0.31 (= ($\beta1 + \beta2$)/(1 − $\alpha1$) = (0.223 − 0.136)/(1 − 0.721)). 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.

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Transfers	0.695***	0.835***	0.293***	0.205***	0.213*	0.571**	0.223***	0.219***	0.223**
	(0.138)	(0.0529)	(0.0925)	(0.0761)	(0.118)	(0.272)	(0.0342)	(0.0741)	(0.0895)
GDP private				0.519***	0.486***	0.402**	0.129**	-0.0946	0.129***
				(0.0759)	(0.0959)	(0.181)	(0.0533)	(0.522)	(0.0480)
NBI					-0.211*	-0.245**	-0.179***	-0.203	-0.179**
					(0.109)	(0.0982)	(0.0479)	(0.130)	(0.0806)
Pop. Dep.					0.00626	-0.124	-0.0557	0.108	-0.0557
					(0.222)	(0.501)	(0.123)	(0.692)	(0.119)
Own-Revenues (t-1)							0.721***	0.689***	0.721***
							(0.0231)	(0.0723)	(0.0389)
Transfers (t-1)							-0.136***	-0.142***	-0.136*
							(0.0332)	(0.0465)	(0.0805)
Observations	1,401	1,401	1,401	1,356	1,150	1,128	1,127	1,127	1,150
Fixed Effect	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trends	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019
Controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	IV	SGMM One	SGMM Two	OLS
AR1 (p-val)							0.000	0.000	
AR2 (p-val)							0.256	0.291	
Hansen J test (p-val)							1.000	1.000	
Diff in Hansen test (p-val)							1.000	1.000	
# of Instruments							1127	1127	
Underidentification Test						13.85			
Chi-sq p-value						0.000			
Weak Instrument Test						34.70			

Source. Authors' elaboration. **Notes:** Robust cluster standard errors in brackets. Significance level *** p<0.01, ** p<0.05, * p<0.1, 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% = 19.93; 15% = 11.59; 20% = 8.75; 25% = 7.25.

5.2. Effects of transfers on the level of expenditure

Table 3 shows the results from the specification in Equation 1 when using provincial expenditure as dependent variables. We find that transfers increase local subnational expenditure in Argentina. Models' presentation follows the same logic as in Table 2. Thus, Model 5 represents our fully controlled specification. It can be appreciated that expenditure rise around 0.54 percent against 1 percent of additional national transfers. In Model 6 we present the IV estimation, and our main result still holds when addressing potential endogeneity concerns. Although the coefficient increases to 0.85 percent, we cannot reject the hypothesis that it is equal to 0.54 at 90 percent statistical confidence. Again, the Kleibergen-Paap F-stat in Table 3 indicates the results are not affected by a weak instrument problem. We then move to the dynamic specification in Equation 2. Models 7 and 8 summarize results from the SGMM models.[10] Expenditure rise around 0.42 percent against 1 percent of additional national transfers. The lagged effect of transfers is negative and statistically significant. The lagged effect of expenditure is positive and

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[10] We reject the null hypothesis of no first-order serial correlation in first differences (AR (1) test) and do not reject the null hypothesis of no higher-order serial correlation in first differences (AR (2) test). This is important since lagging independent variables does not solve endogeneity problems if there is autocorrelation in the error term. 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).

statistically significant indicating that subnational expenditures are serially correlated over the period. The long-run effect is 0.59 (not shown in Table 3), with a standard error of 0.06, suggesting a persistent effect of provincial transfers on public expenditure. Similar results can be appreciated when analyzing the dynamic OLS in Model 9.

Table 3. Baseline panel regressions: effects of transfers on the level of expenditure.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Transfers	0.916***	0.941***	0.566***	0.547***	0.547***	0.850***	0.416***	0.423***	0.416***
	(0.0451)	(0.0457)	(0.0611)	(0.0541)	(0.0870)	(0.140)	(0.0180)	(0.0531)	(0.0771)
GDP private				0.0433	-0.00490	-0.0652	-0.0166	0.0185	-0.0166
				(0.0355)	(0.0424)	(0.0469)	(0.0240)	(0.183)	(0.0220)
NBI					-0.102	-0.0961*	-0.1000***	-0.0866	-0.1000*
					(0.0955)	(0.0580)	(0.0287)	(0.105)	(0.0521)
Pop. Dep.					-0.147	-0.125	-0.0541	-0.159	-0.0541
					(0.169)	(0.224)	(0.0953)	(0.615)	(0.0821)
Total Expenditure (t-1)							0.596***	0.556***	0.596***
							(0.0384)	(0.0978)	(0.0461)
Transfers (t-1)							-0.174***	-0.170***	-0.174***
							(0.0371)	(0.0536)	(0.0512)
Observations	1,400	1,400	1,400	1,356	1,150	1,128	1,127	1,127	1,150
Fixed Effect	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Trends	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019
Controls	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Method	OLS	OLS	OLS	OLS	OLS	IV	SGMM One	SGMM Two	OLS
AR1 (p-val)							0.000	0.000	
AR2 (p-val)							0.117	0.104	
Hansen J test (p-val)							1.000	1.000	
Diff in Hansen test (p-val)							1.000	1.000	
# of Instruments							1127	1127	
Underidentification Test						13.85			
Chi-sq p-value						0.000			
Weak Instrument Test						34.70			

Source. Authors' elaboration. **Notes:** Robust cluster standard errors in brackets. Significance level *** p<0.01, ** p<0.05, * p<0.1, 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% = 19.93; 15% = 11.59; 20% = 8.75; 25% = 7.25.

5.3.   Extensions

We extend baseline results by asking whether the effects of transfers on provincial own-revenues and expenditures also reach their composition. Thus, we use the composition of both fiscal variables as a dependent variable. We present the estimation through both the OLS's and IV's method.

Columns 1 and 2 of Table 4 show that transfers tend to reduce the share of own revenues collected through distortionary taxation (i.e., the turnover tax and the stamp tax) over total own revenues (i.e., total taxation and royalties). An additional 1 percent of transfers reduces this share by 0.63 percent. This result also holds if the revenues´ composition is measured alternatively. That is, for example, looking only at the ratio between the turnover tax and the property tax; or if royalties (considered as non-distortive)

are excluded from total own revenues. Based on these results we support that transfers tilt the provincial own revenues structure towards less distortionary taxation.

Similarly, columns 3 and 4 of Table 4 show that transfers tend to increase the share of capital expenditures over total expenditures. An additional 1 percent of transfers increases this share by 0.64 percent. This result is also true if the composition of expenditures is measured alternatively. That is, for example, if financial investment is excluded from capital spending and only real direct investment is taken. Based on these results we support that transfers tilt the provincial expenditure towards more capital spending.

Table 4. Baseline panel regressions: effects of transfers on the composition of provincial own-revenues and expenditure.

	Dep Var: Distortive Own-Revenues over Total Own Revenues		Dep Var: Capital Expenditure over Total Expenditure	
	(1)	(2)	(3)	(4)
Transfers	-0.126	-0.637***	0.305*	0.645***
	(0.113)	(0.178)	(0.171)	(0.179)
GDP private	-0.0532	0.0603	0.219***	0.131
	(0.0712)	(0.0963)	(0.0799)	(0.135)
NBI	0.121	0.00897	0.399*	0.494**
	(0.180)	(0.0998)	(0.216)	(0.200)
Pop. Dep.	0.220	-0.267	-0.863***	-0.416
	(0.217)	(0.366)	(0.306)	(0.449)
Observations	1,126	1,105	1,150	1,128
Fixed Effect	Yes	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes	Yes
Sample	1959-2019	1959-2019	1959-2019	1959-2019
Controls	Yes	Yes	Yes	Yes
Method	OLS	IV	OLS	IV
Underidentification Test		14		13.85
Chi-sq p-value		0.000		0.000
Weak Instrument Test		35.59		34.70

Source. Authors' elaboration. **Notes:** Robust cluster standard errors in brackets. Significance level *** p<0.01, ** p<0.05, * p<0.1, 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% = 19.93; 15% = 11.59; 20% = 8.75; 25% = 7.25.

Finally, we extend the set of previous results considering the heterogeneity of the Argentine provinces. Then, we condition the effects according to whether the provinces belong to the high-, medium-, or low-income group, or if they are Patagonian. For the purposes of the presentation, we compute marginal effects using the estimation through the IV's method, but the results hold for the OLS's also. Figure 4 presents the results.

Panel A shows the effect of transfers on the level of own resources by province. In the aggregate (as shown in Table 2) a 1 percent increase in transfers increased own income by 0.57 percent. Now that effect is differential by province and is mostly driven by the Patagonian provinces. In high-income provinces, this effect is 0.41 with a standard error of 0.27. Then, in the middle- (low-) income the effect is reduced to 0.25 (-0.03) although statistically not significant. In the case of the provinces of Patagonia, a 1 percent increase in transfers increased own income by 1.92 percent, with a standard error of 0.84.

Panel B shows the effect of transfers on the level of expenditure by province. In the aggregate (as shown in Table 3) a 1 percent increase in transfers increased expenditures by 0.85 percent. However, this effect is differential by province and, again, is mostly driven by the Patagonian ones. In high-income provinces,

this effect is 0.87 with a standard error of 0.16. Then, in the middle- (low-) income the effect is reduced to 0.59 (0.50) with and standard error of 0.19 (0.23). In the case of the provinces of Patagonia, a 1 percent increase in transfers increased expenditures by 1.65 percent, with a standard error of 0.48.

Panel C shows the effect of transfers on the composition of own-revenues by province. In the aggregate (as shown in Table 4, Column 2) an additional 1 percent of transfers reduces the share of distortionary taxes in provincial revenues by 0.63 percent. However, this effect is differential by province and, again, is mostly driven by the Patagonian ones. In these provinces a 1 percent increase in transfers reduces the relative participation of distortionary taxation by 1.18 percent, with a standard error of 0.36. In high-income provinces, this effect is -0.60 with a standard error of 0.21. Then, in the middle- (low-) income the effect is reduced to -0.48 (-0.23) with and standard error of 0.24 (0.23). Note that the option of reducing distortionary taxation does not seem to be an option for provinces with a lower level of economic development.

Finally, Panel D shows the effect of transfers on the composition of expenditure by province. In the aggregate (as shown in Table 4, Column 4) an additional 1 percent of transfers increases the share of capital expenditure by 0.64 percent. However, this effect is differential by province and, not hold for provinces with a higher level of economic development. For example, in Patagonian provinces a 1 percent increase in transfers increases the relative participation of capital expenditure by 0.012 percent, with a standard error of 0.48. In high-income provinces, this effect is 0.36 with a standard error of 0.29. Then, in the middle- (low-) income the effect is 1.11 (0.47) with and standard error of 0.33 (0.31), respectively.

Figure 4. Heterogenous effects of transfers on the level and the composition of provincial own-revenues and expenditure. By group of provinces
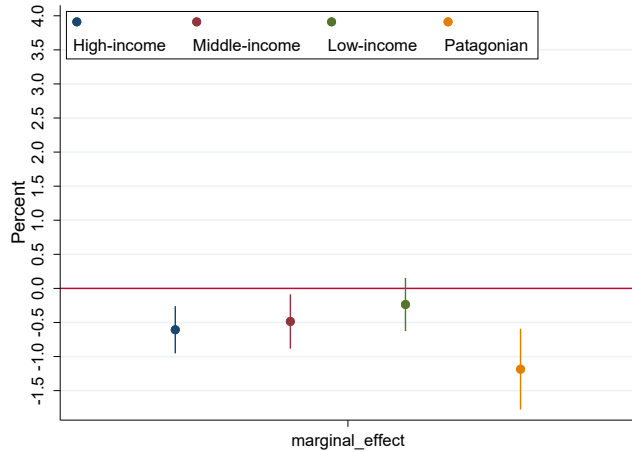
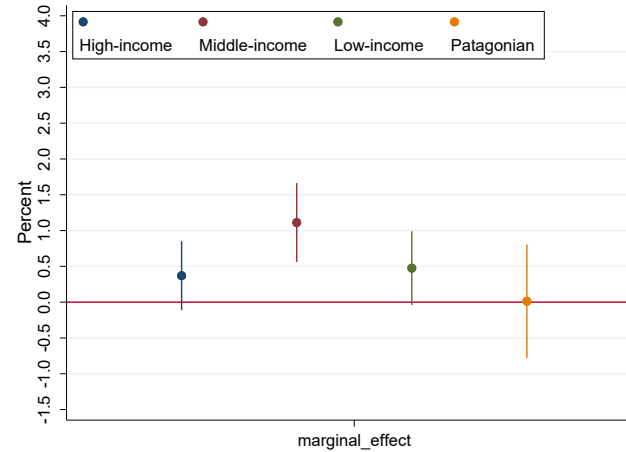**Panel A.** Effects on the level of Own Revenues
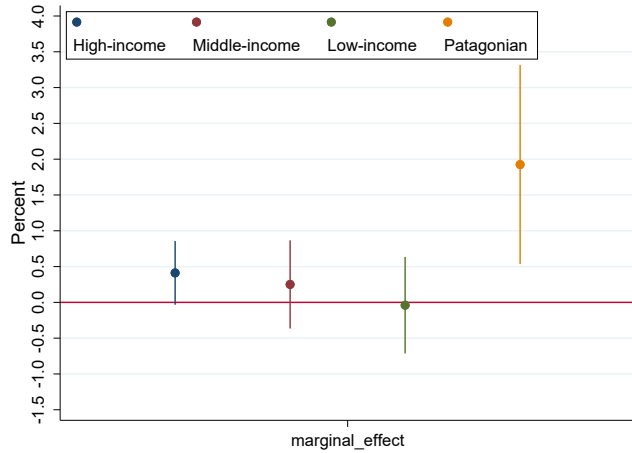
Panel B. Effects on the level of Expenditures
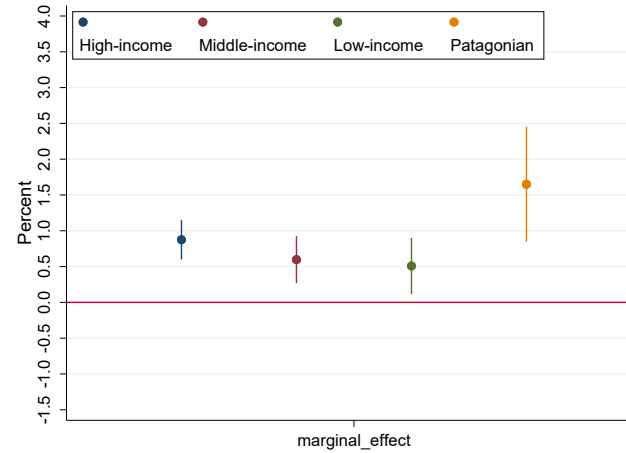
Panel C. Effects on the composition of Own Revenues

Panel D. Effects on the composition of Expenditures

Source. Authors' elaboration. **Notes:** Robust cluster standard errors for a 90 percent confidence interval (in bands).

6. Conclusions

In this paper we analyze subnational public finances in a federal country with a long-term vision. Employing panel data for the 23 provinces of Argentina we cover the six decades from 1959 to 2019 and we show stylized facts of the main provincial fiscal variables over time. In addition, we study the interaction between transfers on the level and the structure of provincial own revenues and expenditures. Given that the provinces present remarkable heterogeneity in expenditure per capita, productive structure, urbanization, and social indicators, previous effects are analyzed taking this heterogeneity into account.

We find that the fact that transfers have been increasing over time did not generate "fiscal laziness" in the Argentine provinces. In this paper there is complementarity between own revenues and transfers. The increasing transfers also generated increases in expenditure. Transfers tend to reduce the share of own revenues collected through distortionary taxation (i.e., the turnover tax and the stamp tax) over total own revenues (i.e., total taxation and royalties). Also, transfers tend to increase the share of capital expenditures over total expenditures. These findings are heterogeneous on the provincial level of development. The Patagonian provinces (highly dependent on royalties) increase their own revenues against higher transfers, while the rest of the provinces do not show a statistically significant relationship between these variables. The increase in spending against higher transfers decreases on the level of provincial income. The bias towards non-distortive taxation is more pronounced in higher-income provinces. It does not seem to be an option for low-income provinces. Interestingly, the increase in capital spending share presents an inverted "u-shaped". Only middle-income provinces seem to increase capital spending against higher transfers. This findings are robust to a battery of different estimation methods and consistent with standard theoretical arguments.

We think that these results help to think about the effects of transfers not only on the level but also on the structure of subnational own revenues. They contribute to reasoning about what type of tax instruments provincial governments can choose against higher transfers, how political economy aspects play, and how the effects can be conditioned on the level of development. 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 1. Additional Figures

Figure A1. Transfers as a share of total provincial revenues. Argentine provinces. Evolution 1959-2019
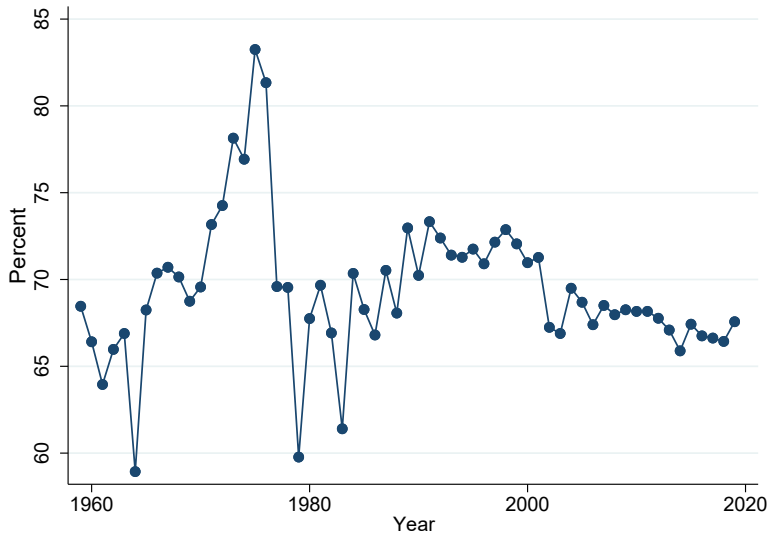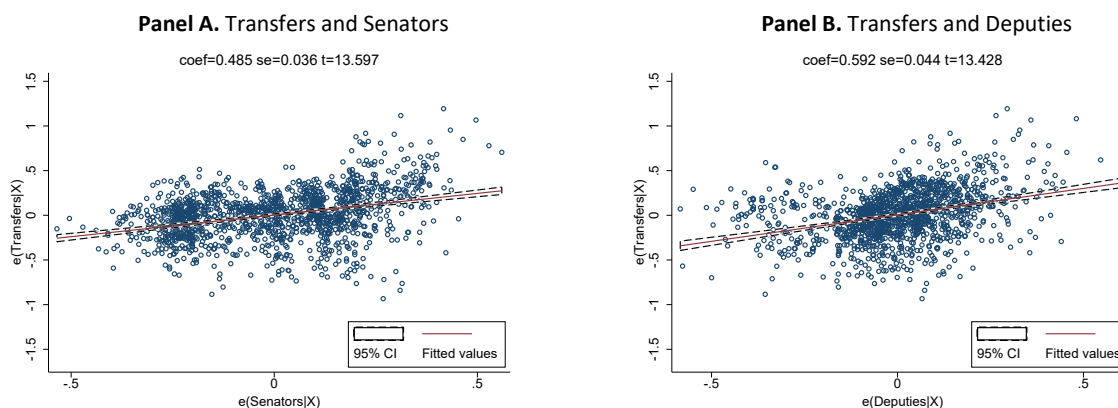

Source: Author´s elaboration. Data on expenditure comes from the National Direction of Fiscal Policy and Revenue - Secretary of Economic Policy on the basis of the Ministry of Finance and SIDIF. Data on revenues comes from the National Direction of Fiscal Investigations and Analysis, Ministry of Finance, based on data from the National Direction of Provincial Affairs, the National Budget Office.

Appendix 2. Identification strategy for exogenous changes on transfers

The representatives of each province in the National Congress, composed of Chambers of Senators and Chamber of Deputies, are responsible for legislating over tax-sharing system and also have the possibility of influencing over the discretionary transfers distribution (i.e., negotiating their support for laws and reforms promoted by the national government in exchange for benefits for their provinces). Historically, since the first National Constitution of 1853, Argentina has shown an unbalanced representation of its provinces in its National Congress.[11] In particular, the less populated provinces have found themselves systematically overrepresented not only in the Senate (where all the provinces have the same number of representatives, regardless of their population) but also in the Chamber of Deputies. Porto and Sanguinetti (2001) established that this observed imbalance in per capita representation between different provinces (i.e., malapportionment) is an important factor explaining the allocation of transfers. Overrepresented provinces have received (on average) more resources from the federal government than more populated and less represented provinces. Thus, changes in the Chambers of the National Congress can cause changes in the allocation of the transfers. This relevance condition is presented in Figure A1. Panel A (B) shows the correlation between total federal transfers and the number of Senators (Deputies) per provinces, both in per capita terms . For both cases, these correlations are positive and with statistical significance, supporting the relevance of the instruments to implement the proposed strategy. Finally, regarding to the exogeneity condition our strategy feeds on Vegh and Vuletin (2015) that on the basis of historical documentation shows that all changes in the number of senators and deputies throughout the Argentinean history were driven by governance considerations and not in response to contemporary macroeconomic changes.

Figure A2. Key empirical factors behind the use of provincial over-representation in the Chambers of the National Congress as instrument for national transfers per capita shocks. Argentine provinces.

Panel A. Transfers and Senators
coef=0.485 se=0.036 t=13.597

Panel B. Transfers and Deputies
coef=0.592 se=0.044 t=13.428

Source: Author´s elaboration. **Note:** Correlation is calculated with the residuals from the regression of each variable in a fixed effect per province and time trends (i.e., in the same way as are included in the regressions). Variables are expressed in logs, per capita, and real terms.

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[11] See Vegh and Vuletin (2015) for a detailed discussion about departs from proportionality in the representation of Argentinean provinces in National Congress since 1853.