

On the fiscal behavior of subnational governments. A long-term vision for Argentina¹

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PRELIMINARY DRAFT

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 provincial own resources towards non-distortionary 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.

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

Key words: *subnational public finances, intergovernmental transfers, spending, tax structure, Argentina.*

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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 evidence². A strand of literature suggests 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. 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. Coming to 2020, provinces 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 over time. In addition, provinces have experienced changes in the composition of their own revenues and expenditures. While the increase in both sources of revenues (own revenues vs. transfers) was similar, the composition of own revenues was biased towards more distortionary taxation (i.e., on mobile factors, such as taxation on business)³. Regarding the composition of expenditure, provinces have experienced a bias against capital spending (i.e., public investment).

These patterns highlight Argentina's undeniable appeal for long-term research on subnational fiscal behavior. In this paper we provide empirical analysis employing panel data for the 23 provinces, covering the six decades from 1959 to 2019. First, we provide stylized facts of the main provincial fiscal variables over time. Second, we study the effects of 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, the analysis includes this dimension.

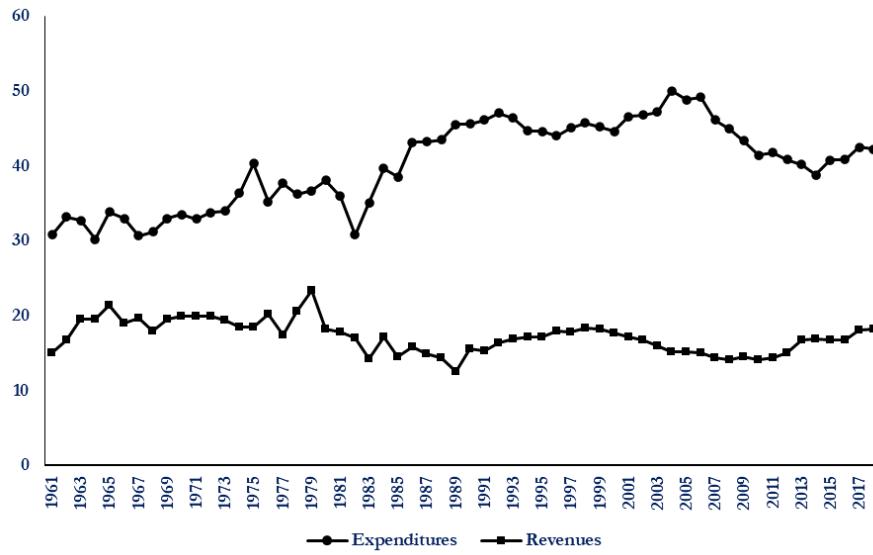
The main results of the paper can be summarized as follows. The fact that transfers have been increasing over time did not generate ``fiscal laziness'' (i.e., transfers and own revenues are complements). Transfers also tend to bias the composition of own revenues toward less distortionary taxation. In terms of

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; Végh and Vuletin, 2015)

³ As in many other countries, provinces have access to both more 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.''

expenditures, higher transfer increase provincial expenditure and bias the composition toward capital expenditure. All these findings are robust to a battery of different estimation methods and can be rationalized with theory from public finance and political economy as well. Interestingly, the results are heterogeneous on the provincial level of development. The lower level of provincial development the higher complementarity between transfers and own revenues, and the higher increase in provincial expenditures. The option of reducing more distortionary taxation does not seem to be an option for provinces with a higher level of economic development. Only the Patagonian provinces seem to increase capital spending against higher transfers.

Figure 1. Decentralization of resources and expenditures in Argentina. Share of provincial governments on consolidated government (provinces + central). Evolution 1961-2018. In percentage.



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 AFIP, ANSES, the National Direction of Provincial Affairs, the National Budget Office.

We believe that our paper mainly contributes in two dimensions. First, to keep considering how transfers interact with provincial own revenues and expenditures, both in terms of level and structure. Additionally, consider the possibility that this relationship could be influenced by the level of development of the provincial governments. Second, to provide new evidence on this interaction. As will be appreciated in the next Section, although the effect of transfers on the level of own revenues has been quite explored, less evidence is available on how transfers affect their composition. The same applies for expenditure. In this sense, we extend empirical evidence on this topic to developing countries. To the best of our knowledge, there is no evidence of the relation between provinces and the central government in Argentina. 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 subnational 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 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 expenditures. 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 subnational 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 the perverse incentive that transfers can generate. For example: “[A]rgentina provides a good illustration of the ‘fiscal perversity’ of subnational governments” (Prud’homme, 1995); “...[t]he 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); “[T]he 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); “[T]he 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); “[T]he 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); “[I]n 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 (Bradford and Oates, 1971). The second-generation theory of fiscal federalism (Weingast, 1995, 2009; Oates, 2005) remarks perverse incentives to explain this 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). The theory behind this is that the transfer encourages the subnational government to exert more financial effort by increasing its own resources in order to offer a public good that would not otherwise be provided.

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)

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 (e.g., property 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 more distortionary taxation (e.g., capital taxation) to alter this allocation may be appropriate. Distributive and political economy arguments are also crucial to understanding tax structure composition. Distortionary taxation redistributes income between regions as well as within regions. Consequently, people with limited capital may embrace these forms of taxes, which they might decide through democratic elections (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

On the revenues side, a closely related contribution is Porto and Puig (2021) that 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 (i.e., municipalities), 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 toward less distortionary taxation. 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) and Besfamille et al. (2021). The first contribution uses an empirical examination of Argentinean provinces from 1963 to 2006 to support the flypaper effect. The flypaper effect arises due to the differential response of precautionary savings to private income or transfers shocks in an uncertain world with incomplete markets. Specifically, the flypaper effect is a decreasing function of the correlation between transfers and private income, and such relationship is stronger the higher is the volatility of transfers and/or private income. Besfamille et al. (2021), based on the fiscal regime that prevailed in Argentina from 1988 to 2003, estimate the effects that changes in transfers and hydrocarbon royalties had on provincial public consumption and debt. From a one-peso increase in 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.

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).

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. Before the 2001-2002 deep economic crisis, Argentina's consolidated primary public expenditure was about 24 percent of GDP. Those expenditures almost reached 40 percent of GDP in 2015 and declined afterward to 38 percent by 2017; this share is both well above the average for Latin America and Caribbean countries and closer to the OECD average (OECD, 2020). Government spending is highly decentralized; on average, Argentinean provinces are responsible for about 40 percent of consolidated fiscal spending. 75 percent of education (96 percent of basic education), 65 percent of public health, and more than 65 percent of other public goods like security and justice are funded by the provinces. On the other hand, tax collection is highly centralized at the federal level. Argentina's tax burden is close to 30 percent of GDP and the provinces contribute 5 percentage points. The main provincial tax is the gross income tax (i.e., turnover tax), which accounts for 75 percent of provincial own revenues. Then, the tax structure is completed by the stamp tax, the property tax, and the automobile tax.

These vertical imbalances are financed by a system of transfers from the federal government which represent, on average, about 60 percent of provincial expenditure. The most important component of transfers (about 65 percent) is based on a tax-sharing law called "Coparticipación" which dates from 1935 (Porto, 2021). 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 (Vegh and Vuletin, 2015).

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 income (i.e., GPP) 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, income 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 income per capita, of about twice the national average (column 3, Table 1).

As shown in Figure 2, provincial expenditure 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 GGP 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 GGP 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.

Beyond the levels of fiscal variables, there are interesting trends in 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 more 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)⁷.

⁶ Non-distortionary 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).

⁷ Public investment levels have been declining across both advanced and emerging economies over the last decades (Izquierdo et al., 2018). This can be problematic for economic welfare since the public investment multiplier can be quite large, especially when compared to the government consumption multiplier (Ilzetzki et al., 2013; Izquierdo et al., 2019).

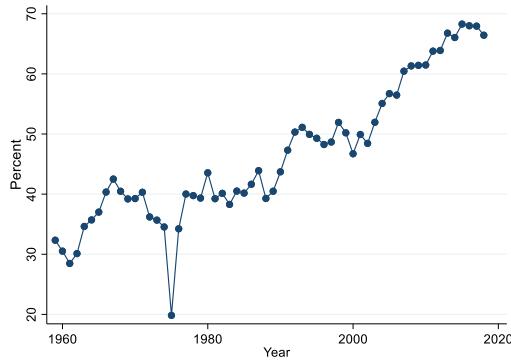
Table 1. Descriptive statistics for Argentine provinces. Demographic, economic, and fiscal variables. Average for the period 1959-2019

Province	% Population	% GDP	GDP per capita (constant \$ 2001)	Population Density (inhab/km ²)	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

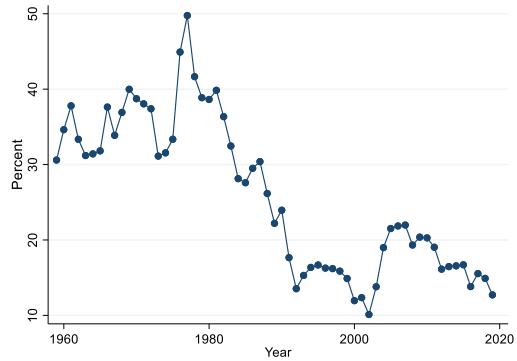
Source: Own elaboration based on Porto (1990,2003 y 2004), INDEC, and National Department of Provincial Affairs. **Note.** Own-revenues include only the provincial current revenues. Thus, capital revenues and indebtedness are not included in this definition.

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

Panel A. Composition of Own-revenues. Share of more distortive taxation



Panel B. Composition of Expenditure. Share of capital 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

The response of own-revenues and expenditure to variations in transfers is analyzed following the basic setup by Masaki (2018):

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

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. 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 included 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. The data used in the empirical analysis correspond to the period 1959-2019⁸. β_1 is the relevant parameter. For example, when using provincial own revenues, a negative value indicates the operation of perverse incentives or the "crowding-out"

⁸ See Appendix 2 for data sources.

effect or ``fiscal laziness'', while a positive value indicates ``crowding-in'' effects (i.e., own revenues and transfers are complements).

First, ordinary least squares (OLS) are used to estimate equation (1)⁹. However, OLS estimates are likely to be biased because the flow of transfers is expected to be endogenous to provincial own revenues or expenditure¹⁰. We tackle this issue with the well-established instrumental variable (IV) strategy developed by Porto and Sanguinetti (2001) and also implemented in Végh and Vuletin (2015). The instrument is the unbalanced representation of subnational governments in National Congress (i.e., malapportionment). We explain this strategy with detail in Appendix 3.

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:

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

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 estimates¹¹.

We also 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 own revenues is measured by the share of own revenues collected through more distortionary taxation (i.e., turn-over tax and the stamp tax) over total own revenues. 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).

⁹ In all cases, we control for spatial and temporal dependence in the data given the length of the panel (i.e., the presence of some omitted variable that correlates with the error term). For this, we use Driscoll-Kraay robust standard errors.

¹⁰ Lagging 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).

¹¹ For the former, and also for robustness, the results of the one-stage and two-stage GMM estimation will be reported.

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 and own revenues are complements. Models 1 employs the OLS estimation without accounting for provincial fixed, 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 concerns¹². The first-stage results show a strong correlation between transfers and the malapportionment 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 indicates the results are not affected by a weak instrument problem¹³.

We then move to the dynamic specification in Equation 2. Models 7 and 8 summarize results from the SGMM models¹⁴. Again, own revenues rise around 0.22 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 revenues¹⁵. Similar results can be appreciated when analyzing the dynamic OLS in Model 9.

¹² Note that although the coefficient is 0.571, we cannot reject that it is different from 0.213 at the usual levels of confidence.

¹³ Based on the Sargan-Hansen test of overidentifying restrictions, we cannot reject the joint null hypothesis on the instruments' validity (pval== 0.3784).

¹⁴ 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).

¹⁵ From Equation 2 and Table 2 we obtain this 0.31 (= $(\beta_1 + \beta_2)/(1 - \alpha_1) = (0.223 - 0.136)/(1 - 0.721)$). 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*** (0.138)	0.835*** (0.0529)	0.293*** (0.0925)	0.205*** (0.0761)	0.213* (0.118)	0.571** (0.272)	0.223*** (0.0342)	0.219*** (0.0741)	0.223** (0.0895)
GDP private				0.519*** (0.0759)	0.486*** (0.0959)	0.402** (0.181)	0.129** (0.0533)	-0.0946 (0.522)	0.129*** (0.0480)
NBI					-0.211* (0.109)	-0.245** (0.0982)	-0.179*** (0.0479)	-0.203 (0.130)	-0.179** (0.0806)
Pop. Dep.					0.00626 (0.222)	-0.124 (0.501)	-0.0557 (0.123)	0.108 (0.692)	-0.0557 (0.119)
Own-Revenues (t-1)						0.721*** (0.0231)	0.689*** (0.0723)	0.721*** (0.0389)	
Transfers (t-1)							-0.136*** (0.0332)	-0.142*** (0.0465)	-0.136* (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 brevity. 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 provincial expenditure in Argentina. Again, Model 5 represents our fully controlled specification and can be appreciated that expenditure rises 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 of confidence. Again, the Kleinbergen-Paap F-stat 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 models¹⁶. Expenditure rises 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 statistically significant indicating that subnational expenditures are serially

¹⁶ 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).

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*** (0.0451)	0.941*** (0.0457)	0.566*** (0.0611)	0.547*** (0.0541)	0.547*** (0.0870)	0.850*** (0.140)	0.416*** (0.0180)	0.423*** (0.0531)	0.416*** (0.0771)
GDP private				0.0433 (0.0355)	-0.00490 (0.0424)	-0.0652 (0.0469)	-0.0166 (0.0240)	0.0185 (0.183)	-0.0166 (0.0220)
NBI					-0.102 (0.0955)	-0.0961* (0.0580)	-0.1000*** (0.0287)	-0.0866 (0.105)	-0.1000* (0.0521)
Pop. Dep.					-0.147 (0.169)	-0.125 (0.224)	-0.0541 (0.0953)	-0.159 (0.615)	-0.0541 (0.0821)
Total Expenditure (t-1)						0.596*** (0.0384)	0.556*** (0.0978)	0.596*** (0.0461)	
Transfers (t-1)						-0.174*** (0.0371)	-0.170*** (0.0536)	-0.174*** (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 brevity. 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. Effects of transfers on the structure of own revenues and expenditures

We then extend baseline results by asking whether the effects of transfers on provincial own-revenues and expenditures also affect their composition. Thus, we use the composition of both fiscal variables as a dependent variable. For brevity and endogeneity concerns we present the estimation using the IV strategy, but the results are valid even estimating by OLS.

Column 1 of Table 4 show that transfers tend to reduce the share of own revenues collected through more distortionary taxation (i.e., the turnover tax plus the stamp tax) over total own revenues (i.e., total taxation plus 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. In Column 2 we use the ratio between the turnover tax plus the stamp tax over the property tax plus the vehicle tax and royalties. In Column 3

we use the ratio between the turnover tax over the property tax. Based on these results we support that transfers tilt the provincial own revenues structure towards less distortionary taxation.

Similarly, Columns 4 and 5 show that transfers tend to increase the share of capital expenditures over total expenditures or over current expenditure. An additional 1 percent of transfers increases the first (second) ratio by 0.64 (0.86) percent. 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.

	Own revenues			Expenditure	
	More Distortionary/Total Own Revenues	More Distortionary/Less Distortionary	More Distortionary (turnover)/Less Distortionary(property)	Capital to Total Exp.	Capital to Current Exp.
	(1)	(2)	(3)	(4)	(5)
Transfers	-0.637*** (0.178)	-0.827* (0.455)	-1.125** (0.568)	0.645*** (0.179)	0.864*** (0.237)
GDP private	0.0603 (0.0963)	-0.350 (0.326)	0.0364 (0.314)	0.131 (0.135)	0.157 (0.173)
NBI	0.00897 (0.0998)	0.116 (0.193)	-0.320 (0.751)	0.494** (0.200)	0.649** (0.253)
Pop. Dep.	-0.267 (0.366)	0.407 (0.730)	-1.113 (1.550)	-0.416 (0.449)	-0.316 (0.569)
Observations	1,105	1,104	1,097	1,128	1,128
Fixed Effect	Yes	Yes	Yes	Yes	Yes
Time Trends	Yes	Yes	Yes	Yes	Yes
Sample	1959-2019	1959-2019	1959-2019	1959-2019	1959-2019
Controls	Yes	Yes	Yes	Yes	Yes
Method	IV	IV	IV	IV	IV
Underidentificatio	14	13.98	13.80	13.85	13.85
Chi-sq p-value	0.000	0.000	0.001	0	0
Weak Instrument ^a	35.59	33.89	33.32	34.70	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 brevity. 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.

5.4. The role of heterogeneity in the Argentine provinces

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 the impact is intensifying as lower-income provinces are taken into account. In high-income provinces, this effect is -0.46 with a standard error of 0.69. In the case of the provinces of Patagonia, a 1 percent increase in transfers increased own income by 0.38 percent, with a standard error of 0.23. Then, in the middle- (low-) income the effect is 0.98 (1.00), with a standard error of 0.56 (0.22).

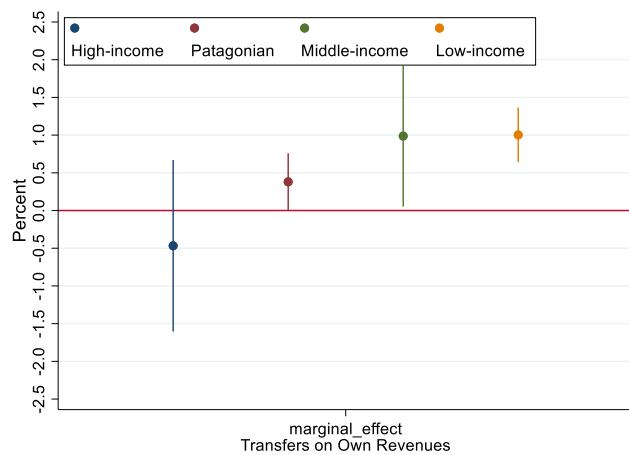
Panel B shows the effect of transfers on the level of expenditure by province. In the aggregate (as shown in Table 3) a 1 percent increase in transfers increased expenditures by 0.85 percent. However, this effect is differential by province and, again, the impact is intensifying as lower-income provinces are taken into account. In high-income provinces, this effect is 0.35 with a standard error of 0.30. For the Patagonian provinces, a 1 percent increase in transfers resulted in a rise in spending of 0.62 percent, with a standard error of 0.09. Then, in the middle- (low-) income the effect is 1.26 (1.08) with and standard error of 0.24 (0.09).

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 more distortionary taxes in provincial revenues by 0.63 percent. However, this effect is differential by province and is non-linear in the level of income. In high-income provinces, this effect is -0.21 with a standard error of 0.20. In the Patagonian provinces a 1 percent increase in transfers reduces the relative participation of more distortionary taxation by 0.82 percent, with a standard error of 0.33. Then, in the middle- (low-) income the effect is -0.95 (-0.39) with and standard error of 0.40 (0.11). Note that the option of reducing more distortionary taxation does not seem to be an option for provinces with a higher level of economic development.

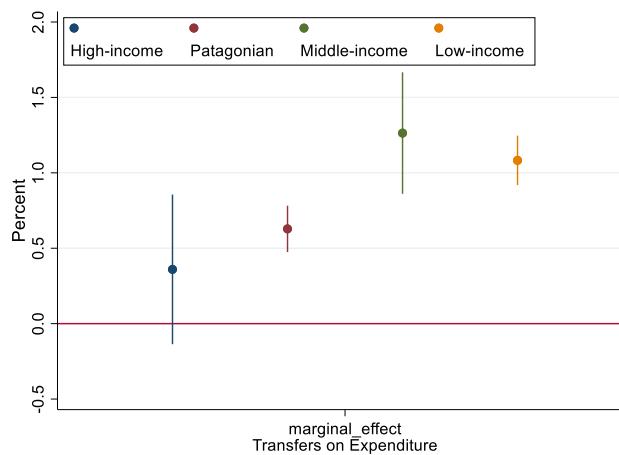
Finally, Panel D shows the effect of transfers on the composition of expenditure by province. In the aggregate (as shown in Table 4, Column 4) an additional 1 percent of transfers increases the share of capital expenditure by 0.64 percent. However, this effect is differential by province and, for provinces other than those in Patagonia, it is not fulfilled. For example, in Patagonian provinces a 1 percent increase in transfers increases the relative participation of capital expenditure by 0.82 percent, with a standard error of 0.20. In high-income provinces, this effect is -0.31 with a standard error of 0.66. Then, in the middle- (low-) income the effect is 0.24 (0.44) 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

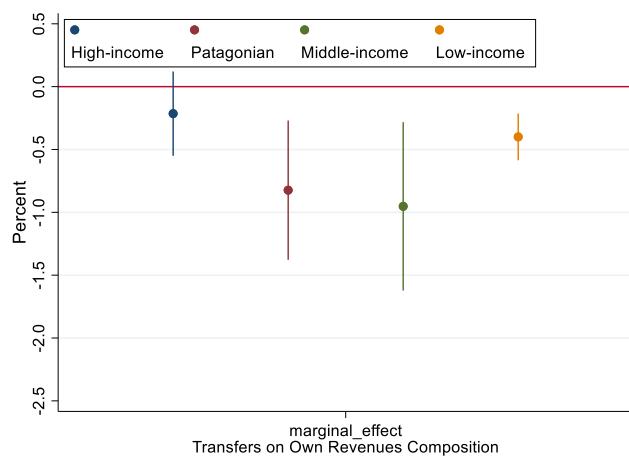
Panel A. Effects on the level of Own Revenues



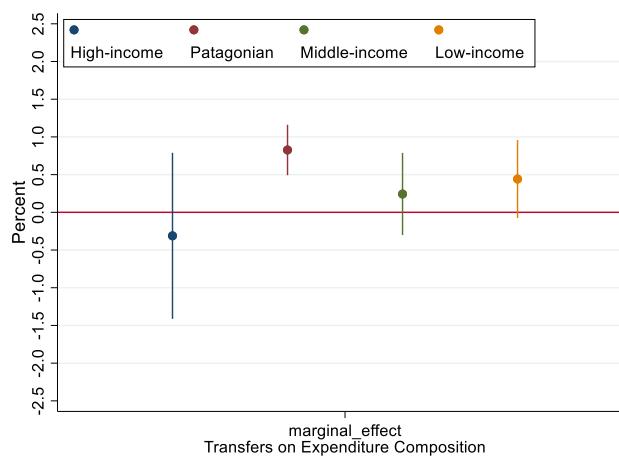
Panel B. Effects on the level of Expenditures



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 more distortionary taxation (i.e., the turnover tax and the stamp tax) over total own revenues. Also, transfers tend to increase the share of capital expenditures over total expenditures. These findings are heterogeneous on the provincial level of development and are robust to a battery of different estimation methods.

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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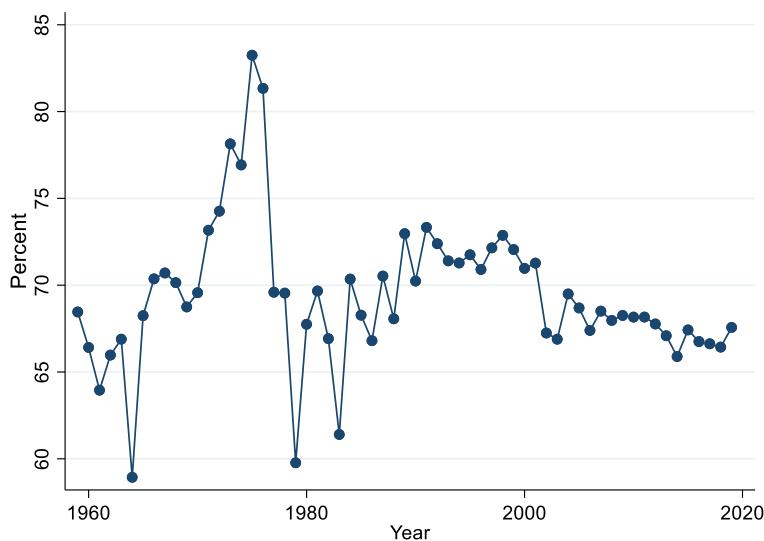
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Appendix 1. Additional Figures

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. Data Sources

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 Ministry of Economy of the Argentine Republic was used. The geographic gross product (GGP) comes from Porto (2004) for the period 1959-2000. For the period 2001-2019, data from the Ministry of Industry and the Ministry of Economy was used.

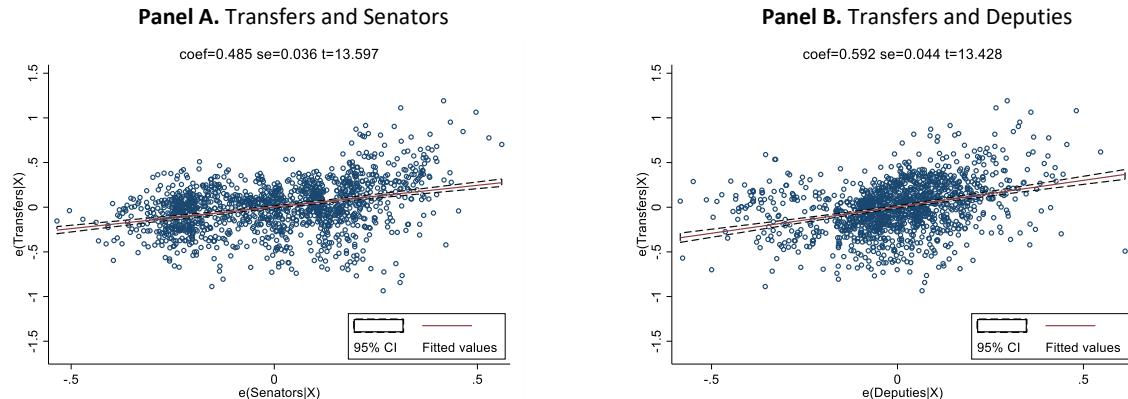
The provincial population comes from Porto (2004) for the period 1959-2000 and from the National Institute of Statistics and Census (INDEC) for the period 2001-2019. The NBI and population dependency data come from INDEC for the period 1959-2019. The data for implementing the IV strategy, referring to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

Appendix 3. 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.¹⁷ 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.

¹⁷ See Vegh and Vuletin (2015) for a detailed discussion about departs from proportionality in the representation of Argentinean provinces in National Congress since 1853.

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.



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.