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ABSTRACT

This paper offers a comprehensive and updated review of the effects of intergovernmental grants. We focus on the main findings in the existing literature on the effects of intergovernmental grants on tax policy and choices, expenditure decisions, fiscal stability and behavioral choices, and political economy. The intricate nature of the subject, innately, does not allow for an all-inclusive survey, but we aim to provide a thorough examination and update of the most salient effects of intergovernmental grants, while indicating areas for further research.

KEYWORDS: Intergovernmental transfers, effects, fiscal decentralization

JEL CODES: H71, H72, H77

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1. Introduction

Intergovernmental grants are a key financial instrument for funding subnational governments, at both the local and intermediate or regional levels, serving different objectives.[1] Among others, they fill the vertical fiscal gap left between diverging tax and expenditure decentralization, reduce horizontal imbalances when tax capacity and expenditure needs are significantly different across jurisdictions, boost subnational government spending in priority areas for the whole country, and address inter-jurisdictional externalities.

Over the past several decades, a large body of literature has contributed to our understanding of whether and to what extent the targets of different transfers are met, and how complex the responses of subnational governments can be, largely depending on how grants are designed. Literature surveys on this topic include Gramlich (1977), Hines and Thaler (1995), Bailey and Connolly (1998), Oates (1998), Gamkhar and Shah (2007) and Inman (2008).

Our paper provides an update of this literature by offering a comprehensive review of what is known to date on the main effects, both pursued and unintended, of intergovernmental grants. We go beyond the intended effects of grants in vertical and horizontal imbalances or specific policy objectives, to also focus on how intergovernmental grants can alter subnational budget constraints, incentive systems and the institutional settings framing intergovernmental relations. The policy implications of our review are significant because subnational government responses and the consequences on the efficiency and equity of fiscally decentralized systems are often far reaching. With this information, policy makers can become much more aware of what the potential indirect effects of grant design may be and therefore try to avoid shortcomings and unplanned troubles.

The rest of the paper is organized as follows. In section 2, we introduce a nomenclature for the different main types of grants analyzed, providing a common vocabulary to the often-diverse terminology employed in the empirical works surveyed in the rest of the paper. In Section 3, we critically review findings on the main different impacts of intergovernmental grants on tax policy choices, including the impacts on tax

[1] The terms 'transfers' and 'grants' are used interchangeably in the paper. Generally, we use the terms intergovernmental transfers or grants for funds payable to any level of government by other levels of government.

effort and tax competition, or the presence of possible asymmetric effects. The focus of section 4 is on the impact of grants on expenditure decisions by subnational governments, with especial emphasis on the phenomenon of the "fly-paper effect". In Section 5, we analyze the effects on fiscal stability and fiscal policy. In Section 6, we analyze the impact of intergovernmental grants on political institutions, including accountability and subnational autonomy. Section 7 concludes. At the end of every section, a table which summarizes the main findings of the specific literature is referenced. Papers are selected according to its perceived relevance from both a subjective criterion and its impact measured by Google Scholar. They are ordered in tables following a chronological structure. The information displayed includes the definition of the main outcome variables and type of grants analyzed, the data sample and the empirical strategy and a brief review of the results.

2. The taxonomy of grants in theory and practice

2.1 Classification

Intergovernmental grants can be classified according to their purpose and to how funds are allocated. Regarding the first dimension, the literature has mainly divided intergovernmental grants into conditional (also called earmarked, categorical, or specific-purpose grants) and unconditional grants (also called general-purpose grants).[2] Conditional grants restrict the receiving government to specific forms of spending. In contrast, unconditional grants have no restriction on what the funds can be spent on.

Both conditional and (much less frequently) unconditional grants may be themselves categorized in matching and non-matching grants, depending on the requirement that subnational governments contribute or not a share of the funds. Conditional grants may also be differentiated by the timing of the conditionality: ex ante, the most common practice, or ex post, as in the case of performance-based transfers.[3] The

[2] See, among many others, Oates (1972); Bahl, Boex and Martínez-Vázquez (2001); Bird and Smart (2009), and Boadway and Shah (2009).

[3] Among the ex-ante conditional grants, a further distinction is made between specific or categorical grants and block grants. In the case of the former, the conditionality is detailed and obligates subnational governments to spend funds into narrow areas with little choice. In contrast, block grants just target specific areas of spending but provide considerably more discretion on how the funds are spent by subnational governments. The clear greater autonomy provided by block grants has been often used to proclaim their superiority over specific grants, but in fact these latter may be more effective instruments in achieving certain types of national objectives; they are also less prone to intergovernmental controversy. For further

difference is that the latter links the performance of subnational governments to the access and/or the amount of funding, thus improving the chances of more effective service delivery (Martínez-Vázquez, 2020). Furthermore, grants can be differentiated according to whether their allocation is formula-based (based on pre-defined criteria) or discretionary (allocated on an ad-hoc manner).[4]

2.2 The Practice of Granting: Is there a best type of grant?

Although each country has its own history regarding the evolving structure of the intergovernmental grant system, more mature and evolved decentralized systems tend to rely more on unconditional than on conditional grants; and when the latter are used, they are more likely to be block grants than specific earmarked grants.[5]

Intergovernmental grants may be designed in the pursuit of multiple objectives at the same time. This may be the most common design problem across countries. Lack of transparency, confusion on the outcomes being achieved, and even inefficiencies may easily arise in that context. A clear statement of the objective and how to evaluate its achievement are preconditions to good transfer design.

Even though it has been extensively analyzed, it has been hard to reach a consensus on what the optimal design of intergovernmental grants system should be.[6] Boadway (2006) exposes two possible reasons. First, redistributive objectives necessarily entail subjective perceptions and judgments, over which even fully rational agents can disagree. And second, it is difficult to understand or fully predict the behavior of the subnational governments themselves. Overall, there is a tradeoff between unconditional general-purpose grants and conditional earmarked grants. Unconditional grants may be preferred because by allowing subnational officials decide how best to use the funds, they strengthen the fiscal autonomy of subnational governments and the overall decentralization system. On the other hand, conditional or earmarked grants can be more

information on taxonomies of grants, see Bahl, Boex and Martínez-Vázquez (2001), Bergvall et al. (2006), Boadway and Shah (2007), Searle and Martínez-Vázquez (2007), and Spahn (2012).

[4] On an additional dimension, matching grants can be open-ended, if there is no limit to the amount of funding that can be received, or close-ended, if the amount of funds available is capped at some level.

[5] See for example Blöchliger and Rabesona (2009) and Lotz (2009) for additional information on the composition of intergovernmental grants in the OECD member countries.

[6] Using one of the most salient examples, in the case of equalization grants, no general agreement has been reached in both the theoretical and empirical fiscal equalization literatures on the optimal design features of a universal fiscal equalization scheme (e.g., Johansson, 2003; Kalb, 2010; Albouy, 2012, or Simon-Cosano et al., 2013) This lack of consensus emerges also in numerous comparative studies (e.g., Dabla-Norris, 2006 for transition countries; Peteri, 2006 for Southeast European countries; Shah, 2007 for industrialized countries; or Blöchliger, et al., 2007 for OECD countries).

effective in channeling resources to national priority areas. Among conditional grants, block grants can be seen as ensuring the use of funds in a specific area but still respect subnational officials' autonomy to decide how best utilize those resources (within that area).

Simply put, there is an array of worthwhile objectives that grants help support and the art of transfer design is to reach a balance between them. Beyond the reduction of vertical and horizontal imbalances, typically pursued by using unconditional grants, choosing between a conditional or an unconditional transfer scheme is likely to be the main decision central governments faced in developing most other grants; generally, some sort of conditionality is called forth when subnational governments are wanted to perform some work or service so that the objective of the transfer can be achieved (Searle and Martinez-Vazquez 2007).

Summing up, there is no such a thing as the "best grant", nor general statements such as "block grants are superior instruments to specific grants" can be defended. All types of grants can be the optimal instrument of choice depending on the situation and context.

3. Effects on Tax Policy and Choices

We start by considering the effects which directly or indirectly affect the behavior and decision making of subnational governments regarding their tax policy decisions. Our focus is on three vectors: the effects on tax effort and the generation of both crowding-out and crowding-in effects, the effect on tax competition, and the asymmetric effects depending on the sign of changes in grants.

3.1. Tax Effort and Crowding-out effects

The impact of grants on the tax effort exerted by subnational governments within the confines of their revenue assignments has been a focus of the literature.[7] Many scholars have argued that grants induce a crowding-out effect because of the negative incentives generated for subnational governments to raise their own revenues. The basic

[7] While the operational definition of tax effort has evolved over time, the concepts of fiscal capacity and tax effort have experienced less variation and controversy over time from a theoretical perspective, t. See Bird and Slack (1990), Dahlby and Wilson (1994), or Cyan, Martínez-Vázquez and Vulovic (2014) among others.

mechanism for this crowding-out effect is based on political economy arguments. Subnational government officials find it so much easier to depend on transfers than on asking their voters to pay more taxes, while their central governments may oblige them because that transfer dependence gives them a sense of power and control.[8]

However, the overall empirical evidence is somewhat mixed. Empirical work focused on high-income countries includes Shah (1994); Rajaraman and Vasishtha (2000); Zhuravskaya (2000); Bird and Smart (2002); Knight (2002); Schroeder and Smoke (2003); Buettner and Wildasin (2006); Boadway and Shah (2007); Liu and Zhao (2011); Shah (2013) or Mohanty et al. (2019). Empirical studies for developing countries generally suggest a negative impact of central government grants on subnational revenue generation (see Bird, 1994, Ahmad, 1997; Bird and Vaillancourt, 1999; Correa and Steiner, 1999; Jha et al., 1999; Bird et al., 2006; Canavire-Bacarreza and Zúñiga, 2010; Bravo, 2011; Canavire-Bacarreza et al., 2012; Mogues and Benin, 2012; Bird and Slack, 2014; Bhatt and Scaramozzino, 2015; Garg et al., 2017; Lewis and Smoke, 2017 and Miri, 2019).[9]

The crowding-out effect of grants is also often boosted by the perverse incentives set by the grant design, since subnational governments may receive lower amounts when they increase their own revenue generation effort. To avoid this, formulas for computing the allocation amounts must be based on revenue potential or fiscal capacity instead of collected revenues. In fact, there is empirical evidence that subnational tax effort may increase when the tax capacity of subnational governments is based on potential tax revenues instead of actual revenues. This crowding-in effect has been empirically documented by many authors: Skidmore (1999) for the US; Litschig and Morrison (2013) for Brazil; Zhang (2013) for China; Caldeira and Rota-Graziosi (2014) for Benin; Brun and El Khdari (2016) for Morocco; Miyazaki (2016) for Japan; Lewis and Smoke (2017) for Indonesia; and Masaki (2018) for Tanzania.

[Insert Table 1 near here]

[8] The nature of grants can also contribute to the level of crowding out. For example, block general grants are more subject to negotiation and bargaining between government tiers than specific grants or formula driven equalization grants.

[9] See also Bahl and Bird (2018) for an extensive discussion on subnational government revenue generation issues in developing countries.

3.2. Tax Competition

Tax competition involves strategic interactive relationships between subnational governments to attract or retain mobile tax bases. Tax competition is expected to vary across countries and over time, depending on fiscal and institutional frameworks (Blöchliger and Pinero-Campos, 2011). Theoretical studies have thus examined the effects of equalization transfers on mitigating tax competition and equilibrium efficiency (e.g., Koethenbuerger, 2002; Bucovetsky and Smart 2006; Hindriks et al., 2008). Besides, this idea that tax-base equalization grants weaken tax competition among subcentral governments has been also empirically studied extensively in the context of federal countries with subnational taxing autonomy. Empirical evidence supporting this conclusion is provided by Boadway and Hayashi (2001); Esteller-Moré and Solé-Ollé (2002); Smart (2007) and Ferede (2017).

All previous studies are based on Canada's equalization system for provincial governments, which is built exclusively on disparities in fiscal capacity. However, when equalization systems take into account not only tax but also expenditure needs, results tend to be somewhat different.

In particular, Dahlby and Warren (2003) for Australia only weakly support the hypothesis that tax-base equalization leads to a reduction on tax competition rates at the state level. Similarly, Buettner (2006); Egger et al. (2009); Baskaran (2014); Rauch and Hummel (2015); Buettner and Krause (2020) and Holm-Hadulla (2020); for German municipalities and Widmer and Zweifel (2012) for Switzerland, all found smaller but positive effects on tax-raising efforts in comparison to the empirical results for Canada.

[Insert Table 2 near here]

3.3. Asymmetries in effects

The idea of asymmetric responses to increases and cuts in grants was first introduced by Gramlich (1987). Cuts in transfers may be partly compensated by subnational governments willing to preserve current expenditure levels by raising additional taxes. Thus, program cuts following grant decreases could be much smaller than program expansions following increases in grants. This is what Gramlich (1987) named as the "fiscal replacement" effect. In contrast, the typical response of subnational

governments to increases in transfers is to expand expenditures instead of cutting taxes. This latter behavior, known as the "fly paper effect," is discussed immediately below in the paper. But a fuller explanation of those responses requires making use of fiscal illusion and institutional bias to understand why subnational government responses may not be symmetrical in terms of taxation and expenditure decisions. [10]

A significant body of research by Stine (1994); Volden (1999); Heyndels (2001); Levaggi and Zanola (2003); Deller and Maher (2006); Lago-Peñas (2008); Cárdenas and Sharma (2011); Mehiriz and Marceau (2014); Samal (2020) and Rios et al. (2021) has found that the marginal propensity to spend when grants are rising is higher than the propensity to cut expenditures when grants are falling.[11] Regarding the nature of grants, the empirical evidence suggests that the likelihood of observing a fiscal replacement form of asymmetry is lower in the case of block grants (Volden, 1999; Gamkhar, 2000). In addition, Stine (1994); Goodspeed (1998); Heyndels (2001); Deller and Maher (2006) and Lago-Peñas (2008) all found that unconditional grants may generate fiscal replacement, while Gamkhar and Oates (1996) and Gennari and Messina (2014) found no robust evidence of fiscal replacement asymmetric effects.

Institutional and political factors may also be relevant in explaining asymmetric effects. In this regard, Lago-Peñas (2008) found that municipalities with lower levels of debt and leftist-leaning administrations are more likely to maintain expenditure levels when facing grant cuts, while Bækgaard and Kjaergaard (2015) found that left-wing political administrations will raise spending when grants increase and raise taxes when grants are cut. In addition, Rios et al. (2021) found that those municipalities where incumbent authorities either make weaker enforcement efforts in tax collection or have lower margins of maneuver for budget allocations are more responsive to additional grants.

It also appears that the econometric methods utilized could also be an important issue to consider to properly understand the asymmetry of response. Specifically, the inclusion or not of time fixed effects, the use or not of first differences, or whether including different lengths of lags for the explanatory variables have been found to

[10] Stine (1994) suggests that the existence of fiscal illusion provides an explanation of why there is a larger increase in own-source revenue to offset the loss of the grant than would be expected if the response was symmetric.

[11] Gamkhar and Oates (1996), using US aggregate time-series data on state and local expenditures, found no asymmetries in response to cuts and rises. These results are confirmed by Gennaro and Messina (2014) for Italian municipalities.

provide divergent results (Goodspeed, 1998; Gamkhar, 2000). In addition, Levaggi and Zanola (2003) found problems of heteroskedasticity and serial autocorrelation, while Gamkhar and Oates (1996) and Knight (2002) remark the necessity of properly addressing the potential problem of endogeneity of grants. One last econometric issue in the early literature has been the difficulty with isolating the impact of program structure and financing institutions from the effects of variations in the levels of grant funding.

[Insert Table 3 near here]

4. Effects on expenditure

4.1. Fly-paper effect

The phenomenon of the "fly-paper effect" first introduced by the end of the 1960s (Henderson, 1968; Gramlich, 1969) holds that "money sticks where it hits". Funds from intergovernmental transfers tend to be used by subnational governments for public spending rather than for tax relief. This translates into intergovernmental nonmatching grants having a much larger stimulating effect on subnational government spending than an equivalent change in private income. The existence of this effect is largely documented in the literature across countries (see Bradford and Oates 1971b; Hines and Thaler 1995; Bailey and Connolly 1998; Oates 1998; Gamkhar and Shah 2007).

Challenging the academic consensus, more recently it has been argued that this result could be mostly explained by an endogeneity problem present in the estimations. Using proper exogenous instruments to correct for the endogenous determination of grant allocation, this argument continues, makes the fly-paper effect fade. This may be why some early studies, have found a minimal or no fly-paper effect at all, or reported that its effect is not persistent over time (Dollery and Worthington, 1999 for Australia; Knight, 2002 [12] or Gordon, 2004 [13] for the US). Nonetheless, these studies have analyzed very specific grant programs within the Australia and the US contexts, so their external validity

[12] Knight (2002), after controlling for endogeneity of grant amounts federal highway funding to states, suggested that some observed flypaper effects may just be statistical artifacts.
[13] Specifically, Gordon (2004) studied the effects of the Title I program in the U.S, a program that transfer nonmatching resources to school districts targeting their number of poor children. She employed a discrete change in the census-based index of poverty to estimate state-level effects to correct for endogeneity.

and robustness have been questioned, as have been also questioned the exogeneity of the instruments utilized.

However, several more recent studies have supported the idea of a still minimal presence of the fly-paper effect after correcting for endogeneity. For instance, Lutz (2010)[14] finds that one dollar of additional transfers on education spending results in an increase of less than 0.2 dollars, while Litschig and Morrison (2013) demonstrated that transfers increased local government spending per capita by about 20 percent over a 4-year period. [15] More significantly, there are more numerous papers that still have found a sizeable fly-paper effect after correcting for the endogenous allocation of grants. For example, Card and Payne (2002) report evidence of a strong fly paper effect after studying the effects of school finance reforms between 1977 and 1992 on U.S. states spending [16]; Cascio et al. (2013) showed an expansion in school spending of 50 cents per dollar in the average Southern school district in the U.S. [17] Dahlberg et al. (2008), Liu and Ma (2015) and Lundqvist (2015) found an increase on subnational spending in response to grant increases in Sweden, China, and Finland, respectively, near to 1 to 1.[18] In addition, more recent studies such as Gennari and Messina (2014), Allers and Vermeulen (2016); Leduc and Wilson (2017) or Langer and Korzhenevych (2019) kept finding consistent empirical evidence in favor of the presence a sizeable strong fly-paper effect.

Regarding the causes of the fly-paper effect, Hines and Thaler (1995) have argued that the fly-paper effect is simply an empirical anomaly. In contrast, other studies have suggested that this phenomenon stems from the presence of fiscal illusion within subnational government operations, or that citizens tend to misjudge and erroneously estimate the costs and benefits of their subnational government. This notion is explored in both theoretical papers (among others, Courant et al. 1979; Mueller 1989; Baekgaard

[14] He studies the effect of statewide school finance reform in New Hampshire, using reform grants per pupil as an instrument of the allocation of transfers.
[15] They estimate the impact of intergovernmental transfers, under the unconditional program "Fundo de Participação dos Municípios (FPM)" in Brazil, using RDD models based on multiple population cutoffs to address endogeneity.
[16] These authors employed state Supreme Court decisions as instrumental variables for state educational grants-in-aid. They report that a one-dollar-increase in state aid raised district education spending by 50 to 65 cents.
[17] Cascio et al. (2013) also studied the implications of the Title 1 program, focusing on the Southern states in the US, but employing the per-pupil current expenditure using 1960 child poverty rate as an instrument of the federal revenue.
[18] Dahlberg et al (2008) used the formula for the distribution of funds in Sweden to address endogeneity, while Liu and Ma (2015) exploit a discontinuity from the central Chinese government's designation of National Poor Counties; and Lundqvist (2015) employed a quasi-experimental research design for finish municipalities.

et al., 2016; Dell´Anno and Martinez-Vazquez 2019), and empirical work, (Heyndels and Smolders 1994; Becker 1996; Gemmell et al. 2002; Cárdenas and Sharma 2011; or Ferreira et al.2019).[19] However, in turn, many of these latter studies may suffer from the presence of endogeneity, this time in the measurement of fiscal illusion.[20]

Other authors have offered alternative causal interpretations involving the impact of politics, such as citizens´ inability to establish "political contracts" with their elected officials (Inman, 2008), or the dynamic interactions between politicians and interest groups that can influence the allocation of public funds (Mueller, 2003; Singhal, 2008 or Leduc and Wilson, 2017).

An additional interesting twist in some recent literature on the subject has been to see the fly paper effect not as an anomaly or distortion but rather as a rational response in situations where subnational governments use distortionary taxes to finance at least part of their expenditures. This strand of the literature, which builds upon Hamilton (1986), focuses on the idea that transfers are more stimulative of public spending than increases in private income because grants generally can lead to a greater reduction in the marginal cost of public funds (MCPF). Henceforth, the fly paper effect arises as the result of maximizing welfare behavior by public governments in situations of costly tax collection, which increase with tax rates (Dahlby, 2011; Aragon, 2013; Vegh and Vuletin, 2015; Mattos et al., 2018; and Ferreira et al., 2020).[21] Here the important obstacle has been how to measure the MCPF accurately.[22]

One last strand of the empirical literature suggests that the fly-paper effect may be due to the presence of strategic interactions and spatial local interdependence on subnational governments' spending behavior, which are captured using spatial analysis

[19] The fiscal illusion model, perhaps the most accepted for explaining the fly-paper effect, essentially assumes that the median voter is only capable of observing the average cost of public expenditures, leading to an underestimation of the real marginal costs and thus to a choice to overspend.

[20] Intergovernmental grants are likely to be endogenously determined by political and socioeconomic factors that may distort subnational behavior and grants allocation and also by fiscal competition and asymmetric information issues (Khemani, 2007 or Boex and Martínez-Vázquez, 2005). More recent contributions, including Knight (2002) and Ichimura and Todd (2007), have used a variety of techniques, including Instrumental Variable (IV) estimators to address the potential endogeneity of fiscal illusion.

[21]Note that Sepúlveda (2017) has argued that the fly-paper effect does not require the MCPF to be increasing in the tax rate, but only to be greater than one and non-decreasing in the tax rate.

[22] MCPF estimates vary greatly across countries and time. Some of those differences may be due to the different methodologies employed (e.g., Bastida and Fullerton, 1992; Dahlby, 2008; Auriol and Warlters, 2012). Another layer of complexity and source of variation has been the different instrumental variable used to address the issue of endogeneity. For example, Buettner and Fabritz (2014) used differences in subnational employment as an instrument; Dahlby and Ferede (2015) employed the weighted average personal income tax of other provinces; and Ferede and Islam (2015) and Langer and Korzhenevych (2019) employed the allocation formula for the equalization grant and the exogenous shocks from adjustments of the weighting function used to regulate expenditure needs, respectively.

on cross-sectional data, controlling for both spatial and time fixed effects (Acosta, 2010; Bastida et al., 2013; Kakamua et al., 2014 and Yu et al., 2016).[23]

To the extent that the government budget constraint relates grants with taxes, deficit and expenditure, changes in the former may also generate crowding-in and crowding-out effects on the spending side. The idea was originally introduced by Scott (1952) and Bradford and Oates, (1971a, 1971b). While intergovernmental grants may involve a lower increase in expenditure because of reductions in taxes and fees, they may also generate a crowding-in effect, increasing total expenditure above the amount of the grant (see Gramlich, 1977 and Hines and Thaler, 1995). For example, Lago-Peñas (2006) found an increase in investment of around 90 percent of the capital grants received by Spanish regions, with the remaining 10 percent going to reduce the deficit, thus involving a partial and small crowding out.

A fair conclusion, therefore, is that our knowledge about the effects of grants on the spending behavior of subnational governments is rich and extensive, but far from complete. Going forward it will be useful to have a wider diversity of country studies; until now most of the empirical work on the flypaper effect has been focused on high-income countries, where government institutions and officials probably follow different patterns of behavior than those in low and middle-income countries.

[Insert Table 4 near here]

4.2 Effects on government size

Grants can also affect the size of government. The general relationship between fiscal decentralization and the size of government was introduced by Brennan and Buchanan (1980). Empirical research consistently has shown that the size of subnational governments increases when decentralization is predominantly funded with intergovernmental grants, while size decreases when subnational governments are funded with own tax revenues (see Grossman, 1989; Grossman and West, 1994; Shadbegian, 1999; Stein, 1999; Jin and Zou, 2002; Rodden, 2003; Prohl and Schneider, 2009; Cassette and Paty, 2010; Ashworth et al., 2013; Liberati and Sachi, 2013 or Makreshanska and

[23] An extension of this strand of literature is performed by Rios et al. (2021) who employed a spatial panel data framework to account for unobserved spatial and temporal variability.

Petrevski, 2019). [24] This positive impact on subnational government size tends to hold also when fiscal decentralization is funded through revenues sharing or centrally regulated sub-national taxation, instruments that are more akin to grants (Makreshanska and Petrevski, 2019).

[Insert Table 5 near here]

5. Fiscal stability and behavioral effects

5.1 The cyclicality effects of grants on subnational fiscal choices

Depending on their timing and design, intergovernmental grants can either dampen or amplify the typical pro-cyclicality of subnational government spending. If transfers are designed as an insurance mechanism over the business cycle, they will have a dampening impact (Xing and Fuest, 2018). However, if transfers expand when the economy is growing or decrease when the economy is contracting, they will exacerbate the business cycle.

Earlier empirical studies have found mixed evidence. For example, Sorensen et al. (2001) found a pro-cyclical behavior in the U.S. for federal grants to the states over the nationwide business cycles, while federal grants were counter-cyclical with respect to state-specific business cycles. Similarly, Arena and Revilla (2009) found that intergovernmental grants in Brazil are also counter-cyclical with respect to state-specific shocks. In contrast, other studies for the U.S. and OECD countries suggest that intergovernmental grants are often pro-cyclical with respect to subnational output shocks, contributing to aggravate the typical pro-cyclicality of subnational government spending (Seitz, 2000; Boadway and Hayashi, 2004; Abbott and Jones, 2012, 2013; Blöchliger and Égert, 2013; Caldera-Sanchez, 2013). Two other multi-country studies suggest the predominance of pro-cyclical behavior; Rodden and Wibbels (2010)[25], find that discretionary transfers are either at best a-cyclical or pro-cyclical in seven of the largest OECD federations, while Blöchliger and Petzold (2009) found that at least half of the transfers systems of all OECD countries tend to be pro-cyclical.

[24] Makreshanska and Petrevski (2019) only found weak support for this positive relationship.
[25] The list of OECD countries analyzed by Rodden and Wibbels (2010) included Argentina, Brazil, Canada, Germany, India, Spain, and the United States. Interestingly, they found a clearly not pro-cyclical behavior in the case of Australia, although it was the country with the fewest data points.

[Insert Table 6 near here]

5.2 Perverse incentives to subnational fiscal choices

Risk sharing arrangements between central and subnational authorities, instrumentalized through the use of grants may, depending on their design, encourage subnational governments to follow a risk avoidance behavior with fiscal discipline or lead to excessive spending through the tragedy of the fiscal commons (Sanguinetti and Tommasi, 2004).

A common perverse effect of equalization grants when their formula design incorporates the actual collections rather than the revenue capacity of subnational governments is to discourage subnational fiscal effort (Baretti et al., 2002; Bravo, 2011; Pöschl and Weingast. 2013; Weingast, 2014). But when capacity rather than actual revenues is included in the equalization formula, equalization grants may induce subnational governments to raise taxes beyond what is desirable from a national point of view; this can happen when, for example, equalization grants compensate jurisdictions for the adverse effect of reduced tax bases caused by increased subnational tax rates (Persson and Tabellini, 1996; Smart, 1998, 2007; Esteller-Moré et al., 2015).

Intergovernmental grants might lead to several other types of perverse incentives. Matching grants offer benefits such as inducing subnational ownership of projects and spending additionality, but by reducing the marginal cost of spending they may incentivize inefficient spending (Toolsema and Allers 2014). In this regard, Wiesner (2003) reports how transfers to subnational governments in Bolivia and Ecuador have been employed for patronage rather than for the provision of local public goods. In other empirical studies, such as De Borger and Kerstens (1996), Loikkanen and Susiluoto (2005), Balaguer-Coll et al. (2007), Kalb (2010) or Doumpos and Cohen (2014) find, by using different parametric and non-parametric estimation techniques on different European countries, that intergovernmental grants stimulate technical or cost inefficiency. However, Geys and Moesen (2009) find a positive impact of grants on cost efficiency for a sample of Flemish municipalities, while Worthington (2000) argues that there is no significant relationship between transfers and technical efficiency in Australian local governments. [26]

[26] Geys and Moesen (2009) argue that their results might be driven by the strict supervision on expenditures that grants from higher levels of governments in Flanders are subject to.

Finally, in a recent theoretical analysis, Kotsogiannis and Schwager (2006) show that fiscal equalization programs foster the incentives of the incumbents towards more rent extraction by reducing the intensity of political competition.

For instance, Zhuravskaya (2000) shows that the fiscal dependence of local governments on the regions has a negative effect on the efficiency of local public goods provision, while Hailemariam and Dzhumashev (2019) find that Canadian recipient provincial governments relatively allocate more shares to unproductive government services, thus reinforcing the claim by Dahlby and Warren (2003).

Transfers funds may work as "political resource curse." In this sense, Brollo et al. (2013) find that increased federal transfers to municipalities in Brazil induce political corruption and lower the quality of politicians running for office, while Litschig and Morrison (2009) find, also for Brazil, that those additional transfer funds disproportionally increase the probability of the incumbent party being reelected. Moreover, Kotsogiannis and Schwager (2006) suggest that fiscal equalization transfers might reduce the intensity of political competition, which could foster incumbents to follow a rent extraction behavior.

Besides, Chernick (2000) points out that if more responsibility for redistribution is left to subnational governments, those states with weak fiscal capacity or limited preferences for redistribution will choose "benefits and levels of access below the minimum standards of adequacy".

Summing up, despite all the efforts so far in the literature, the issue of the perverse incentives generated by intergovernmental grants in the measurement of decentralization remains an area with mixed empirical evidence validating different approaches.

5.3 Fiscal discipline

From a combination of political economy- based deviations from optimal behavior and spillover effects emerge one important concern in decentralized countries: over-borrowing or the bias of subnational governments to get into excessive debt. Within the context of the soft budget constraint hypothesis developed by Kornai (1979 and 1986), intergovernmental grants may boost subnational indebtedness and weaken overall budget discipline by weakening incentives for prudent fiscal behavior. That is, the presence of transfer dependence or vertical fiscal imbalances would tend to soften subnational budget constraints, encouraging excessive borrowing. This effect is part of the "common pool"

problem, where financing comes from taxes raised outside the jurisdiction (see von Hagen and Harden, 1995; Alesina et al., 1999; Velasco 1999, 2000; Persson and Tabellini, 2000; Cullis and Jones, 2009 or Krogstrup and Wyplosz, 2010; Baskaran, 2012; Molina-Parra and Martinez-Lopez, 2016).

Many empirical studies have shown that the common pool problem is relevant for explaining the generation of a deficit bias among OECD and non-OECD countries (Roubini and Sachs 1989; de Mello 1999 and 2000; Rodden 2002; Fabrizio and Mody 2006; Debrun et al. 2008; Foremny 2014, and Shi and Hendrick 2020). The behavior of subnational governments under a soft budget constraint has been extensively studied from a theoretical and empirical perspectives. A central theme has been that the dependence on grants and the expectation of their permanence in the future build incentives for increased subnational indebtedness and for creating the believe that higher level governments will bail out subnational governments in times of crisis (Djankov and Murrell, 2002; Pettersson-Lidbom, 2010; Baskaran 2011; Sorribas-Navarro, 2011; Braun and Trein, 2014; Dietrichson and Ellegård, 2015; Baskaran et al., 2016; Akai and Sato 2019; and Calvo and Cadaval 2021).[27] Furthermore, potential rescuers are not likely to credibly commit themselves to a no-bailout policy ex-ante (Wildasin, 1999; Goodspeed, 2002; Oates, 2005; Crivelli and Staal, 2013; Martinez-Lopez, 2022).[28] Bailout tends to be a dominant strategy because there exists a lot of public pressure to avoid cuts in public services such as health care or education provided by subnational governments.

An alternative, but generally complementary, view of this process is that central governments increase grants to those subnational governments with higher deficits and debt stocks to avoid financial stress and eventual bankruptcy. Empirical evidence supporting this hypothesis includes Garcia-Milà et al. (2002); Levaggi and Zanola (2003); Buettner and Wildasin (2006); Pettersson-Lidbom (2010); Baskaran (2012) or Sola and Palomba (2016). [29]

[Insert Table 7 near here]

[27] Note that a common issue with most of these empirical studies is the the proper identification and accounting for of future expectations.

[28] Oates (2005) work evolved the fiscal federalism's theory into the second introduced the second-generation theory. This new strand is concerned with the viability, political actions and limited power of federal institutions.

[29] See Goodspeed (2017) for a survey of the literature on soft budget constraints in fiscally decentralized contexts.

5.4 Transfers for addressing externalities across subnational government units

The presence of spillover effects or externalities represents one of the weakest points of decentralized governance (Oates 1972). Many subnational government policies and programs can have significant positive and negative spillovers beyond their jurisdictions. This can be for very visible reasons, such as upper stream jurisdictions inflicting negative externalities on downstream ones, to more subtle reasons due to the presence of spatial interactions.[30] The complication for decentralized governance is that generally, subnational governments have little incentives to internalize those spillover effects by spending more or less on specific sectors or programs, which could benefit other subnational governments. The question that concerns us is to what extent intergovernmental grants can be successful in helping subnational governments internalize those externalities.

One important difficulty is that estimating the size of those spillovers effects across jurisdictions is a hard task due to many different complications, as highlighted by Bird and Smart (2002). This means that calibrating the size of the grant that may be needed becomes more of an uncertain task. And this helps explain why the empirical literature has found mixed results on the effectiveness of using grants for addressing these inter-jurisdictional externalities. It is often argued that the best type of grant that can be used to address inter-jurisdictional externalities is a matching grant (Bezdeck and Jonathan, 1988; Bird and Slack, 1993; Oates, 1998; Figueires and Hindriks, 2002; Bergvall et al. 2006; Blöchliger and Kim, 2016).[31] This is because while both matching and non-matching grants stimulate spending by effectively increasing local ability to spend (the income effect), only matching grants provides an additional stimulus through the lower tax price (the price effect).[32]

[30] The seminal paper on spatial interactions by Case, Hines and Rosen (1993) reported a positive effect of the neighbors' expenditure levels on local per capita expenditure. Similarly, Dahlberg and Edmark (2008) found a positive effect of the welfare level in neighboring municipalities on local welfare. Other studies on the presence of spatial spillovers include Hanes (2002), Lundberg (2006), Birkelöf (2009) and Stastna (2009).

[31] Bergvall et al. (2006) suggest that earmarked matching grants are indeed efficient instruments to internalize national spillovers, but they fail to internalize regional spillovers. For instance, Ogawa (2006) argues that the optimal matching grant rate might decrease with the degree of spillover externalities.

[32] Wildasin (1999) argues that the internalization of externalities is likely affected by the size of the locality receiving the grant allocation, which may matter little for larger size budgets. That is, the larger the municipality, the smaller the relative importance of budget constraints.

However, empirical studies on the real effectiveness of matching grants or other types of grants in reducing externalities find mixed results, and there is some general skepticism that governments have been successful in this matter. For example, in the U.S. context, Inman (1988) and Grossman (1994) argue that the distribution of central grants reflects decisions taken by a universalistic central legislature, rather than being focused on correcting inefficiencies of a decentralized tax system. Therefore, transfers are likely to fail in the objective of making subnational governments internalize spillovers.

For instance, authors such as Smart and Bird (2010) express their concerns regarding the extensive use of matching grants to address spillovers. From the Pigouvian perspective, the effectiveness of this type of grants would be limited.

In short, future research, aiming to advance the empirical evidence and practice of whether matching grants or other types of grants help to the internalization of spillovers is thus needed.

[Insert Table 8 near here]

6. Political economy: effects on accountability and autonomy

One of the most common design flaws of fiscally decentralized systems is the asymmetry in their design with larger decentralization of expenditures responsibilities and much smaller decentralization of revenue sources. As it has been already mentioned, this creates vertical fiscal imbalances and grant dependence of subnational governments. The potential effect of intergovernmental grants weakening the accountability link between subnational government elected officials and citizens has become a topic of increasing interest.[33] Accountability is based on two pillars. First, individuals must know whom to assign blame or reward for policy outcomes (Bird and Smart, 2010; Lago and Lago-Peñas, 2010; Kleider, 2018; Dynes and Martin, 2019). Second, the link between tax and expenditure decisions must be clear for citizens. The fundamental issue is that grant financing tends to weaken, if not sever, the accountability link by reducing the political costs of inefficient spending for subnational officials since they do not have to tax their

[33] Although the use of transfers to finance subnational governments generally may weaken accountability, not all types of transfers have the same effects. Particularly, in situations where subnational accountability mechanisms are weak, earmarked grants may provide a partial solution by which vertical accountability to central authorities, as opposed to the preferred horizontal accountability to citizens, can work as an imperfect substitute to generate subnational government accountability to their residents.

residents, who will not hold officials accountable either. Grant financing also biases the balance made by voters between both sides of the budget, undermining the relation between government performance and re-election incentives (Smart, 1998; Rodden, 2003; Martinez, 2005; Egger et al., 2009; Litschig and Morrison, 2009; Gervasoni, 2010; Kalb, 2010; Narbón-Perpiñá and De Witte, 2018).

In addition, grant financing may generally affect the autonomy of subnational governments to make their own decisions regarding the composition and levels of expenditures, depending on the conditional versus unconditional nature of grants and their relative size (Stein, 1999; Rodden 2003, Furceri and Ribeiro, 2009; Sacchi and Salotti, 2017). From this perspective, non-earmarked or unconditional intergovernmental grants are generally interpreted to be more beneficial to autonomy, and among earmarked grants, block grants are preferred to specific grants (Blöchliger and King, 2006; Martinez-Vazquez and Searle, 2006; and Ladner et al., 2019).[34] Numerous papers have documented the relationship between increases in grant financing and losses in autonomy by subnational government, for example, Zhuravskaya (2000); Buettner and Wildasin (2006); Bodman and Hodge (2010) and Psycharis et al. (2016) for OECD countries, and for the case of developing countries, Azis et al. (2001) and Silver (2003) for Indonesia, Mogues and Benin (2012) for Ghana, and Bongo (2019) for Sudan.

[Insert Table 9 near here]

7. Concluding Remarks

Intergovernmental grants are ubiquitous across countries, as significant public policy tools. This makes it important to systematically review and update what is known and what it is not about both their intended and unintended effects. This survey on the different effects of intergovernmental grants on subnational governments had to be, by necessity, selective. Although some relevant empirical and theoretical research on this

[34] Of course, block grants with general earmarking to some areas of expenditure are still more restrictive for autonomy than general- purpose or unconditional grants. See Bergvall et al. (2006) for a detailed discussion of block and general- purpose grants.

topic may have not been included, we have strived to provide a balanced view taking stock of what is known and pointing out areas that still will require further research.

We have seen that some different results in empirical studies are related to the different methodological estimation approaches utilized, which as is logical have been evolving over time with advances in estimation techniques dealing with problems such as endogeneity. Another handicap lurking in the background is the need to improve the overall quality and quantity of subnational governments data. This is certainly a more general problem encompassing the empirical fiscal federalism literature. It is also generally the case that our understanding on the impact of transfers could be enriched by striking a better balance between cross-country analysis and single case country studies of what may be behind the heterogeneous and disparate results observed across countries.

There may also be a need to strike a better balance among the topics being researched. In comparative terms, empirical research of the fly-paper effect and the effects on the tax effort has been considerably more abundant. But that may not be the only or most policy relevant issue regarding the impact of grants. For example, we need a better understanding about the incentives or causal mechanism and the magnitudes involved for the net effect of transfers on subnational revenues generation, perverse incentives, spending efficiency and accountability, and how specific institutional contexts may affect the results.

But even after future research contributes to clarify the questions raised, we will likely need to accept that definite conclusions regarding some of the effects of intergovernmental grants will not become available. The fly-paper effect is a good example of that. We have seen that despite considerable research, its existence, size, and persistence over time is still in doubt.

In closing, considering the literature reviewed in this paper much work still remains to be done on how to design, implement and measure the effects of intergovernmental grants.

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Table 1: Selected papers on Tax Effort and Crowding-out effects

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Knight (2002)	State spending and grant receipts.	Sample: 47 US states. Period: 1983-1997. Method: Ordinary Least Square Model (OLS), Two Stages Least Square Models (2SLS) and LIML estimations. Endogeneity: Treated by two IV: preferences for public goods.	Federal Highway Trust Fund: closed-end matching grants.	Intergovernmental grants generate a crowd-out that is statistically and economically significant.
Buettner and Wildasin (2006)	Expenditures, intergovernmental transfers, debt service, and revenues.	Sample: 1270 U.S. municipalities subnational government authorities in Tasmania (Australia). Period: 1973-1997. Method: Panel; Vector error-correction model with an intertemporal budget constraint. Endogeneity: Not treated.	General grants.	An increase in external grants results in reduced subsequent subnational revenue generation.
Mogues and Benin (2012)	Districts´ own generated revenues.	Sample: 110´s district governments' public finances in Ghana. Period: 1994-2004. Method: Panel; OLS and Random Effects (RE) model. Endogeneity: Not treated.	Conditional transfers.	External transfers crowd-out subnational governments' own revenues.
Litschig and Morrison (2013)	Spending areas such as education, transportation, and housing and urban infrastructure.	Sample: 391 subnational municipalities in Brazil municipalities. Period: 1982-1988. Method: A regression discontinuity approach (RDD). Endogeneity: Not Treated.	Unconditional program: Fundo de Participação dos Municípios (FPM).	They found no evidence of crowding out, but rather a crowding in effect.

		Endogeneity: Treated by IV: redistributed strictly based on population, via a formula based on cutoffs.		
Masaki (2018)	Subnational own revenues removing agricultural taxes.	Sample: 1,572 subnational governments in Tanzania. Period: Quarterly data from 2010 to 2013. Method: OLS and Generalized Method of Moments (GMM) estimations. Endogeneity: Treated as IV. lagged differences of the variables and lagged levels of the equations.	General transfers, both unconditional and conditional, and earmarked development grants.	Grants facilitate subnational revenue generation, especially on rural areas, thus evidence of crowding-in effect.

Table 2: Selected papers on Tax Competition

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Boadway and Hayashi (2001)	Provincial tax rates, s including lagged tax rates of other jurisdictions as well as their own lagged tax rate	Sample: i) The federal government; ii) the provinces of Ontario and Quebec, and iii) the aggregate of the other eight Canadian provinces. Method: Seemingly unrelated regression (SUR) system by the method of iterated feasible generalized least squares (IFGLS). Endogeneity: Not treated.	Discretionary tax policies.	Negative effect on provincial tax rates, while some provinces increase their tax rates in response to increases in the tax rates of other provinces.
Smart (2007)	Ratio of tax revenue to tax base.	Sample: 10 Canadian provincial tax bases and revenues. Period: 1972-2002. Method: OLS and 2SLS estimations.	Tax-base equalization transfers.	Tax-base equalization transfers have a distorting effect on subnational tax bases.

		Endogeneity: Treated as IV: Increases in the national average tax rate as instrument of the target tax rate.		
Dahlby and Warren (2003)	State Land Taxes.	Sample: 96 Australian subnationalities. Period: 2000-2001. Method: Pooled Data (OLS). Endogeneity: Not treated.	Tax-base equalization transfers.	Tax-base equalization transfers weakly leads to a reduction on tax competition rates at the state level.
Egger et al. (2009)	Business tax policy.	Sample: 1022 municipalities Lower Saxony. Period: 1994-2004. Method: Difference-in-difference estimation (ATT and ATE). Logit and Probit estimations. Endogeneity: Not treated.	Tax-base equalization transfers.	Positive incentive effects of tax-base equalizing grants on subnational tax rates.

Table 3: Selected papers on Asymmetries in effects

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Stine (1994)	Own-source revenue response variables.	Sample: 66 Pennsylvania county government municipalities. Period: 1978-1988. Method: 2SLS estimation. Endogeneity: Predetermined variables were used as instrumental variables: i) a percentage of the population receiving cash public assistance; ii) the annual dollar changes in three separate expenditure functions	Unconditional nonmatching grant.	The local government revenue response to federal aid was found to be asymmetric.

		(highway, parks and recreation, and library); and iii) two tax base composition variables.		
Heyndels (2001)	Municipality's per capita expenditures	Sample: 308 Flemish municipalities. Period: 1989-1996. Method: Fixed Effects and Random Effects models. Endogeneity: Not treated.	Unconditional grants from the regional government.	Evidence of a fiscal replacement asymmetry.
Lago-Peñas (2008)	Total municipal expenditures	Sample: Broad sample of 264 Spanish municipalities (all of them in the same region, Galicia). Period: 1985-1995. Method: OLS and GMM models. Endogeneity: A lagged endogenous variable is included to deal with potential sluggishness in adjustments.	Wisconsin's unconditional shared revenue program.	Evidence of asymmetries in the effects of grants on total spending. This fiscal replacement form of asymmetry is explained by the incumbent's ideology and the financial capacity of getting into debt.
Gamkhar and Oates (1996)	State and subnational expenditure per capita.	Sample: 39 U.S. subnationalities. Period: 1953-1991. Method: Time-series data; OLS and 2SLS. Endogeneity: Treated as IV: several variables such as the fraction of Democrats or the square of the unemployment rate and of the population residing in metropolitan areas.	Both matching and non-matching grants.	No asymmetry in the response to federal grants.
Gamkhar (2000)	Per capita real state and subnational government high-way spending.	Sample: 45 U.S. states. Period: 1976-1990. Method: Panel data with state and time-fixed effects; GLS and OLS. Endogeneity: Not treated.	Federal highway transfers: closed-end matching grants.	A symmetric response by state and subnational government to federal highway spending.

Table 4: Selected papers on the Fly-paper Effect

Authors	Main dependent variables	Data and econometric technique	Type of Grant	Main results
Card and Payne (2002)	State´s Educational Spending per student.	Sample: 48 mainland states in U.S. Period: 1977-1992. Method: OLS and 2SLS models. Endogeneity: Treated by IV: Supreme Court decisions as instrumental variables for state educational grants-in-aid.	Combination of MFP and flat grants.	Evidence of a strong fly paper effect on U.S. states spending: One-dollar-increase in state aid raised district education spending by 50 to 65 cents.
Gordon (2004)	Instructional spending and revenues.	Sample: 7047 schools at the district level in the US. Period: 1991-1995. Method: OLS and 2SLS models. Endogeneity: Treated as IV: Discrete change in the census-based index of poverty to estimate state-level effects.	Title I program non-matching block grants.	Grants raise spending initially, but the effects become very minimal over time.
Dahlberg et al. (2008)	Total and disaggregated by the different sectors.	Sample: 284 Swedish municipalities. Period: 1996-2004. Method: Discontinuity approach that exists every tenth year; 2SLS model. Endogeneity: Treated as IV: new formula for the distribution of funds.	Unconditional block (lump sum) grants.	The fly-paper effect persists when one uses appropriate instruments for grants.

Lutz (2010)	Variation in municipal per pupil local revenue for education.	Sample: 125 New Hampshire municipalities. Period: 1998-2000. Method: OLS and 2SLS models. Endogeneity: Treated as IV: reform grants per pupil as an instrument of the allocation of transfers.	Unconditional grants and matching grants.	One dollar of additional transfers on education spending results in an increase of less than 0.2 dollars.
Cascio, Gordon and Reber (2013)	Per-pupil school expenditure and revenue.	Sample: 910 school districts in 9 southern states of US. Period: 1961-1964-1969. Method: Panel FE; 2SLS. Endogeneity: Treated by IV: per-pupil current expenditure.	Title I: restricted block grant program.	An expansion in school spending of 50 cents per dollar in the average Southern school district in the U.S.
Leduc and Wilson (2017)	Change in state highway spending per capita.	Sample: 48 U.S. states. Period: 2009-2012. Method: OLS and Instrumental variables (IV) difference-in-differences methodology. Endogeneity: Treated by IV: pre-existing road-related factors as instruments for the amount of ARRA highway funds received by states.	Federal highway grants unde2009 American Recovery and Reinvestment Act (ARRA).	States increased highway spending more than dollar-for-dollar with the ARRA grants they received, especially those states with more political contributions from the public-works sector.

Table 5: Selected papers on the effects on government size

Authors	Main dependent variables	Data and econometric technique	Type of Grant	Main results
Stein (1999)	The size of the consolidated public sector as a share of GDP.	Sample: 44 OECD countries. Period: 1978-1997. Method: Aggregate panel data. OLS and error-correction models (ECM). GMM estimation. Endogeneity: Treated by GMM estimator: the lagged explanatory variables and lagged dependent variable (in differences).	Discretional grants.	The larger the share of grants, the larger the government.
Rodden (2003)	A measure of total public-sector expenditure as a percent of GDP.	Sample: 43 Latin America and OECD countries. Period: 1990-1995. Method: Cross Section OLS. Endogeneity: Not treated.	From specific-purpose matching grants to open-ended block grants.	When funded by grants, fiscal decentralization is associated with larger government.
Cassetter and Paty (2010)	Government size measured as total public-sector expenditures (as a percentage of GDP).	Sample: EU-15 countries. Period: 1972–2004. Method: Spatial dynamic panel data model (GMM) and using a generalized one-step ECM estimated using a LSDVC estimator. Endogeneity: Treated by GMM estimator: use of the weighted averages of neighbours' exogenous or control variables, (WX), as instruments.	Intergovernmental transfers.	Grants have a positive effect on the size of subnational, national, and aggregate governments.

Table 6: Selected papers on the cyclicality effects of grants on subnational fiscal choices and on the perverse incentives to subnational fiscal choices

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Baskaran et al. (2016)	Annual per capita deficit.	Sample: Panel of 114 Israeli municipalities. Period: 1999-2009. Method: Fixed effects model with a lagged dependent variable; System-GMM estimator. Endogeneity: Treated as IV: the lagged dependent variable is instrumented with further lags of itself.	Earmarked transfers.	The higher the dependence of central government grants, the more exacerbate political budget cycles are.
Baretti et al. (2002)	Combined state income and corporate tax revenues as percentage of state GDP.	Sample: 10 western states of Federal Republic of Germany. Period: 1970-1998. Method: Pooled time series and OLS; Hausman and Taylor (1981) estimator lagged dependent variable. Endogeneity: Not treated.	Tax-revenue equalization transfers.	Tax-revenue equalization grants have a negative effect on states' tax revenue.
Brollo et al (2013)	Broad and narrow corruption measures, and observed quality of political candidates.	Sample: 2,217 Brazilian municipalities. Period: Two mayoral terms: January 2001–December 2004 and January 2005– December 2008. Method: Fuzzy Regression Discontinuity Design (RDD), with population discontinuities as an instrument for the transfers actually received. Endogeneity: Not Treated.	Fundo de Participaçao dos Municipios (FPM): Federal Transfers Program.	Federal transfers to municipalities in Brazil induce political corruption and lower the quality of politicians running for office.

Table 7: Selected papers on fiscal discipline

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Rodden (2002)	Yearly data on subnational budget balance, as a way of measuring subnational fiscal discipline.	Sample: 43 OECD countries. Period: 1986-1996. Method: Time-Series Cross Sectional Analysis. GMM estimation Endogeneity: Treated using GMM. Lagged explanatory variables (in differences).	Intergovernmental transfers.	As countries increase their reliance on intergovernmental transfers over time, subnational fiscal performance decline, especially when subnational governments have easy access to credit.
Levaggi and Zanola (2003)	Number of units of expenditure in public health services per capita at the regional level	Sample: 20 Italian regions. Period: 1989-1993. Method: OLS models with hard-budget and soft-budget constraints. Endogeneity: Lagged current level of regional deficits employed.	Categorical lump-sum grants.	Central governments increase grants to those subnational governments with higher deficits and debt stocks to avoid financial stress and eventual bankruptcy.
Pettersson-Lidbom (2010)	Debt measured in per capita terms and at constant prices.	Sample: Panel of 276 Swedish local governments. Period: 1979-1992. Method: 2SLS estimation. Endogeneity: Treated as IV: the fraction of contiguous jurisdictions receiving discretionary grants today	Swedish equalization transfers.	A local government significantly increases its debt level by going from a hard to a soft budget constraint.
Shi and Hendricks (2020)	Debt level measured in three ways-relative to population, personal income, and gross state product (GSP).	Sample: Panel of 50 U.S. states. Period: 1997-2007. Method: Fixed effects with the Driscoll-Kraay (DK) standard error. Endogeneity: Not Treated.	Federal Grants.	Intergovernmental grants from higher levels of governments to lower levels reduce the debt level of governments significantly.

Table 8: Selected papers on addressing externalities across subnational government units.

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Inman (1988)	Several spillovers indicators: i) the Percentage of state residents who have left the state within the past year; ii) the Percentage of households below poverty level in the state; iii) the New housing starts per capita within the state; iv) and the Number of local governments per square mile in the state.	Sample: 49 states of the U.S. Period: 1952,1962,1972. 1977, 1984. Method: Aid regressions and simple correlations analysis. Endogeneity: Not treated	Several major categories of federal-to-state and federal-to-local grants-in-aid.	Grants are not observed to correct resulting inefficiencies from across-state spillovers
Grossman (1994)	Yearly data on subnational budget balance, as a way of measuring subnational fiscal discipline.	Sample: 49 states of the U.S. Period: 1974,1977,1980, and 1983. Method: Time-Series Cross Sectional Analysis. GMM estimation. Endogeneity: Treated using GMM. Lagged explanatory variables (in differences).	Intergovernmental transfers.	As countries increase their reliance on intergovernmental transfers over time, subnational fiscal performance decline, especially when subnational governments have easy access to credit.

Table 9: Selected papers on the effects on accountability and autonomy.

Authors	Main dependent variables	Data and econometric technique	Type of grant	Main results
Gervasoni (2010)	Subnational Democracy: Which includes two indicators of electoral competition, and three indicators of power concentration in the incumbent.	Sample: 22 Argentinian provinces Period: 1983-2003 Method: Random Effects models and G2SLS estimation. Endogeneity: Reciprocal of population employed as instrument.	Annual federal transfers per adult (eighteen or older) averaged over the four years of each gubernatorial term during the period of analyses.	Negative relationship between federal grants and subnational democracy levels.
Azis et al. (2001)	Potential local revenue sources.	Sample: 20,000 identified Indonesian needy villages Period: 1994-1998 Method: Descriptive Analysis	Earmarked Grants.	Increases in grant financing may actually have increased local reliance on the central government.
Bodman and Hodge (2010)	Measures of Fiscal Decentralization	Sample: 67 countries. Period: 1981-1999. Method: Cross-section and Panel Data analysis: OLS and Fixed-Effects estimation Endogeneity: Not Treated.	General Grants.	A negative impact of central transfers on subnational autonomy is found due to the substitution effect of subnational governments as grants increase.
Psycharis et al. (2016)	Revenue Autonomy Indicator estimated as the ratio of the sum of deflated values of own internal revenues.	Sample: 1031 Greek municipalities Period: 1999-2009. Method: Panel Least Squares with cross-section Random Effects. Endogeneity: Not Treated.	General central transfer.	Negative impact of intergovernmental transfers on subnational autonomy.

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