

# *Effects of Intergovernmental Transfers on Income and Poverty Rates: Evidence from the Philippines*

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## Abstract

Despite that subnational governments are key actors in the provision of public services, there are concerns about whether providing additional funding to them in developing countries can raise the living standards of local communities. This study investigates the impact of intergovernmental transfers on development outcomes at municipality and city levels in the Philippines from 1994 to 2015. Since the revenue-sharing mechanism between central and local governments in the Philippines follows a pre-determined formula, we leverage this feature and apply the instrumental variable (IV) method for estimation. Our results suggest that the household disposable income per capita increases by 9.6% in the long run due to extra transfers of 1,000 pesos per capita in the Philippine local governments. The poverty rate has also decreased by approximately five percentage points in the long run. The improvement of development outcomes mainly occurs in small and less-developed local governments. Finally, we examine the effect of intergovernmental transfers on local expenditure and taxation; then we discuss how the results of local finance behavior can explain the observed developmental impact.

**Keywords:** Intergovernmental transfer, income, poverty, instrumental variable, the Philippines

*JEL Classification:* C26, H71, H72, H75, I32, O15

# 1. Introduction

Intergovernmental transfers are a pervasive feature of fiscally decentralized countries around the world. In developing countries, these transfers finance about 60% of subnational expenditures, and they are a necessary complement to achieving multiple development goals (Shah, 2007). However, in the context of fiscal decentralization, whether transferring additional funds to local governments can serve as a good instrument to reduce poverty or inequality and boost economic growth is still under debate in developing countries (Bird and Smart, 2002; Gadenne and Singhal, 2014). On the one hand, local governments have an information advantage regarding the needs of their constituent communities. Hence, allowing local governments' discretion in choosing programs would result in higher public service delivery efficiency than the central government (Oates, 1972; 2005). The information advantage due to greater proximity is particularly prominent when preferences are highly heterogeneous across jurisdictions, as in many ethnically fragmented or socially diverse developing countries.

On the other hand, the widespread phenomenon in the fiscal decentralized countries that local governments rely heavily on transfers from the central government to finance their expenditures implies a lack of a strong tax-benefit linkage at the local level.<sup>1</sup> This suggests

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<sup>1</sup> According to Gadenne and Singhal (2014), the share of nontax revenues in subnational revenues increases from 49% to 62% between 1996–2000 and 2006–2010, while this share is quite stable (from 60% to 61%) for developed countries over the same period. Their sample includes the 32 developed countries and 38 developing countries. In a more comprehensive database with 135 countries (compiled from OECD and United Cities and Local Government open data source), the shares of transfer to total subnational government revenue from 2020 onward are still high (51.6% for high-income countries; 48.2% for each low- and middle-income countries).

local public spending may not be in accordance with the local overall marginal propensity to spend on public goods, leading to efficiency loss.<sup>2</sup> Moreover, there are concerns regarding the proper management of the significant transfers to local governments in developing countries, including potential corruption (Gauthier et al., 2021; Dávid-Barrett and Fazekas, 2020), and elite capture or clientelism (Bardhan, 2002; Smoke, 2014). Therefore, intergovernmental transfers can fail to achieve their development goals, as transfers may be diverted toward favorable groups or other unproductive usages before trickling down to local people. Given these concerns, it is unclear whether providing more transfers to local governments can enhance the welfare of their residents and achieve the intended development goals. Besides, owing to high data requirements, empirical studies that evaluate the causal effects of intergovernmental transfers on development outcomes, such as income or inequality, are still limited.

This study aims to contribute to the literature by identifying the developmental impacts of intergovernmental transfers at the municipality and city levels in the Philippines from 1994 (i.e., shortly after fiscal decentralization became institutionalized) until 2015.<sup>3</sup> We focus on

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<sup>2</sup> Recent empirical findings about the “flypaper effect” in several developing countries support the conjecture that the effect of intergovernmental transfers on local expenditures does not reflect voters’ preferences, speaking against the theory prediction by Bradford and Oates (1971). See Litschig and Morrison (2013) for Brazil and Mamaradlo et al. (2021) for the Philippines.

<sup>3</sup> In the Philippines, there is one level of local government, called barangay (village), below municipality and city. However, municipality and city are considered as the main entities that directly provide public services (Uchimura

the effects of formula-based general-purpose (unconditional) transfers that are supposed to introduce only income effects without distorting relative prices. For the development outcomes, we look at income, poverty, and inequality because they indirectly represent general measures of local communities' welfare upon receiving general-purpose transfers. In addition, we examined the impact of additional funding on local public spending and taxation.

In the Philippines, most funds transferred to municipalities and cities come from a pre-determined share of national taxes and are considered unconditional grants after an extensive decentralization reform during the early 1990s (Bird and Rodriguez, 1999). However, it may be challenging to find positive impacts of the transfers, given that the country does not have a good reputation for corruption control in public governance after decentralization.<sup>4</sup> To estimate the effects of intergovernmental transfers, our identification strategy is to leverage a grant distribution formula universally applied to the Philippines municipality and city after the decentralization reform of the early 1990s. Since the Philippine grant transfers are distributed to each local government unit according to population, land area, and equal sharing (with a pre-determined weight for each of the three factors), this rule-based transfer scheme facilitates our causal analysis in the panel data regression. In addition, we observe discrepancies between the

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and Suzuki, 2012). Both municipality and city are also the fundamental local governments that possess the authority of local taxation and land use reclassification (from agriculture to non-agriculture).

<sup>4</sup> According to the Control of Corruption Index (constructed by the World Bank as one of the six composite World Governance Indicators), the Philippines' corruption control has been relatively weak for a long period, ranging from -0.36 in 1996 to -0.76 in 2010 and -0.57 in 2019 based on a scale of -2.5 (weak) to +2.5 (strong).

actual-received and rule-implied grant transfers where the rule-implied values are calculated based on weighting parameters stipulated in the legal document of the formula. These discrepancies are potentially from measurement errors or unobserved grant manipulation, which can induce endogeneity. We, therefore, use the rule-implied values as an instrument for the actual-received grant transfers of local governments in our estimation.

The main finding of this study is that after fiscal decentralization became institutionalized, the Philippine municipality and city that received extra unconditional transfers from the central government benefited in terms of higher income (i.e., higher average household disposable income per capita) and poverty reduction (i.e., lower poverty rates) in the long run. The results on income suggest that household disposable income per capita increases by 9.6% in the long run for extra transfers of 1,000 Philippine pesos per capita.<sup>5</sup> The poverty rates, measured relative to the national poverty line (i.e., the absolute poverty rate) and half of the national median disposable household income per capita (i.e., the relative poverty rate), decrease by 4.6 and 5.4 percentage points in the long run, respectively, with reference to the absolute and relative poverty rates of 35% and 26%, respectively, estimated from our sample. The effect of transfers on the Gini coefficient was positive, although not statistically significant. Our results also show that the long-run income gains and poverty reduction are larger in the less-developed LGUs (i.e., municipalities) than in the well-developed ones (i.e.,

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<sup>5</sup> One Philippine peso was equivalent to US\$0.02 in 2000.

cities). Moreover, the long-run income gains seem to be more evident in the lower quartile of the LGUs (in terms of each LGU's average household disposable income per capita) based on quantile regression analysis.

Since we also found a large stimulative effect on local expenditure, the long-run income gains seem consistent with a simple growth model in which health, human capital, and physical capital (e.g., infrastructure) play important roles in development. Our results show that one additional Philippine peso in per capita unconditional transfer causes the per capita local spending to increase by 0.67 pesos, where the categories of education, health, housing, and economic development (including infrastructure and telecommunication) together receive the second largest share in expenditure, averaging 32.2% in our data period.<sup>6</sup>

To corroborate the internal validity of our results, we ran the robustness checks as follows: First, some municipalities converted to cities in pursuit of higher intergovernmental transfers during our data period, and this transfer-driven incentive for city conversion may affect development outcomes. We use another instrumental variable (IV) based on a policy change of the cityhood conversion criteria (i.e., the increase in locally sourced income) to correct this potential bias. The results are similar to those of our main model, except that the effect on the absolute poverty rate becomes insignificant. Second, because our outcome variables are generated based on surveys of individual family income and expenditure, there is

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<sup>6</sup> The largest share in the Philippines' local expenditure is "general public service," averaging 51% in our study period, where this expenditure sector represents the personnel cost of running the local government.

a trade-off between including a larger number of local government units in the analysis and excluding the local government units with a lower number of individual households (i.e., increasing the precision of the measured outcome variables). We raised the threshold of sampling household numbers (3% of local government units were dropped) and found that the overall results are similar to the main model, except that the magnitude of the coefficients slightly increased.

Our work is related to the growing literature that examines the impact of fiscal decentralization on the development outcomes of economic growth, poverty, and inequality by exploiting cross-sectional variation (see Gemmell et al., 2013; Filippetti and Sacchi, 2016; Tselios et al., 2012; Sepúlveda and Martinez-Vazquez, 2011; Sacchi and Salotti, 2014; for a thorough review, see Martinez-Vazquez et al., 2016). Empirical findings remain mixed for each outcome variable. We share with these recent studies the geographic cross-sectional approach and the effort to address endogeneity issues in the estimation. However, we also seek to advance the empirical literature in the following novel dimensions.

First, we focus on intergovernmental transfers, the essential and pervasive feature in fiscally decentralized countries, and study the impacts of the general-purpose transfers on development outcomes.<sup>7</sup> We present evidence on the effects of these transfers in a large

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<sup>7</sup> There are two primary categories for classifying intergovernmental transfers: general-purpose (unconditional) and specific-purpose (conditional) transfers. The former type of transfer simply augments the resources available to the local governments without influencing their spending patterns, resulting in only an income effect. While the latter type of transfer often includes cost-sharing component or specifies particular type of expenditure that



developing economy against the backdrop of empirical literature dominated by estimates for OECD countries or regions in the European Union. Notable exceptions are a few recent works, including Caselli and Michaels (2013) and Litschig and Morrison (2013) for Brazil, and Rodríguez-Castelán et al. (2020) for Mexico.<sup>8</sup>

Second, we leveraged the formula-based transfer scheme in the Philippines and applied the IV method for identification. This connects our work to recent empirical contributions that utilize a quasi-experimental approach in exploring grant effects on public finance behavior in lower-tier governments in both developed and developing countries. For example, Knight (2002) and Gordon (2004) deal with specific transfer programs in the U.S. context, and

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can be financed, offering the grantor a degree of control at the expense of local financial autonomy. Assuming the recipient local government represents local residents' preference, Shah (2007) notes that the design of general-purpose transfers is preferred if the objective is to enhance the welfare of local residents. As elaborated in a conceptual framework in Section 3, this study mainly accounts for the total effect on some development outcomes (e.g., income) resulting from the provision of general-purpose transfers. Nevertheless, as transfers are a necessary complement to decentralization, we recognize the purposes of transfers can be much broader than the outcomes targeted in this study. For example, Boadway (2007) notes that transfers are viewed as fulfilling three main purposes: bridging fiscal gaps, equalization, and allowing federal government to exercise control to achieve national objectives. In practice, some of these purposes may be in conflict with others. See Shah (2007) and Boadway (2007) for further discussion within this particular strand of literature.

<sup>8</sup> Caselli and Michaels (2013) examine the impacts of an offshore oil-induced fiscal windfall on living standards among Brazilian municipalities and find little (if any) improvement in household income and public good provision. Litschig and Morrison (2013) show regression discontinuity evidence in Brazil, indicating that general-purpose intergovernmental transfers lead to better education outcomes and lower poverty rates at the municipality level. Rodríguez-Castelán et al. (2020) explore the effects of a social infrastructure fund (i.e., a specific-purpose fund) from the central government and find that municipalities in Mexico benefit from a higher income effect and other non-monetary measures of well-being while suffering from unequal distributional impact in terms of a higher Gini coefficient.

Lundqvist (2015) and Mamaradlo et al. (2021) use general-purpose grant data in Finland and the Philippines, respectively. Finally, the richness of the quasi-experimental variation and the vast differences in Philippine local government units allow us to move beyond the average effects and explore heterogeneity. We show differential effects in both high-income and low-income governments (i.e., cities and municipalities, respectively), and explore how the improvement of development outcome depends on various quantiles of the distribution of average household disposable income per capita at LGU level over time.

The remainder of this study is organized as follows. Section 2 provides the institutional background for intergovernmental transfers in the Philippines and documents the role of local government units in public service provision. Section 3 presents the conceptual framework of the empirical analysis. Section 4 describes the data, and Section 5 discusses the estimation approach and addresses the endogeneity problem. Section 6 presents the main empirical results, robustness checks, and an analysis of the heterogeneous effects and quantile regression. Section 7 briefly looks into the data for the potential channels of our results and provides a discussion. Finally, Section 8 concludes the study.

## **2. Institutional and Policy Background**

The Philippines has four types of local government units (hereafter referred to as LGUs), and they are arranged into three layers. The first layer is the province, followed by municipalities

and cities, where the city has a higher average population and income than the municipality, and the lowest layer is the village-level barangay.<sup>9</sup> Each LGU has an election structure for its local legislature and chief executives. We focus on municipalities and cities since this layer of local governments covers the entire country without overlap. In addition, they are the fundamental LGUs in the Philippines responsible for public service provision; they are entitled to financial resources from the central government (Uchimura & Suzuki, 2012).<sup>10</sup>

## **2.1 Local Public Services and Financial Resources in the Philippines**

The fiscal autonomy of Philippine LGUs has increased significantly since the passage of the Local Government Code (hereafter referred to as LGC) in 1991 (which became effective in 1992). The LGC devolved principal duties and responsibilities to LGUs for delivering public services, such as health, education, and social welfare services.<sup>11</sup> Consistent with the devolution program, total LGU expenditure rose from an average of 1.6% of GNP during 1985-1991 to 3.3% of GNP during 1992-2003, and local spending on all social and economic sectors

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<sup>9</sup> Specifically, the province comprises the component city and municipality in the Philippines. A few so-called “independent cities” outside of provincial jurisdiction also exist. The two types of cities are similar in the scopes of their administrative power and responsibility, whereas the income and population levels are generally higher in the independent cities.

<sup>10</sup> Given the focus of this study, the LGU in our discussion mainly refers to municipality and city.

<sup>11</sup> See Section 17 of the LGC for the detailed description of devolved functions and responsibilities. In general, provinces are assigned intermunicipal functions and services that cover more than one component city or municipality, such as operation and maintenance of provincial hospital. Municipalities and cities, on the other hand, are mainly responsible for the delivery of frontline basic services.

(including education, health, housing, infrastructure, and telecommunication) also increased when expressed relative to GNP (Manasan, 2005). Similarly, according to Manasan (2005), the share of all LGUs in total government expenditure (net of debt service) rose from 11% during 1985-1991 to 21.2% during 1992-2003. At the LGU level, the share of those economic and social services sectors in total expenditure of all municipalities and cities is 32.2% on average within our data period from 1992 to 2015.

The LGC also includes far-reaching provisions concerning national internal revenue-sharing between the central and local governments and local revenue generation tools. Specifically, LGC formalizes the financial resources available to LGUs, either locally or non-locally sourced. Local resources mainly include (1) local tax revenue, especially those from property and business taxation, and (2) non-tax revenue, such as regulatory fees from permits or licenses and service charges. Non-locally financial resources accrued to LGUs through intergovernmental transfers, where the most important type of transfer is “Internal Revenue Allotment” (IRA) in the Philippines.<sup>12</sup>

IRA is considered an unconditional grant since its utilization is mainly at the discretion of the respective LGUs.<sup>13</sup> The distribution of IRA was based on a formula after LGC became

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<sup>12</sup> There exist other financial resources transferred from the central government, which either account for a relative smaller portion among all transfers or are not transferred on a regular basis. See Soriano et al. (2005).

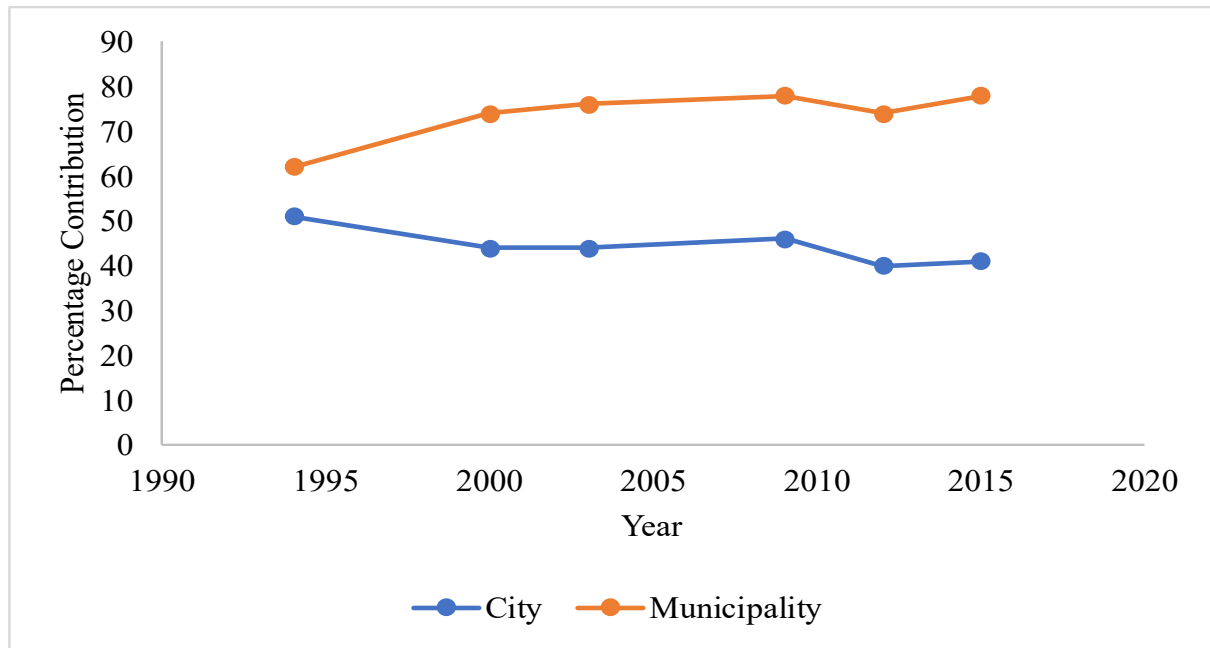
<sup>13</sup> Although there exists a requirement that 20% of IRA should be used for “development purposes,” this condition does not bind local governments’ spending decisions in practice (Bird and Rodriguez, 1999). This is because the

effective. Figure 1 shows that municipalities and cities depend heavily on IRAs.

IRA actually serve as the major source for bridging the fiscal gaps between expenditures, including existing and newly devolved functions under LGC, and own revenues of LGUs in the Philippines. Due to the unconditional nature of the transfers, IRA can be spent on any combination of public goods or used to provided tax relief to local residents. The stimulation of local public spending can have direct effect on local residents' welfare. The tax relief, on the other hand, can alter inequality through income redistribution and hence affect the welfare of local residents. See Section 3 for a conceptual framework regarding channels through which transfers can affect development outcomes.

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specific criteria for development-purposes programs are not explicitly stated, and this requirement is not clearly monitored in practice.



**Figure 1. Contribution of IRA to total income in municipalities and cities, 1994, 2000, 2003, 2009, 2012, 2015**

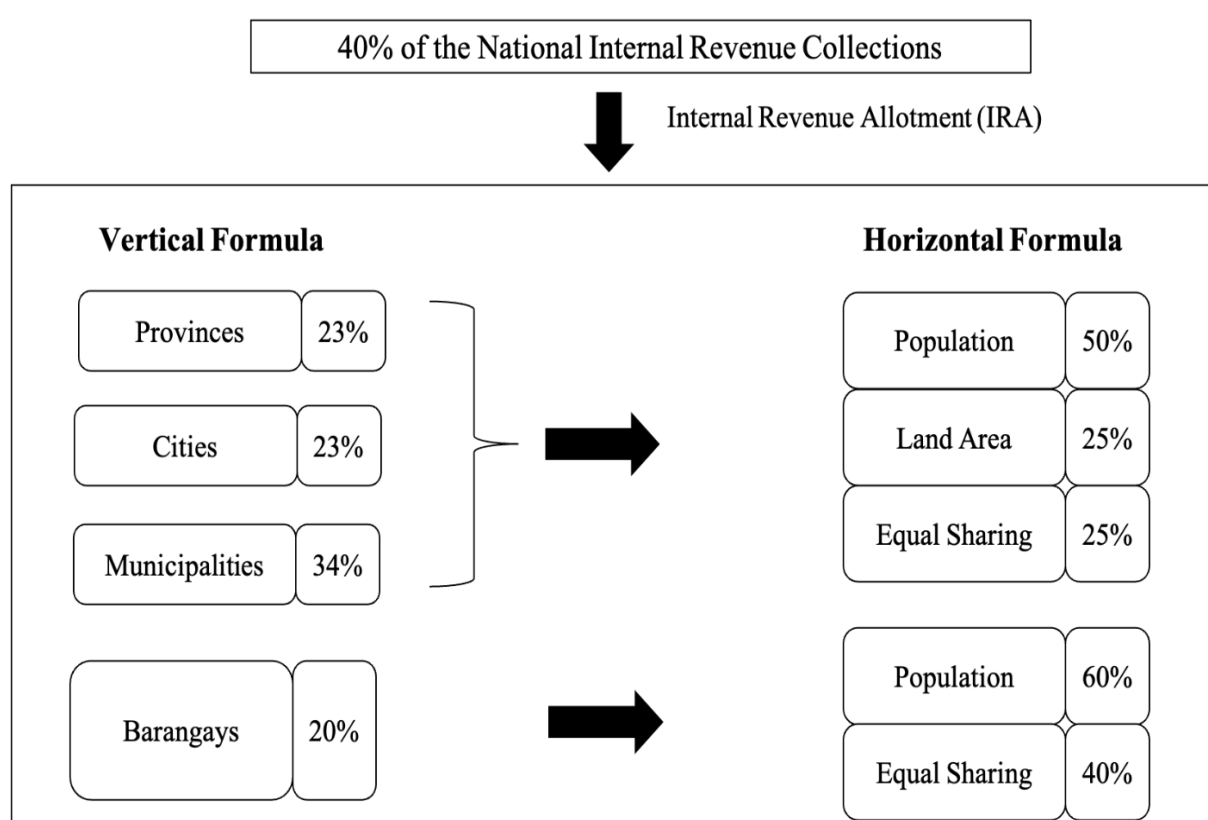
*Notes:* Total income includes IRA, own-sourced revenue, and other external sources of local governments. Each point on the trend was calculated based on the ratio of  $\sum_i IRA_i$  to  $\sum_i Total\_Income_i$  in the corresponding year where  $i$  stands for an LGU of either municipality or city.

*Source:* Fiscal data of local government units, Bureau of Local Government Finance (BLGF, n.d.).

## 2.2 Rule-based Grant Transfer Scheme in the Philippines

To estimate the impact of intergovernmental transfers, we exploit the variation in IRA at different LGUs in our panel data analysis. Before the LGC became effective in 1992, the distribution of the IRA was highly discretionary and used for patronage politics (Hutchcroft, 2012). Since 1992, the revenue-sharing mechanism between central and local governments has been stipulated in the LGC where 40% of the national internal revenues shall be transferred to all LGUs as IRA pool (among them, 23% go to the city and 34% go to the municipality). The

critical feature of IRA allocation for the purpose of our analysis is Section 284 of the LGC, which stipulates that the transfer amounted to municipality and city is determined by population, land area, and equal sharing factors (the weights used are 50%, 25%, and 25%, respectively).<sup>14</sup> Figure 2 provides an overview of the IRA sharing scheme (between the central and local governments) and allocation formulas (among LGUs).



**Figure 2. Formulas in computing IRA**

*Source:* Section 284 of the LGC.

<sup>14</sup> The weighting factor of equal sharing means that total grant transfers of an administrative status (i.e., municipality or city) would be distributed to each belonging LGU equally according to the number of LGUs in that administrative status.

The passage of the LGC in 1991 was considered a sudden and unanticipated change in local governance by local politicians.<sup>15</sup> This is because national legislators who are in control of passing the LGC are often rivals of local officials in the Philippines; thus, they are reluctant to give up their power in allocating the IRA. After the LGC became effective in 1992, a significant number of municipalities converted to the city during 1993-2000. Table 1 shows the composition of municipalities and cities over time. One important reason for the rush of cityhood conversion phenomenon is the improvement of IRA receipts, provided that the “equal sharing” factor in the IRA distribution formula applies to all LGUs within the same administrative divisions. Since there were more than 1,500 municipalities but only around 60 cities in 1993, the equal sharing factor implies the gap in IRA receipts between a municipality (each equally shares 34% of transfers) and a city (each equally shares 23% of transfers) was large. Another reason for the rush of city conversion during this time is that the conversion criteria became institutionalized. According to the LGC, a municipality is eligible to convert to a city once it meets the threshold levels of locally sourced income and population size, or land area, for two consecutive years.<sup>16</sup> Starting in 2001, the income requirement was revised to a

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<sup>15</sup> The passage of LGC is referred to as a “Saturday morning surprise” by a team of writers from the National Economic and Development Authority (Rood, 1998).

<sup>16</sup> Once the criteria are met, the decision to apply for conversion is at the full discretion of the municipality concerned. The respective municipal council can pass a resolution indicating their desire to be converted into a city and submit it to Congress. The latter will then conduct deliberations and pass an Act of Congress for meritorious requests for conversion, in which the official cityhood conversion process also involves approval from the majority of its voting residents.



higher threshold level of 100 million pesos, while the population and the land area remained unchanged. See Appendix Table B-1 for the conversion criteria during the two policy phases.

**Table 1. Number of the municipalities and cities across time**

Year	LGU		Year	LGU	
	Municipality	City		Municipality	City
1993	1518	61	2005	1464	115
1994	1518	61	2006	1464	115
1995	1515	64	2007	1463	116
1996	1515	64	2008	1445	134
1997	1513	66	2009	1444	135
1998	1499	80	2010	1460	119
1999	1498	81	2011	1459	120
2000	1498	81	2012	1443	136
2001	1465	114	2013	1437	142
2002	1465	114	2014	1437	142
2003	1465	114	2015	1437	142
2004	1465	114	2016	1436	143

*Notes:*

1. The total number of municipalities and cities presented in this table has excluded ten municipalities and two cities due to merging and one municipality due to missing data.

2. The number of cities decreased in 2010 because the Supreme Court had cancelled the city status of 16 LGUs that had involved legal suits regarding revised conversion criteria since 2001. The decision was later reversed and finalized for granting city status in 2011.

*Source:* Fiscal data of local government units, Bureau of Local Government Finance (BLGF, n.d.).

### 3. Conceptual Framework

As additional IRA transfers provide unconditional budgetary support, effects on income may arise through various channels. These include direct provision of public services (e.g., transport

infrastructure or health and educational facilities) or adjustment in expenditure composition that can indirectly affect living standards in communities. We follow Litschig and Morrison (2013) and present a conceptual framework for thinking about causal analysis with a focus on the grant effect on income. Then, we compare the causal effects estimated in this study to the micro- and macro-level literatures on income.

Suppose that the human capital level  $H$  in the local community depends on public spending on education  $E$  through, for example, school quality  $Q$ , and on another public service, say transport infrastructure  $T$ . Both inputs, in turn, depend on the total local public spending  $S$  where the unconditional grant  $G$  (e.g., IRA in the Philippines) contributes a significant share. Further, suppose that household income  $I$  depends on human capital and public services such as transport infrastructure. We summarize this relationship as below.

$$I = I \left( H \left( Q(E(S(G))), T(S(G)) \right), T(S(G)) \right).$$

In this context, existing studies on policy evaluation that utilize micro-level data typically focus on the estimation of resource provision to teachers' training or school facilities. That is, they evaluate the *partial* derivatives of  $H_Q$  or  $I_Q$  as exemplified in our framework. On the other hand, the effect estimated in our study can be thought of as  $I_G$  representing the *total* derivative of income with respect to the change in grant transfers. It captures the total effect arising through various spending channels, directly or indirectly, rather than from a single spending category alone (e.g., education). This total derivative may be larger or smaller than partial derivatives, depending on whether the specific spending projects are complementary or,

perhaps, undermine each other.<sup>17</sup> The relative size also depends on whether we focus on the short- or long-run effects.

On the other hand, existing macro-level studies that examine the impact of government spending on local economic outcomes essentially evaluate  $I_S$ . The difference between this type of macro study and ours (estimate  $I_G$ , but not  $I_S$ ) lies in whether and how unconditional grants can crowd-in or crowd-out spending and in whether grants are well-managed without concerns of waste or corruption. Such a difference may not be very significant in some cases; however, those studies typically use measures of spending that are likely to be correlated with other factors affecting income, except for the recent literature that pushes on causation via exploiting some forms of quasi-experimental variations (e.g., Nakamura and Steinsson, 2014; Chodorow-Reich, 2019; Corbi et al., 2019).

Finally, income and income inequality do not necessarily work in the same direction in response to additional grant transfers, although they are closely related. The effect of grants on inequality depends on both the income response in the local community and the local government's efforts in resource redistribution. A particular income group in the local

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<sup>17</sup> That is, the effect of unconditional grant on income or other development outcomes is context specific. For example, the public spending through higher-level actors, like central or provincial governments, would affect local development outcomes, so that the explicit functional form of  $I(H(\cdot), T(\cdot))$  can be different across federations. In addition, the composition of local public spending can affect the explicit expression of  $E(S(G))$  and, in turn, alters the development outcomes. In either case, this study aims to evaluate the total effect of the IRAs, taking specific institutional arrangements of fiscal relations in the Philippines as given. While concerning external validity, we recognize the generalization of our findings to different federal contexts is limited.

community may benefit more from the increase in grants compared to other groups, even if grants have zero overall effect on average income. Moreover, if grants affect local taxation,<sup>18</sup> such taxation may further affect inequality owing to its distortional or progressivity features. Our conceptual framework can be further thought of as whether additional grants to local governments trickle down to the population *equally* through multiple channels.

## 4. Data

This analysis exploits longitudinal data on municipalities and cities from multiple data sources. Our consolidated dataset between 1992 and 2015 comes from three sources: (1) public expenditure and income at the LGU level; (2) Family Income and Expenditure Survey (FIES) at the individual family level; and (3) population census at the LGU level. In addition, we utilized land area data (National Statistics Office, 2004) when constructing an IV for estimation. All variables, if expressed in monetary units, were adjusted by the year 2000 constant prices.

Data on public expenditure and income at the LGU level were collected from the Bureau of Local Government Finance (BLGF) and have been available for all municipalities and cities annually since 1992 (BLGF, n.d.). The fiscal data contains our main variable of

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<sup>18</sup> For example, according to the median voter theorem (Bradford and Oates, 1971), intergovernmental transfers would result in a large effect on local tax reduction (associated with a small stimulating effect on public spending). This is because a median voter perceives grants and private income to be fungible; thus, receiving a one-dollar grant transfer should affect total spending no different from a one-dollar increase in private income (i.e., tax return).

interest, unconditional grants (or IRA in the Philippines). It also includes information on local expenditures and locally sourced taxation.

FIES data were obtained from the Philippine Statistics Authority (PSA), which is the main source of income and expenditure data in the Philippines (Ericeta and Fabian, 2009). It is a nationwide representative survey conducted by the statistics office once every three years since the late 1980s. Our data includes a survey of the indexed years of 1994, 2000, 2003, 2009, 2012, and 2015, where the 1994 FIES has the smallest sample size of 24,797 responding households, and the 2015 FIES has the largest sample size of 41,544 (PSA Data Archive, 2021).<sup>19</sup> Four development outcome variables at the municipality and city levels are generated from the FIES data: household disposable income per capita, absolute and relative poverty rates (relative to the national poverty line and half of the national median household disposable income per capita, respectively), and the Gini index. See Appendix A for details of the variable construction.

Philippine population information at the LGU level comes from the census, which is also conducted by PSA and is typically updated every five years. The available population census years during my data period were 1990, 1995, 2000, 2007, 2010, and 2015 (National Statistics Office, 2004, 2011; PSA, 2016).

We merged those three datasets with the unique LGU identifier. Since FIES data is

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<sup>19</sup> The 1997 and 2006 FIESs are not included, given that the coding of the LGUs is inconsistent with other periods, so the LGUs in those two years cannot be identified.

conducted every three years, we conform with this 3-year interval structure of the consolidated data; thus, there are eight periods (i.e., a 3-year interval) during 1992-2015. In addition, given that the outcome variables in period 2 (including 1997 FIES) and period 5 (including 2006 FIES) are excluded due to unavailable LGU codes in the FIES, six out of eight periods data in FIES can be utilized. In our analysis, the fiscal variables for grants, expenditure, and tax revenue were divided by the population size using the latest available census. Then, the grant per capita of period  $t$  is generated by using the 3-year average of the per capita term in the same period (to follow the 3-year interval structure of the consolidated data), and the lags of one and two periods of the grant variable refer to the 3-year average of the grant per capita at periods  $t - 1$  and  $t - 2$ , respectively.<sup>20</sup>

Lastly, the LGUs included in our consolidated data are based on their availability in the FIES. The number of LGUs in the 1994, 2000, 2003, 2009, 2012, and 2015 FIES dataset periods are 949, 1,236, 1,133, 1,132, 1,131, and 1,130, respectively. Note that 10 municipalities and 2 cities were excluded from those LGUs. This is because these LGUs evolved into new LGUs through merging so that their locations and boundaries could not be uniquely identified, and their political functions also changed significantly during our data period. Table 2 summarizes the definitions of all variables, and the explanatory variables and IV are further

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<sup>20</sup> The fiscal variables are available for all eight periods in the merged data. Once the 3-year average of the grant per capita in each period  $t$  (i.e., 3-year interval) is generated, the lag 1 and lag 2 of the grant per capita are also provided by referring to the 3-year average of the grant per capita in the lagged periods. Taking period 7 as an example, its lag 1 covers the 3-year average of the grant per capita in the years of 2009, 2008, and 2007 (i.e., period 6), and its lag 2 covers the 3-year average of the grant per capita in the years of 2006, 2005, and 2004 (i.e., period 5).

explained in the next section.

**Table 2. Description of variables**

Variables	Notation	Definition
<b>Outcome Variable (<math>y_{it}</math>)</b>		
<u>Development outcome</u>		
Income	$income_{it}$	Average household disposable income per capita in 1,000 Philippine pesos in LGU $i$ in the latest year of period $t$ .
Absolute Poverty	$abspov_{it}$	Proportion of households in LGU $i$ who fall below the national food threshold in the latest year of period $t$ .
Relative Poverty	$relpov_{it}$	Proportion of households in LGU $i$ who fall below the 50% of the national median disposable household income per capita in the latest year of period $t$ .
Gini Index	$gini_{it}$	Inequality of income, based on the variable $income_{it}$ , in LGU $i$ in the latest year of period $t$ .
<u>Fiscal outcome</u>		
Expenditure	$expi_{it}$	Three-year average of the expenditure per capita in 1,000 Philippine pesos in LGU $i$ at period $t$ .
Tax Revenue	$tri_{it}$	Three-year average of the tax revenue per capita in 1,000 Philippine pesos in LGU $i$ at period $t$ .
<b>Explanatory Variable</b>		
Received Grant	$g_{it}$	Three-year average of actual-received IRA per capita in 1,000 Philippine pesos in LGU $i$ at period $t$ .
City	$c_{it}$	City status dummy of LGU $i$ in the latest year of period $t$ .
Population	$pop_{it}$	Population count (in thousand) of LGU $i$ in the latest year of period $t$ .
<b>Instrumental Variable</b>		
Rule-implied Grant	$Rg_{it}$	Three-year average rule-implied IRA per capita in 1,000 Philippine pesos in LGU $i$ at period $t$ .

*Notes:*

1. To calculate the per capita terms of expenditure, tax revenue, received grant, and rule-implied grant variables in each period, we first divide those fiscal variables by the population size and then take the 3-year average.
2. We follow the OECD practice in defining the relative poverty line (Keeley, 2015).

## 5. Methodology

### 5.1 Regression Model

The causal effect of intergovernmental grants on income and inequality was estimated using the following equation:

$$y_{it} = \beta_0 + \beta_1 g_{it} + \beta_2 g_{i,t-1} + \beta_3 g_{i,t-2} + \beta_4 c_{it} + \beta_5 pop_{it} + \mathbf{lgu}_i \boldsymbol{\gamma} + \mathbf{period}_t \boldsymbol{\rho} + u_{it}, \quad (1)$$

where  $y_{it}$  is the outcome variable in LGU  $i$  at period  $t$ , including the household disposable income per capita, absolute poverty rate, relative poverty rate, and the Gini index;  $g_{it}$  is the period average of the received grant per capita of each LGU  $i$  at period  $t$ ;  $g_{i,t-1}$  and  $g_{i,t-2}$  are two lag terms of the period average received grant;  $c_{it}$  is the dummy variable for being a city at period  $t$ ;  $pop_{it}$  is the population of each LGU  $i$  at period  $t$ ;  $\mathbf{lgu}_i$  is the row vector of the LGUs' fixed effects;  $\mathbf{period}_t$  is the row vector of the period dummies; and  $u_{it}$  is the idiosyncratic error.

The main variables of interest are the received grants in the current and previous two periods, that is,  $g_{it}$ ,  $g_{i,t-1}$ ,  $g_{i,t-2}$ . We use the three-year average of the received grant to conform with the FIES data structure (conducted every three years) in the Philippines. In addition, because past grants are likely to have effects, we include lag terms.<sup>21</sup>

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<sup>21</sup> The main results in Section 6 are based on the regression model with two lag terms,  $g_{i,t-1}$  and  $g_{i,t-2}$ . We also conduct a regression analysis with an additional lag term  $g_{i,t-3}$  (see Appendix Table C-1). The results align with the primary ones in Table 4 and 5 (the regression specification with IVs), provided there is no impact from the extra lag term  $g_{i,t-3}$ . We continue to use the regression model with two lag terms since it permits us to conduct robustness check regarding IRA-driven incentive for cityhood conversion (see Section 6.3.2). However, having



The variable  $c_{it}$  is a confounding factor. We include it not only because LGUs consist of municipalities and cities but also because the administrative status of an LGU can change over time due to conversion from a municipality to a city during our data period, as shown in Table 1. We follow the city status of an LGU in the latest year of period  $t$  to assign the value of this variable.

The variable  $pop_{it}$  is included in our estimation equation because it can have an impact on the outcome variables due to economies of scale and can account for characteristics of LGUs that may change over time. It also changes discretely with each new census year and, hence, is likely to create bias in the estimation if omitted.

The period fixed-effects, ***period<sub>t</sub>***, capture the unobservable macroeconomic conditions (e.g., fiscal deficit, ASEAN financial crisis, etc.) in that particular period that may affect the outcome variables across all LGUs. Furthermore, the LGU dummy ***lgu<sub>i</sub>*** is added to the estimation to capture the unobservable time-invariant characteristics of each LGU.

## 5.2 Identification Issue

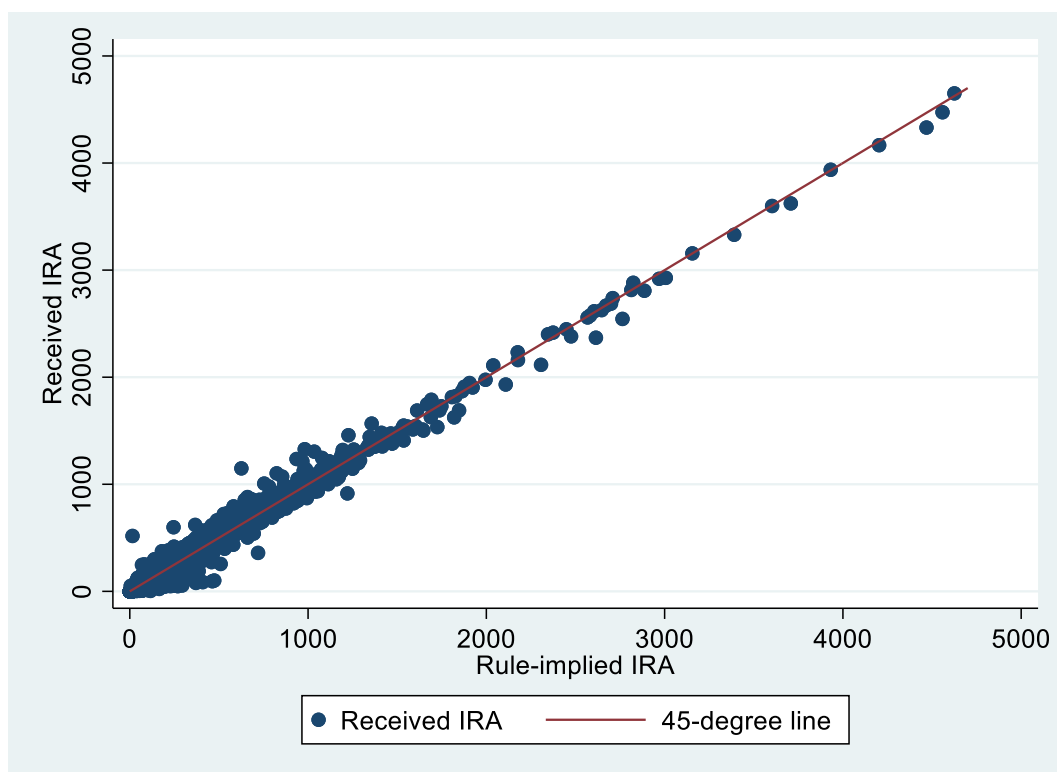
In regression equation (1), the variables of received grants are supposed to be exogenous (i.e., uncorrelated with the unobservables of LGUs that can affect outcome

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three or more lag terms in the empirical model (i.e., the starting year of  $y_{it}$  is 2003 or later) cannot incorporate the additional IV constructed from the change of cityhood conversion rule in 2000. Finally, we do not consider the regression model with four or more lag terms as it would decrease the sample size by over 40% compared with the current model.

variables) if the rule-based transfer scheme is strictly implemented in practice. However, there are concerns regarding whether the ceteris paribus relationship between received grants and income or inequality can be estimated.

Consider the received and rule-implied grant scatterplots (expressed in per capita terms in the same year, described in the next subsection) in Figure 3. If the IRA distribution formula is strictly followed, all the dots should line up along the 45-degree line. A glance at the figure, however, shows that some LGUs receive more than the rule-implied values and some others receive less than they should.



**Figure 3. Comparison of the received and rule-implied IRAs, 1992-2015**

*Source:* Authors' calculation

Several reasons may result in such discrepancies, leading to the concern that the regression estimates may be biased. One reason for this is that there could be a simple reporting error. There is anecdotal evidence indicating LGUs' poor budget preparation (Union of Local Authorities of the Philippines, 2016). As budget officers in each local government must prepare hundreds of reports in various categories, misreports in the budget data may occur. If the errors due to misreporting are exogenous to the outcome variables, it is an issue of random measurement error, which would produce a downward bias in absolute value.

Other reasons for discrepancies between the received and rule-implied IRAs may arise from political manipulation by central authorities. For example, the timing of releasing LGUs' IRA shares may be delayed, although LGUs expect it to be automatically released without conditions or delays. Shair-Rosenfield (2016) pointed out that the central government had attempted to withhold IRA disbursements in return for compliance with its interests.<sup>22</sup> Such a delay in releasing IRA can only apply to some LGUs, creating discrepancies between rule-implied and actual-received IRA. In that case, the central government's discretion in manipulating IRA disbursements would generate estimation bias if it also affects LGUs' incentives to improve development outcomes.<sup>23</sup>

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<sup>22</sup> This is anecdotal evidence based on the author's personal communication with local professionals.

<sup>23</sup> For example, when a mayor of an LGU receives more grants due to political manipulation (probably because they belong to the same political party), they may become less accountable to the constituency, creating a downward bias in the estimation.

### 5.3 Instrumental Variable Method

We apply the IV method to address the potential bias arising from the endogenous grant variable. Specifically, we generated another grant variable as if the exogenous transfer scheme was strictly followed, which we called a rule-implied grant. To construct it, we collected annual total grant transfers by administrative status (i.e., city or municipality), and then recalculated an annual grant for each LGU according to parameters of each weighting factor illustrated in Figure 2 (i.e., 50% for population, 25% for land, and 25% for equal sharing). Hence, the total rule-implied grant transfer of LGU  $i$  belonging to administrative status  $k \in \{city, municipality\}$  in year  $s$ , denoted by  $TRg_{iks}$ , is summarized as follows:

$$TRg_{iks} = (0.50) \left( \frac{pop_{iks}}{pop_{ks}} * T_{ks} \right) + (0.25) \left( \frac{land_{iks}}{land_{ks}} * T_{ks} \right) + (0.25) \left( \frac{1}{number_{ks}} * T_{ks} \right), \quad (2)$$

where  $pop_{iks}$  is the population count of LGU  $i$  with administrative status  $k$  in year  $s$ ;  $pop_{ks}$  is the total population of administrative status  $k$  in year  $s$ ;  $land_{iks}$  is the land size of LGU  $i$  with administrative status  $k$  in year  $s$ ;  $land_{ks}$  is the total land size of administrative status  $k$  in year  $s$ ;  $number_{ks}$  is the total number of all LGUs belonging to administrative status  $k$  in year  $s$ ;  $T_{ks}$  corresponds to the total grant transfers (i.e., total IRA) for administrative status  $k$  in year  $s$ . Note that for the calculation of 25% of the land area share in equation (2), we used the 2001 master list of land area data from the Land Management Bureau. The land areas of each LGU

in our sample did not change over time, except for merging between LGUs.<sup>24</sup>

The resulting  $TRg_{iks}$  was then divided by the population size of LGU  $i$  in year  $s$ . The rule-implied grant per capita in period  $t$  for each LGU is again generated by using the 3-year average in that period accordingly. We denote this rule-implied per capita term in period  $t$  as  $Rg_{it}$ . Given that three received grant variables are in the regression equation (1), we used the corresponding periods of rule-implied grant variables as IVs in the estimation.

The validity of the IVs can be justified as follows: The IVs are relevant because their construction was based on the formula that the received grants should follow in practice (see also Table 6 for the first-stage regression results). The exogeneity condition is also plausible because the IRA distribution formula is predetermined in the LGC and remains unchanged over time (see also Section 6.3.2 for over-identification test results when including multiple IVs). This suggests that the rule-implied grant does not directly affect the outcome variables except through the channel of the received IRA in providing public goods to the constituents.

Following the model in equation (1), the reduced form equation for the first-stage regression of each endogenous variable (i.e.,  $g_{it}$ ,  $g_{i,t-1}$ , and  $g_{i,t-2}$ ) using the three rule-implied grant variables as IVs is:

$$g_{i,t-n} = \pi_{n0} + \pi_{n1}Rg_{it} + \pi_{n2}Rg_{i,t-1} + \pi_{n3}Rg_{i,t-2} + \pi_{n4}c_{it} + \pi_{n5}pop_{it} + lgu_i\delta_n + yr_t\tau_n + v_{int}, \quad (3)$$

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<sup>24</sup> As described in the Data section, the number of merging LGUs is very few, and they are excluded from our consolidated data. Further note that the total land size of LGUs that belong to the same administrative status  $k$  in year  $s$  may change because an LGU's administrative status can change over time.

where  $n = 0, 1$ , and  $2$ . Given the variable  $g_{i,t-n}$ , the sign of the corresponding period of rule-implied grant is expected to be positive because both received and rule-implied grants originate from the same formula.

## 6. Empirical Results

### 6.1 Summary Statistics

The summary statistics of the variables at the LGU level are shown in Table 3. Panel A presents the outcome variables, and Panel B provides the independent variables. The IV and land size variable (used for the construction of the IV) are shown in Panel C. It can be seen that the average income in cities is higher than in municipalities by 12,112 Philippine pesos per capita. However, both absolute and relative poverty rates are lower in cities than in municipalities, with 17% and 12% gaps, respectively. Income inequality, measured by the Gini index, is slightly higher in cities than in municipalities.

**Table 3. Summary statistics of the variables**

Variables	All LGUs			Municipalities		Cities	
	Obs.	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
<i>Panel A. Dependent variables</i>							
Income	6,582	25.14	13.77	23.93	12.85	36.09	16.68
Absolute Poverty	6,582	0.35	0.26	0.36	0.26	0.19	0.17
Relative Poverty	6,582	0.26	0.22	0.27	0.23	0.15	0.15
Gini Index	6,581	0.35	0.11	0.35	0.11	0.40	0.08
Expenditure	6,582	1.12	0.66	1.02	0.54	1.96	0.98
Tax Revenue	6,582	0.15	0.40	0.09	0.18	0.65	1.02

Variables	All LGUs			Municipalities		Cities	
	Obs.	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
<i>Panel B: Independent variables</i>							
Received Grant	6,582	1.01	0.60	0.96	0.57	1.47	0.69
Population	6,582	64.42	127.04	43.44	38.64	254.61	329.98
<i>Panel C: IV and the variables used in its construction</i>							
Rule-implied Grant	6,582	1.37	1.05	1.29	1.01	2.07	1.21
Land Size	6,582	176.25	195.65	171.25	183.14	221.62	281.17

Notes:

1. The variables of income, expenditure, tax revenue, received-grant, and rule-implied grant are all in per capita terms and in 1000 Philippine pesos. They are all adjusted by year 2000 constant prices. The population is expressed in thousands. The land size is expressed in square kilometers.
2. The total number of LGU observations is slightly fewer for the Gini index variable due to insufficient household number in one LGU (i.e., less than two households when calculating the Gini index).

After combining all datasets, we obtained an unbalanced panel dataset covering six periods with 6,582 observations in total. Of these, 5,928 and 654 observations were from municipalities and cities, respectively. The average of the outcome variables among all LGUs is close to that in municipalities, given that around 90% of the LGUs in our data are municipalities. In addition, cities have a higher IRA because the number of cities that share the corresponding IRA pool is significantly lower than municipalities. The rule-implied grant is, on average, larger than the received grant, associated with a larger standard deviation.

## 6.2 Regression Results

Tables 4 and 5 present the regression results for equation (1). For each outcome variable, the first column presents the results using only the current period of the received grant, the second includes two additional lags of the received grant, and the third includes the IVs (i.e.,

three corresponding rule-implied grant variables).

In the second specification, the grant has no short-run effect but has a long-run impact on the average disposable household income per capita and absolute poverty rate compared to the first column. In addition, this grant had no effect on the Gini index. In the long run, household income per capita at LGU level increases by 5.3%, and both absolute and relative poverty rates also decrease by approximately 3 percentage points. Meanwhile, in the short run, the grant results in a 5.1 percentage point rise in the relative poverty rate.

**Table 4. Main model estimation results for income and absolute poverty**

	Log Income			Absolute Poverty		
	(1)	(2)	(3)	(1)	(2)	(3)
Grant	-0.031 (0.027)	-0.052 (0.037)	-0.055 (0.046)	0.003 (0.017)	0.030 (0.024)	0.034 (0.029)
L.1 grant	-	-0.017 (0.027)	0.016 (0.041)	-	0.005 (0.015)	-0.013 (0.023)
L.2 grant	-	0.053* (0.031)	0.096** (0.048)	-	-0.031* (0.016)	-0.046* (0.027)
City	-0.042 (0.036)	-0.031 (0.044)	-0.056 (0.048)	0.056*** (0.020)	0.034 (0.021)	0.043* (0.026)
Population	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Constant	10.316*** (0.040)	10.330*** (0.051)	10.242*** (0.063)	0.191*** (0.027)	0.182*** (0.031)	0.215*** (0.044)
Period dummy	Yes	Yes	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	No	No	Yes	No	No	Yes
No. of observations	6582	5643	5639	6582	5643	5639



	Log Income			Absolute Poverty		
	(1)	(2)	(3)	(1)	(2)	(3)
R-squared	0.154	0.160		0.287	0.253	
Cragg-Donald <i>F</i> -statistics			827.76			827.76

*Notes:* L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

**Table 5. Main model estimation results for relative poverty and the Gini index**

	Relative Poverty			Gini Index		
	(1)	(2)	(3)	(1)	(2)	(3)
Grant	0.040** (0.016)	0.051** (0.021)	0.058** (0.027)	0.002 (0.008)	-0.004 (0.012)	-0.007 (0.013)
L.1 grant	-	0.013 (0.013)	0.010 (0.021)	-	0.003 (0.007)	0.010 (0.014)
L.2 grant	-	-0.030** (0.015)	-0.054** (0.026)	-	0.004 (0.009)	0.007 (0.015)
City	-0.004 (0.016)	-0.001 (0.020)	0.003 (0.024)	-0.009 (0.011)	-0.009 (0.013)	-0.010 (0.013)
Population	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.000*** (0.000)	-0.000** (0.000)	-0.000** (0.000)
Constant	0.176*** (0.023)	0.166*** (0.029)	0.189*** (0.040)	0.361*** (0.012)	0.361*** (0.016)	0.354*** (0.020)
Period dummy	Yes	Yes	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	No	No	Yes	No	No	Yes
No. of observations	6582	5643	5639	6581	5642	5638
R-squared	0.016	0.018		0.051	0.006	
Cragg-Donald <i>F</i> -statistics			827.76			828.18

*Notes:* L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

Column (3) includes the rule-implied grants IVs, and we consider the estimated coefficients from this column as the main results. The direction and significance of the effects here are all similar to those in column (2), but their magnitudes differ. The effects of grants are also more pronounced in the long run than in the short run, except for relative poverty. In particular, an extra 1,000 pesos increase in grant per capita results in a 9.6% increase in the average disposable household income per capita at LGU level in the long run, which is larger than the OLS estimate in column (2). This suggests that the OLS estimation (without using IVs) may suffer from endogeneity problem due to measurement error (creating attenuation bias) or political manipulation with downward bias in the grant variables.

Moreover, the increase in the grant per capita by 1,000 pesos reduces poverty in the long run as the absolute and relative poverty rates decrease by 4.6 and 5.4 percentage points, respectively. On the other hand, the grant causes a 5.8 percentage point increase in the relative poverty rate in the short run. Also notice that the grants have no impact on the Gini coefficients of the local communities. We performed a weak identification test (Cragg-Donald Wald test), and the IV coefficients in the first-stage estimation are presented in Table 6. The test results support that our IVs are valid because the relevance condition holds, and they are not weak IVs either.

**Table 6. First-stage estimation results from the main model**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
<b><i>Grant</i></b>				
Rule-implied grant	0.497*** (0.024)	0.497*** (0.024)	0.497*** (0.024)	0.497*** (0.024)
L.1. Rule-implied grant	-0.017 (0.016)	-0.017 (0.016)	-0.017 (0.016)	-0.017 (0.016)
L.2. Rule-implied grant	-0.143*** (0.031)	-0.143*** (0.031)	-0.143*** (0.031)	-0.143*** (0.031)
<b><i>L.1. received grant</i></b>				
Rule-implied grant	-0.144*** (0.020)	-0.144*** (0.020)	-0.144*** (0.020)	-0.144*** (0.020)
L.1. Rule-implied grant	0.553*** (0.031)	0.553*** (0.031)	0.553*** (0.031)	0.553*** (0.031)
L.2. Rule-implied grant	0.001 (0.034)	0.001 (0.034)	0.001 (0.034)	0.001 (0.034)
<b><i>L.2. received grant</i></b>				
Rule-implied grant	-0.203*** (0.022)	-0.203*** (0.022)	-0.203*** (0.022)	-0.203*** (0.022)
L.1. Rule-implied grant	-0.040*** (0.014)	-0.040*** (0.014)	-0.040*** (0.014)	-0.040*** (0.014)
L.2. Rule-implied grant	0.709*** (0.028)	0.709*** (0.028)	0.709*** (0.028)	0.709*** (0.028)

*Notes:* L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

## 6.3 Robustness Checks

### 6.3.1 Threshold of household number in each LGU

In the main model, we include all LGUs, as long as the concerned LGUs contain at least one household observation in the FIES data. There is a trade-off between increasing the number

of LGUs included in the analysis and increasing the number of individual households within an LGU (i.e., increasing the precision of the measured outcome variables). When we increase the threshold of the household number to 10 (i.e., only LGUs with a sampling household number equal to or greater than 10), our sample size of the LGUs becomes 5,467; that is, 3% of the LGUs were dropped when conducting IV estimation. Nevertheless, the overall results are similar to those of the main model, except that the magnitudes of the coefficients slightly increase, as shown in Table 7.

**Table 7. Estimation results of higher household number threshold**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
Grant	-0.062 (0.044)	0.037 (0.029)	0.062** (0.026)	-0.006 (0.013)
L.1. grant	0.032 (0.040)	-0.024 (0.024)	0.000 (0.022)	0.010 (0.014)
L.2. grant	0.088** (0.042)	-0.053* (0.028)	-0.063** (0.027)	0.0000 (0.012)
City	-0.057 (0.048)	0.049* (0.025)	0.009 (0.022)	-0.010 (0.013)
Population	-0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	-0.000** (0.000)
Constant	10.242*** (0.064)	0.231*** (0.040)	0.206*** (0.036)	0.364*** (0.017)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes
No. of observations	5467	5467	5467	5467

*Notes:* L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

### 6.3.2 IRA-driven incentive for cityhood conversion

As described in Section 2.2, a municipality can opt to convert to a city to improve its grant receipts if its locally sourced income and population (or land area) exceed certain thresholds. If LGUs' unobserved proclivities for pursuing higher IRA through cityhood conversion also affect income, poverty rates, or income inequality (possibly going through local public expenditure), the variable  $c_{it}$  in equation (1) can be endogenous. Then, our estimation may be biased. To address this issue, we follow Mamaradlo et al. (2021) to leverage two policy changes regarding conversion criteria. That is, the launch of the formalized criteria in cityhood conversion in the LGC in 1992 and the subsequent policy change in lifting the locally generated income threshold in the conversion criteria in 2001 (see Appendix Table B-1 for explicit conversion criteria at two different policy phases). Then, in addition to our IV estimation using the rule-implied grant, we add another IV to remove the potential endogenous part of being a city (by applying the change in conversion criteria) in equation (1).

Specifically, we need two dummy variables to construct the IV. Let the variable  $imuni_{iq}$  denote whether an LGU is a municipality in the initial year of the conversion policy phase  $q$ , and let  $eligimuni_{iq}$  denote whether an LGU is an eligible municipality for cityhood conversion in the initial year of policy phase  $q$  (see the description in Appendix B for an illustrative example). Note that  $q \in \{1,2\}$  where  $q = 1$  refers to the initial year of the conversion policy phase 1993-2000 (i.e., the year 1993), and  $q = 2$  refers to the initial year of the conversion policy phase 2001-2015 (i.e., the year 2001). Further, note that the conversion

policy became effective in 1992; however, the first conversion phase in our data analysis began in 1993 rather than 1992 because the eligibility for cityhood conversion requires municipalities to meet the income criterion for two consecutive years.

Table 8 shows that the results are similar to our main model except for absolute poverty. The effect of the grant is also not evident in the Gini index. Since the number of IVs is greater than that of endogenous variables under this specification, we perform the over-identification test (Hansen's J test). The results show that the majority of test statistics have the p-values above 5%, i.e., supporting the exogeneity of instruments at 5% (see Appendix Table B-3 for the first-stage regression coefficients).

**Table 8. IV estimation for endogenous city status**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
Grant	-0.048 (0.056)	0.014 (0.037)	0.063** (0.030)	0.001 (0.017)
L.1. grant	0.018 (0.041)	-0.016 (0.023)	0.010 (0.021)	0.011 (0.014)
L.2. grant	0.092* (0.049)	-0.035 (0.028)	-0.056** (0.026)	0.003 (0.015)
City	-0.069 (0.010)	0.096* (0.052)	-0.011 (0.043)	-0.030 (0.030)
Population	-0.001*** (0.000)	0.000*** (0.000)	0.000** (0.000)	-0.000 (0.000)
Constant	10.236*** (0.071)	0.235*** (0.050)	0.184*** (0.044)	0.347*** (0.022)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effects	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
IVs ( <i>imuni</i> and <i>eligimuni</i> )	Yes	Yes	Yes	Yes
No. of observations	5639	5639	5639	5638
Hansen-J ( <i>p</i> -value)	0.05	0.11	0.07	0.10
Cragg-Donald <i>F</i> -statistics	226.79	226.79	226.79	226.66

*Notes:* L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

## 6.4 Heterogeneous Effects and Quantile Regression Analysis

### 6.4.1 Heterogeneous effects by LGUs' initial administrative status

The grant effects in larger and well-developed LGUs (in terms of LGUs' financial resources and population) may differ from smaller and less-developed LGUs. To explore the heterogeneous effects, we conduct a subsample analysis according to the initial administrative status of LGUs (i.e., whether an LGU is a municipality or a city in 1993; an exogenous dimension in dividing the sample). As shown in Tables 9 and 10, the effects of grants on development outcomes mainly occur in the municipality but not in the city, and the magnitude of the effects is slightly larger than that of the overall sample.

**Table 9. Subsample analysis results for income and absolute poverty**

	Log Income		Absolute Poverty	
	Municipality (in 1993)	City (in 1993)	Municipality (in 1993)	City (in 1993)
Grant	-0.09* (0.05)	3.12 (3.94)	0.06** (0.03)	-1.84 (2.05)
L.1. grant	-0.00 (0.04)	1.28 (0.88)	-0.00 (0.02)	-0.53 (0.47)
L.2. grant	0.12** (0.05)	1.50 (2.19)	-0.06** (0.03)	-1.07 (1.11)
City	-0.01 (0.05)	-	0.02 (0.03)	-
Population	-0.00*** (0.00)	-0.00 (0.00)	0.00*** (0.00)	0.00 (0.00)
Constant	10.29*** (0.06)	2.21 (9.72)	0.18*** (0.04)	5.01 (5.05)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes
No. of observations	5344	295	5344	295

*Notes:* 1. L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. 2. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

**Table 10. Subsample analysis results for relative poverty and the Gini index**

	Relative Poverty		Gini Index	
	Municipality (in 1993)	City (in 1993)	Municipality (in 1993)	City (in 1993)
Grant	0.07*** (0.03)	-0.47 (0.78)	-0.01 (0.01)	0.40 (0.70)
L.1. grant	0.02 (0.02)	-0.27 (0.19)	0.01 (0.01)	0.24 (0.19)
L.2. grant	-0.07** (0.03)	-0.23 (0.44)	0.01 (0.02)	0.21 (0.41)



	Relative Poverty		Gini Index	
	Municipality (in 1993)	City (in 1993)	Municipality (in 1993)	City (in 1993)
City	-0.01 (0.02)	-	-0.01 (0.01)	-
Population	0.00*** (0.00)	0.00 (0.00)	-0.00 (0.00)	-0.00* (0.00)
Constant	0.17*** (0.04)	1.54 (1.96)	0.35*** (0.02)	-0.76 (1.80)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IV (rule-implied grant)	Yes	Yes	Yes	Yes
No. of observations	5344	295	5343	295

*Notes:* 1. L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. 2. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

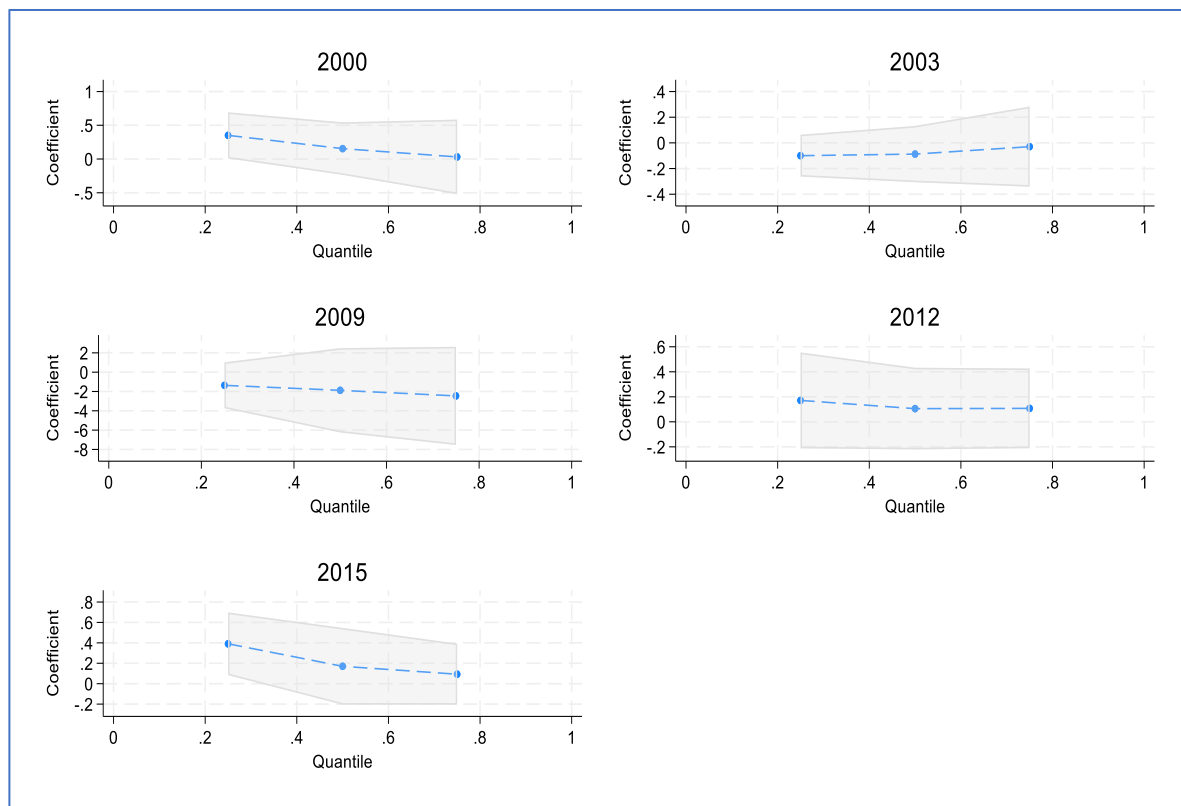
In other words, our main results of long-run income gains (based on average household disposable income per capita) and poverty reduction at LGU level are driven by the effects of small and less-developed LGUs (i.e., municipalities in 1993). The long-run income gains and poverty reduction disappear at the city level. In addition, the short-run effect was more evident in the municipalities.

#### 6.4.2 Effects on various quantiles of the income distribution

Aside from the subsample analysis based on LGUs' initial administrative status, another way to look at the improvement of development outcomes is through the exploration of the effect of grants on various quantiles of the distribution of average household disposable income

per capita at LGU level over time. To do so, we adopt a quantile regression analysis with the rule-implied grant IV.<sup>25</sup>

Figure 4 demonstrates the long-run effect of the grant (i.e., the estimated coefficient of lag 2 grant together with 95% confidence interval) at three quantiles of average household disposable income per capita at LGU level in each FIES data period. The long-run income gains seem to be evident in the lower quantile of the LGUs, since both the period of 2000 and 2015 exhibit the significant result of income increment in the 25th percentile and other periods exhibit no effect. The detailed results from the quantile regression with IVs can be found in Appendix Table C-2.



**Figure 4. Coefficient plots for L.2. grant at different quantiles**

<sup>25</sup> We adopt the quantile IV method proposed by Chernozhukov and Hansen (2008).

*Notes:* The dots in the plots show the coefficient estimates of L2. grant on different quantiles of log income variable at LGU level in each FIES data period. The gray bound shows the 95% confidence interval.

## 7. Potential Mechanisms

The focus of this study thus far has been to provide convincing estimates regarding *how* grants influence development outcomes where local communities enjoy income gain in the long run while also suffering from unequal income distribution in terms of higher poverty rates. The full answer of *why* the development outcomes of local communities respond to the grant increase in this way is outside the scope of this study, but it is still useful to think about possible mechanisms, even briefly, that can lead to our results. This final section will examine the data on local spending and taxation to explore potential mechanisms through which grants may affect income, poverty rates, and inequality.

As described in the framework in Section 3, the effect of additional IRA on income starts from the channel of local public finance, especially local expenditure and taxation. Therefore, we run another regression based on our equation (1) but focus on the current period effect of the grant. In addition, we replace the outcome variable with local expenditure and local tax revenue, which are generated using a 3-year average of per capita terms (the same as the grant variable). See Table 2 for their variable definitions and Table 3 for the summary statistics.

The regression results are shown in Table 11. For each outcome variable, the first column presents the OLS result without the rule-implied grant IV and the second column includes the IV.

**Table 11. Main model estimation results for expenditure and tax revenue**

	Expenditure		Tax Revenue	
	(1)	(2)	(1)	(2)
Grant	0.731*** (0.037)	0.670*** (0.059)	-0.098*** (0.028)	-0.096*** (0.034)
City	0.118** (0.059)	0.165** (0.072)	0.262*** (0.065)	0.261*** (0.072)
Population	-0.000** (0.000)	-0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Constant	0.369*** (0.054)	0.458*** (0.084)	0.238*** (0.041)	0.236*** (0.048)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IV (rule-implied grant)	No	Yes	No	Yes
No. of observations	6512	6512	6512	6512
R-squared	0.631		0.166	
F-statistics for the first-stage regression		1754.16		1754.16

*Notes:* Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

We focus on the results of the IV estimation in the second column. A few implications can be drawn as follows. First, there is evidence of a large stimulating effect on public spending in the Philippines' local governance; this grant effect was also dubbed the “flypaper effect” in the literature (Hines & Thaler, 1995; Inman, 2008). From Table 11, one peso increase in the

grant causes local spending to increase by 0.67 pesos.<sup>26</sup> Using the data of Philippine national accounts (from World Bank Open Data), it can be found that among the total consumption level since 1993, around 15% is public consumption and 85% is private consumption. If we interpret this 15% public consumption as the proxy for the representative agent's marginal propensity to spend on public goods, the result of the coefficient of local expenditure (i.e., 0.67) suggests that the grant has a larger stimulating effect on spending in LGUs. Our main result regarding income gain, in the long run, is thus likely driven by the stimulatory effect on spending going through the sectors of social and economic expenditure (including expenditure on health, education, and infrastructure). If the welfare effects of those spending become manifested at local communities in some years later, it is plausible we could also observe the improvement of local public service (e.g., through the expenditure for water resources or energy) in the interim.<sup>27</sup> Therefore, we further examine the impacts of IRAs on water and electricity supply in LGUs. The findings indicate that, although the impact of IRA on water supply is insignificant, IRA has a positive and significant effect on electricity (see Appendix Table C-3).<sup>28</sup> To sum up,

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<sup>26</sup> The result of the flypaper effect is consistent with the finding in Mamaradlo et al. (2021), although the magnitude of the coefficients is slightly different.

<sup>27</sup> The spending on water resources and power belongs to the expenditure sector of economic services at local government level. The sector of economic services accounts for 16.2% of the local expenditure in municipalities and cities (based on our fiscal data), and it also covers expenditures for transportation facilities, agriculture, etc.

<sup>28</sup> The results can be plausibly attributed to disparities in the provision of water and electricity services. Specifically, the Philippine legislation devolved LGUs function and responsibility for the distribution of electric power (Republic Act, No. 9136), thus enabling them to proactively enhance electricity supply autonomously. On the other hand, the water provision in the Philippines is shared by various public and private sectors. It is estimated

the positive effect on electricity lends support to the conjecture that welfare effects are through improvements of public services.

On the other hand, the lack of income gain in the short run reflects that the direct welfare transfers are either negligible (especially during the 1990s) or come from separate financial sources (e.g., national conditional cash transfer programs) rather than from IRA. One such national conditional cash transfer program in the Philippines is the well-known “Pantawid Pamilyang Pilipino Program,” also known as 4Ps.<sup>29</sup> There remains a question regarding the potential confounding effect of the 4Ps on the impact of transfers. To address it, we re-estimate the full model specified in column (3) of Tables 4 and 5 by including 4Ps indicator (vary across LGUs and time) in the independent variables. The results show that the effect of 4Ps is insignificant on all the outcome variables (see Appendix Table C-4). Also, the estimates of the grant variables and other controls are consistent with the main results in Table 4 and 5. This suggests 4Ps seems not to be the confounder in the main model and the estimated impacts of IRA are robust under the specification with 4Ps.

Second, the long-run income gain in our result does not necessarily imply that the extra

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that among the LGUs with level III water supply (i.e., households have private connection points with adequate treatment facility), less than 35% of them received service from LGU-operated water utilities (ADB, 2013).

<sup>29</sup> The 4Ps aims to fight poverty by providing conditional cash grants to the households who live in extreme poverty. The beneficiaries are required to comply with the conditions imposed by the program. Starting from 2007, the Philippine government has expanded 4Ps at a rapid pace and covered a total of 20 million Filipinos belonging to 4.4 million households till 2016. The implementation of 4Ps is carried out by phase and the selection criteria for covered LGUs differed in each phase of the expansion. See Catubig and Villano (2017) for details.

transfer of grants is well-managed. In fact, the results in Table 11 show that 0.23 pesos per capita income disappears, given that a one peso increase in grant per capita induces a 0.67 pesos increase in expenditures and a 0.096 pesos decrease in tax revenue.<sup>30</sup> These results suggest that extra financing from the central government may be wasted (if not simply underspending) or privately appropriated by local politicians. Indeed, according to the literature on political agency models, corruption and public service provision can increase simultaneously due to increased financing (Persson and Tabellini, 2002; Besley, 2006). Our results may motivate further research on political economy explanations of the developmental effects of grants.

Notably, the composition of LGU expenditures may also help to explain the observed effect on development outcomes. The public finance literature shows that the composition of expenditure components, often classified into productive and non-productive parts, has various impacts on development (Devarajan et al., 1996; Ghosh and Gregoriou, 2008; Chu et al., 2020). In this strand of literature, productive government spending can influence private sector productivity and hence has a direct impact on growth, while non-productive spending improves

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<sup>30</sup> The grant also induces a negative effect on local taxation (i.e., local tax revenue decreases by 0.096 pesos) but it is considerably smaller in magnitude than the effect on spending. According to Uchimura and Suzuki (2012), local tax revenues mainly include property and business taxes in the Philippines, where the tax entities can be both corporations and individual persons (either within or outside the respective LGU). Hence, without knowing the composition of tax entities and how those tax returns are managed, it is not clear whether the effect of tax reduction can be transferred to income gains or poverty reduction at LGU level in either short or long run.

citizens' welfare through transfers or subsidies rather than through productivity increase. Since some forms of non-productive expenditures are necessary for social protection and poverty reduction, a policy debate arises regarding what is the optimal composition of public expenditure. Further to the debate is an empirical issue about how to define productive and non-productive public spending categories in the data. For example, some literature considers the expenditure of "general public services" as productive spending, while others do not.<sup>31</sup> In the context of the Philippines, it would make huge difference since the sector of general public service accounts for 51% of the total expenditure in municipalities and cities. Moreover, not only the quantity but also the quality of different types of public services is important. It appears that further study is needed to explore the composition of local public spending.

## **8. Conclusion**

The robust finding in this study is that following an increase in intergovernmental transfers, local communities benefit from higher income and poverty reduction in the long run. Specifically, household disposable income per capita increases by 9.6% in the long run because of extra transfers of 1,000 Philippine pesos per capita. The absolute and relative poverty rates decrease by 4.6 and 5.4 percentage points in the long run, respectively. By utilizing the

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<sup>31</sup> See Irmen and Kuehnel (2009) and Ghosh and Gregoriou (2008) for different classifications of productive spending in the data.



weighting factors in the grant distribution formula, we apply the IV method to address the potential endogeneity of actually received grants.

Furthermore, the results of the heterogeneity analysis indicate that the improvement of development outcomes is greater in small and less-developed LGUs (i.e., municipalities) than in large and well-developed LGUs (i.e., cities). Our quantile regression analysis also shows that the long-run income gains seem to be more evident in the lower quartile of the LGUs (in terms of each LGU's average household disposable income per capita).

This study also examines the effect of intergovernmental transfers on local expenditures and taxation. The result for local public finance behavior shows that a one peso increase in the grant causes local spending to increase by 0.67 pesos. This result is generally consistent with the literature on the flypaper effect, where grant money has a larger stimulatory effect on expenditure than predicted by the theory. It also points out that the long-run income gain and poverty reduction are potentially the result of expenditure expansion, given that the social and economic expenditure sectors account for a fair amount of overall local expenditure.

It is worth noting that the observed effects on the development outcomes depends on the fiscal arrangement of devolved functions and local revenue-raising capacity. In the Philippines, the formula of intergovernmental transfers relies on crude measures of public service needs. In such a setting, if the components of the transfer formula can also capture the expenditure needs or fiscal capacity, it may help to reduce the observed result of higher poverty rates. Modeling developmental impacts from the transfers under such a setting is a task for

future research. In addition, it is natural to further explore the impacts on the outcomes along the political economy dimension, such as election and political participation. This would be beneficial for a better understanding of the effect of intergovernmental transfers under the bigger picture of fiscal decentralization.

## REFERENCE

- Asian Development Bank (ADB). (2013). *Philippines: water supply and sanitation sector assessment, strategy, and road map*. Mandaluyong City, Philippines: Asian Development Bank.
- Bardhan, P. (2002). Decentralization of governance and development. *Journal of Economic Perspectives*, 16(4), 185-205.
- Besley, T. (2006). *Principled Agents? The political economy of good government*. Oxford, UK: Oxford University Press.
- Bird, R. M., & Smart, M. (2002). Intergovernmental fiscal transfers: international lessons for developing countries. *World Development* 30(6), 899-912.
- Bird, R. M., & Rodriguez, E. R. (1999). Decentralization and poverty alleviation. International experience and the case of the Philippines. *Public Administration and Development* 19(3), 299-319.

- Boadway, R. (2007). Grants in a federal economy: a conceptual perspective. *Intergovernmental Fiscal Transfers: Principles and Practice*, edited by Robin Boadway and Anwar Shah, 55–74. Washington, D.C.: The World Bank.
- Bradford, D. F., & Oates W. E. (1971). The analysis of revenue sharing in a new approach to collective fiscal decisions. *Quarterly Journal of Economics* 85(3), 416–439.
- [dataset] Bureau of Local Government Finance (BLGF). n.d. *Local Finance Time Series Data*. Department of Finance, Republic of the Philippines. Retrieved on August 31, 2022 from <https://blgf.gov.ph/lgu-timeseries-data/>.
- Caselli, F., & Michaels, G. (2013). Do oil windfalls improve living standards? Evidence from Brazil. *American Economic Journal: Applied Economics* 5(1), 208-38.
- Catubig, M. C. L., & Villano, R. A. (2017). Conditional cash transfer and school outcomes: an evaluation of the Pantawid Pamilyang Pilipino Program in Davao Oriental, Philippines. *Asian Economic Journal* 31(4), 403-421.
- Chernozhukov, V., & Hansen, C. B. (2008). Instrumental variable quantile regression: A robust inference approach. *Journal of Econometrics* 142(1), 379-398.
- Chodorow-Reich, G. (2019). Geographic cross-sectional fiscal spending multipliers: what have we learned? *American Economic Journal: Economic Policy* 11(2), 1-34.

- Chu, T. T., Hölscher, J., & McCarthy, D. (2020). The impact of productive and non-productive government expenditure on economic growth: an empirical analysis in high-income versus low-to middle-income economies. *Empirical Economics* 58, 2403-2430.
- Corbi, R., Papaioannou, E., & Surico, P. (2019). Regional transfer multipliers. *The Review of Economic Studies* 86(5), 1901-1934.
- Dávid-Barrett, E., & Fazekas, M. (2020). Anti-corruption in aid-funded procurement: is corruption reduced or merely displaced? *World Development* 132, 105000.
- [dataset] Department of Social Welfare and Development (DSWD). n.d. Pantawid Pamilyang Pilipino Program (4Ps) Coverage Indicator. Republic of the Philippines.
- Devarajan, S., Swaroop, V., & Zou, H. F. (1996). The composition of public expenditure and economic growth. *Journal of Monetary Economics* 37(2): 313-344.
- Ericka, C. N., & Fabian, E. (2009). A documentation of the Philippines' family income and expenditure survey. *PIDS Discussion Paper Series No. 2009-18*. Philippine Institute for Development Studies, Makati City.
- Filippetti, A., & Sacchi, A. (2016). Decentralization and economic growth reconsidered: The role of regional authority. *Environment and Planning C: Government and Policy* 34(8), 1793-1824.

- Gadenne, L., & Singhal, M. (2014). Decentralization in developing economies. *Annual Review of Economics* 6(1), 581-604.
- Gauthier, B., Goyette, J. & Kouamé, W. A. K. (2021). Why do firms pay bribes? Evidence on the demand and supply sides of corruption in developing countries. *Journal of Economic Behavior and Organization* 190, 463-479.
- Gemmell, N., Kneller, R., & Sanz, I. (2013). Fiscal decentralization and economic growth: spending versus revenue decentralization. *Economic Inquiry* 51(4), 1915-1931.
- Ghosh, S., & Gregoriou, A. (2008). The composition of government spending and growth: is current or capital spending better? *Oxford Economic Papers* 60(3), 484-516.
- Gordon, N. (2004). Do federal grants boost school spending? Evidence from Title I. *Journal of Public Economics* 88(9-10), 1771–1792.
- Hines, J. R., & Thaler, R. H. (1995). Anomalies: the flypaper effect. *Journal of Economic Perspectives* 9(4), 217-226.
- Hutchcroft, P. D. (2012). Re-slicing the pie of patronage: the politics of the internal revenue allotment in the Philippines, 1991-2010. *The Philippine Review of Economics* 49(1), 109-134.
- Inman, R. P. (2008). The flypaper effect. *NBER Working Paper No. 14579*.

- Irmen, A., & Kuehnel, J. (2009). Productive government expenditure and economic growth. *Journal of Economic Surveys* 23(4), 692-733.
- Keeley, B. (2015). *Income Inequality: The Gap between rich and poor, OECD Insights*. OECD Publishing, Paris.
- Knight, B. (2002). Endogenous federal grants and crowd-out of state government spending: Theory and evidence from the federal highway aid program. *American Economic Review* 92(1), 71-92.
- Litschig, S., & Morrison, K. M. (2013). The impact of intergovernmental transfers on education outcomes and poverty reduction. *American Economic Journal: Applied Economics* 5(4), 206-240.
- Lundqvist, H. (2015). Granting public or private consumption? Effects of grants on local public spending and income taxes. *International Tax and Public Finance* 22(1), 41-72.
- Manasan, R. G. (2005). Local public finance in the Philippines: Lessons in autonomy and accountability. *Philippine Journal of Development* 32(2), 31-102.
- Mamaradlo, M. D. S., Tang, C. T., & Wong, C. Y. (2021). Grant effects on public finance for local governments with self-selection behavior. *Hitotsubashi Journal of Economics* 62(1), 33-58.

- Martínez-Vázquez, J., Lago-Peñas, S., & Sacchi, A. (2016). The impact of fiscal decentralization: a survey. *Journal of Economic Surveys* 31(4), 1095-1129.
- Nakamura, E., & Steinsson, J. (2014). Fiscal stimulus in a monetary union: Evidence from US regions. *American Economic Review* 104(3), 753-792.
- [dataset] National Statistics Office. (2004). *2000 Census of Population and Housing, Report No. 3 – Population, Land Area and Density: 1990, 1995 and 2000*. Republic of the Philippines.
- [dataset] National Statistics Office. (2011). *2007 Census of Population, Report No. 2-4F Demographic and Housing Characteristics, AKLAN*. Republic of the Philippines.
- Oates, W. E. (1972). *Fiscal Federalism*. New York: Harcourt Brace.
- Oates, W. E. (2005). Toward a second-generation theory of fiscal federalism. *International Tax and Public Finance* 12(4), 349-373.
- Olken, B. A., & Pande, R. (2012). Corruption in developing countries. *Annual Review of Economics* 4(1), 479-509.
- Persson, T., & Tabellini, G. (2002). *Political economics: explaining economic policy*. Cambridge, MA: MIT Press.
- [dataset] Philippine Statistics Authority (PSA). (2016). *2015 Census of Population, Report No. 3 – Population, Land Area, and Population Density*. Republic of the Philippines.

- [dataset] Philippine Statistics Authority Data Archive (PSA Data Archive). (2021). Family Income and Expenditure Survey 1994, 2000, 2003, 2009, 2012, and 2015. Republic of the Philippines.
- Rood, S. (1998). Decentralization, democracy, and development. *The Philippines: New Directions in Domestic Policy and Foreign Relations*, edited by David G. Timberman, 111–136. New York: Asia Society.
- Rodríguez-Castelán, C., Cadena, K., & Herrera, L. M. (2020). Distributional effects of intergovernmental transfers in Mexico. *Policy Research Working Paper No. 9209*, World Bank, Washington, DC.
- Sacchi, A., & Salotti, S. (2014). The effects of fiscal decentralization on household income inequality: some empirical evidence. *Spatial Economic Analysis* 9(2), 202-222.
- Sepúlveda, C. F., & Martínez-Vázquez, J. (2011). The consequences of fiscal decentralization on poverty and income equality. *Environment and Planning C: Government and Policy* 29(2), 321-343.
- Shah, A. (2007). A practitioner's guide to intergovernmental fiscal transfers. *Intergovernmental Fiscal Transfers: Principles and Practice*, edited by Robin Boadway and Anwar Shah, 1–53. Washington, D.C.: The World Bank.



- Shair-Rosenfield, S. (2016). The causes and effects of the Local Government Code in the Philippines: locked in a status quo of weakly decentralized authority? *Journal of Southeast Asian Economies* 33(2), 157-171.
- Smoke, P. (2014). Why theory and practice are different: The gap between principles and reality in subnational revenue systems. *Taxation and Development: The Weakest Link?* edited by Richard M. Bird and Jorge Martínez-Vázquez, 287–325. Edward Elgar Publishing.
- Soriano, M. C. G., Steffensen, J., Makayan, E. P., & Nisperos, J. B. (2005). *An Assessment of Non-IRA Transfers and Other Funds for Devolved Services in the Philippines (Vol. 2): Main report (English)*. Washington, D.C.: World Bank Group.
- Tselios, V., Rodríguez-Pose, A., Pike, A., Tomaney, J., & Torrisi, G. (2012). Income inequality, decentralisation, and regional development in Western Europe. *Environment and Planning A: Economy and Space* 44(6), 1278-1301.
- Uchimura, H., & Suzuki, Y. (2012). Fiscal decentralization in the Philippines after the 1991 Code: Intergovernmental fiscal relationships and the roles of fiscal transfers. *Fiscal Decentralization and Development: Experiences of Three Developing Countries in Southeast Asia*, edited by Hiroko Uchimura, 39-72. London: Palgrave Macmillan.
- Union of Local Authorities of the Philippines. (2016). *Unpacking the Puzzle of Local Government Budget Surplus: Do Local Governments Have Too Much Money?* Retrieved

August 20, 2022, from <https://ulap.net.ph/resources/knowledge-products-and-reports/304-unpacking-the-puzzle-of-local-government-budget-surplus-do-local-governments-have-too-much-money.html>.

## **APPENDIX**

### **Appendix A. Construction of development outcome variables**

The impacts of IRA were tested on four development outcome variables: income, absolute and relative poverty rates, and the Gini index. The construction of these variables was based on FIES data, wherein, the total family income includes primary and other earning sources received by all family members. The household disposable income per capita was obtained by firstly deducting the taxes from the total family income and then dividing it by the family size for each household. The income variable at the LGU level is a weighted average household disposable income per capita. That is, it is adjusted by population weighting factor which reflects the number of households for each observation in FIES. The income variable's values are also adjusted reflecting year 2000 constant prices.

Poverty rate is generated by calculating the proportion of households falling below a poverty line. In this study, two types of poverty lines are considered: absolute and relative poverty lines. The absolute poverty line is defined as the minimum income people needed to meet the basic food and non-food requirements (at the national level), which is available in FIES. Then, the absolute poverty rate at the LGU level is obtained by counting the number of households whose disposable income per capita are below the absolute poverty line, and then dividing it by the total number of households in the LGU (adjusted by population weighting factor). Regarding the relative poverty line, it is defined as 50% of the median income at the national level following OECD practice (Keeley, 2015). The relative poverty rate at the LGU

level is thus obtained in the same way as the absolute poverty rate, except that it is measured against the relative poverty line.

The calculation of the Gini index at the LGU level is based on household disposable income per capita where the population weighting factor is taken into account. Since the calculation of the Gini index requires at least two observation units in an LGU, one LGU observation is dropped due to the fact that its household number in FIES is less than 2.

## **Appendix B. Robustness check -- IV estimation for endogenous city status**

We use the IVs as originally adapted in Mamaradlo et al. (2021) to address the potential endogenous city status variable in equation (1). Specifically, we leverage two policy changes regarding conversion criteria, shown in Table B-1, that can eliminate the potential endogenous part of being a city. In our panel data, two dummy variables are constructed in our panel data:  $imuni_{iq}$  (whether an LGU is a municipality in the initial year of conversion policy phase  $q$ ) and  $eligimuni_{iq}$  (whether an LGU is an eligible municipality for cityhood conversion in the initial year of policy phase  $q$ ) where  $q \in \{1,2\}$  referring to the initial year of two policy phases (i.e., the years 1993 and 2001, respectively). See Table B-2 for the illustration of the IVs.

For example, suppose municipality  $j$  was eligible to upgrade to a city in 1993 but it did not upgrade till 2000, and it becomes not eligible in 2001 (no matter whether or not it became eligible between 2002 and 2015), then the IVs of  $imuni_j$  and  $eligimuni_j$  take the values of 1

and 1 between 1993 and 2000, and take the values of 1 and 0 from 2001 onward, respectively. In another case, suppose municipality  $l$  was not eligible to upgrade to city in 1993 and did not upgrade till 2000 (no matter whether or not it became eligible between 1994 and 2000), but it became eligible in 2001, then the IVs of  $imuni_l$  and  $eligimuni_l$  take the values of 1 and 0 between 1993 and 2000, and take the values of 1 and 1 from 2001 onward, respectively. Note that the conversion policy phase starts from the year 1993 rather than the year 1992 because the eligibility for cityhood conversion requires municipalities to meet income criterion for 2 consecutive years according to the LGC.

When applying the IVs of  $imuni_l$  and  $eligimuni_l$  in the equation (1) with three grant variables (current period and two lags), the first three periods in our panel data fall into the first conversion policy phase (i.e., between 1993 and 2000) and the periods 4 to 8 fall into the second conversion policy phase (i.e., between 2001 and 2015). The existence of two policy changes instead of one ensures that the instrument will not be absorbed by the local government fixed effects.

The introduction of first and second conversion policy phases is considered as a sudden and unanticipated change in the Philippines' local governance (see the description of the LGC approval in our Section 2.2 and the discussion of the Supreme Court decision of cancelation of city status of 16 LGUs right after second conversion policy phase in Mamaradlo et al. (2021)). Therefore, the exogeneity condition regarding the validity of IV is plausible. In addition, since the IV construction is based on the conversion criteria that directly affect the probability of a

municipality converting to a city in each of the two policy phases, the relevance condition is likely to hold. See also Table B-3 for the first-stage results.

**Table B-1. Criteria of cityhood conversion**

	Policy phase 1: 1993 to 2000	Policy phase 2: 2001 onwards
Conversion	1. Average annual income for last two consecutive years $\geq$ 20 million pesos	1. Average annual income for the last two consecutive years $\geq$ 100 million pesos
Criteria	2. Population $\geq$ 150,000 inhabitants	2. No change
	3. Land area $\geq$ 100 km <sup>2</sup>	3. No change

Source: Section 450 of the LGC and Republic Act No. 9009.

**Table B-2. The definition of IVs based on changes of city conversion criteria**

		At the initial year of conversion policy phase $q$ , $eligimuni_{iq} = \begin{cases} 1, & \text{if LGU } i \text{ is an eligible municipality} \\ 0, & \text{otherwise} \end{cases}$	
		At the initial year of policy phase $q$ : “eligible municipality”	At the initial year of policy phase $q$ : “otherwise”
$imuni_{iq}$	Municipality: 1	1, 1	1, 0
	City: 0	0, 0	

Notes:

1. The first conversion policy phase starts from 1993 rather than 1992 (the conversion policy in the LGC became effective in 1992) because the eligibility for cityhood conversion requires municipalities to meet income criterion for 2 consecutive years according to the LGC.
2. Once LGU  $i$  is a city at the initial year of conversion phase  $q$ , the exogenous assignment of municipality’ eligibility is not relevant to it; thus, its value of  $eligimuni_{iq}$  is always zero in the phase  $q$ . The number of LGUs with the dummy values (0, 0) (i.e., city) is 61 if  $q = 1$  and the number is 114 if  $q = 2$ .

**Table B-3. First-stage estimation results when considering endogenous city status**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
<b>Grant</b>				
<i>Rule-implied grant</i>	0.546 ** (0.023)	0.546 ** (0.023)	0.546 ** (0.023)	0.546 ** (0.023)
<i>L.1. Rule-implied grant</i>	-0.030 ** (0.015)	-0.030 ** (0.015)	-0.030 ** (0.015)	-0.029 ** (0.015)
<i>L.2. Rule-implied grant</i>	-0.189 ** (0.029)	-0.189 ** (0.029)	-0.189 ** (0.029)	-0.190 ** (0.029)
<i>imuni</i>	-0.292 ** (0.033)	-0.292 ** (0.033)	-0.292 ** (0.033)	-0.292 ** (0.033)
<i>eligimuni</i>	0.187 ** (0.034)	0.187 ** (0.034)	0.187 ** (0.034)	0.187 ** (0.034)
<b>L.1. received grant</b>				
<i>Rule-implied grant</i>	-0.084 ** (0.018)	-0.084 ** (0.018)	-0.084 ** (0.018)	-0.084 ** (0.018)
<i>L.1. Rule-implied grant</i>	0.537 ** (0.029)	0.537 ** (0.029)	0.537 ** (0.029)	0.537 ** (0.029)
<i>L.2. Rule-implied grant</i>	-0.056 ** (0.028)	-0.056 ** (0.028)	-0.056 ** (0.028)	-0.056 ** (0.028)
<i>imuni</i>	-0.382 ** (0.026)	-0.382 ** (0.026)	-0.382 ** (0.026)	-0.382 ** (0.026)
<i>eligimuni</i>	0.208 ** (0.031)	0.208 ** (0.031)	0.208 ** (0.031)	0.208 ** (0.031)
<b>L.2. received grant</b>				
<i>Rule-implied grant</i>	-0.143 ** (0.019)	-0.143 ** (0.019)	-0.143 ** (0.019)	-0.143 ** (0.019)
<i>L.1. Rule-implied grant</i>	-0.051 ** (0.016)	-0.051 ** (0.016)	-0.051 ** (0.016)	-0.051 ** (0.016)
<i>L.2. Rule-implied grant</i>	0.653 ** (0.030)	0.653 ** (0.030)	0.653 ** (0.030)	0.654 ** (0.030)
<i>imuni</i>	-0.296 ** (0.033)	-0.296 ** (0.033)	-0.296 ** (0.033)	-0.296 ** (0.033)
<i>eligimuni</i>	0.115 ** (0.024)	0.115 ** (0.024)	0.115 ** (0.024)	0.115 ** (0.024)
<b>City</b>				
<i>Rule-implied grant</i>	0.217 ** (0.026)	0.217 ** (0.026)	0.217 ** (0.026)	0.217 ** (0.026)
<i>L.1. Rule-implied grant</i>	-0.013 ** (0.015)	-0.013 ** (0.015)	-0.013 ** (0.015)	-0.012 ** (0.015)
<i>L.2. Rule-implied grant</i>	-0.196 ** (0.034)	-0.196 ** (0.034)	-0.196 ** (0.034)	-0.196 ** (0.034)
<i>imuni</i>	-0.652 * (0.050)	-0.652 * (0.050)	-0.652 * (0.050)	-0.652 * (0.050)
<i>eligimuni</i>	0.324 * (0.085)	0.324 * (0.085)	0.324 * (0.085)	0.324 * (0.085)

Notes: L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

## Appendix C. Further estimation results

We report additional regression results in this appendix: (1) adding additional lag term,  $g_{i,t-3}$ , in the main model, (2) estimation results of quantile regression with IVs, (3) estimating transfers' effect on the provision of water supply and electricity, and (4) adding 4Ps indicator in the main model.

**Table C-1. Estimation results with three lag terms of the grant variable**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
Grant	-0.033 (0.047)	0.049* (0.029)	0.053* (0.029)	0.004 (0.012)
L.1 grant	0.006 (0.037)	0.010 (0.022)	0.017 (0.021)	0.012 (0.012)
L.2 grant	0.113* (0.060)	-0.070** (0.032)	-0.080*** (0.031)	0.000 (0.019)
L.3 grant	-0.030 (0.040)	0.024 (0.022)	0.030 (0.022)	0.004 (0.013)
City	-0.005 (0.049)	-0.012 (0.024)	-0.012 (0.024)	-0.000 (0.013)
Population	-0.001*** (0.000)	0.000*** (0.000)	0.000*** (0.000)	0 (0.000)
Constant	10.228*** (0.072)	0.191*** (0.051)	0.187*** (0.050)	0.334*** (0.022)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes
No. of observations	4429	4429	4429	4428
Cragg-Donald F-statistics	326.99	326.99	326.99	326.92

*Notes:* L.1, L.2, and L.3 grants refer to lag 1, lag 2, and lag 3 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.



**Table C-2. Results from quantile regressions with IVs**

Quantile	FIES data period				
	2000	2003	2009	2012	2015
25%					
Grant	-0.371*** (0.081)	-0.535*** (0.098)	-0.33 (0.268)	-0.416*** (0.137)	-0.107 (0.069)
L.1 grant	-0.205 (0.183)	0.189** (0.074)	1.255 (1.017)	-0.047 (0.183)	-0.537*** (0.126)
L.2 grant	0.351** (0.174)	-0.099 (0.083)	-1.362 (1.213)	0.171 (0.196)	0.391** (0.157)
City	0.600*** (0.094)	0.746*** (0.071)	0.424*** (0.133)	0.512*** (0.068)	0.502*** (0.059)
Population	0.001*** (0.000)	0.000*** (0.000)	0.000** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Constant	9.752*** (0.078)	9.888*** (0.075)	10.009*** (0.097)	10.060*** (0.081)	10.207*** (0.072)
50%					
Grant	-0.329** (0.154)	-0.458*** (0.139)	-0.23 (0.223)	-0.382** (0.183)	-0.109 (0.068)
L.1 grant	-0.023 (0.185)	0.177 (0.168)	1.775 (2.279)	0.042 (0.198)	-0.317** (0.160)
L.2 grant	0.154 (0.199)	-0.087 (0.112)	-1.877 (2.228)	0.106 (0.167)	0.17 (0.192)
City	0.382 (0.251)	0.543*** (0.153)	0.343** (0.174)	0.387*** (0.097)	0.416*** (0.044)
Population	0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0 (0.000)	0.000** (0.000)
Constant	10.035*** (0.166)	10.152*** (0.103)	10.192*** (0.087)	10.299*** (0.077)	10.486*** (0.047)
75%					
Grant	-0.341*** (0.124)	-0.357** (0.167)	-0.374* (0.217)	-0.309 (0.283)	-0.055 (0.100)
L.1 grant	0.164 (0.288)	0.101 (0.268)	2.557 (2.759)	0.077 (0.211)	-0.226* (0.122)
L.2 grant	0.031 (0.282)	-0.029 (0.159)	-2.454 (2.594)	0.108 (0.163)	0.093 (0.152)
City	0.116 (0.149)	0.314*** (0.107)	0.342* (0.180)	0.195** (0.095)	0.276** (0.107)
Population	0.002*** (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.000)	0 (0.000)
Constant	10.289*** (0.084)	10.388*** (0.087)	10.464*** (0.083)	10.475*** (0.062)	10.681*** (0.073)
Obs.	1206	1108	1112	1108	1105

Notes: L.1 grant and L.2 grant refer to lag 1 and lag 2 grants, respectively. Robust standard errors are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

**Table C-3. Estimation results for water and electricity supply**

	Water supply		Electricity supply	
	>50%	100%	>50%	100%
Grant	-0.042 (0.067)	0.006 (0.043)	0.097** (0.044)	0.104** (0.048)
L.1 grant	-0.033 (0.042)	-0.034 (0.033)	0.028 (0.039)	-0.044 (0.048)
L.2 grant	-0.051 (0.048)	0.009 (0.024)	0.096** (0.043)	0.032 (0.049)
City	0.160* (0.085)	0.005 (0.031)	-0.140*** (0.049)	-0.163*** (0.061)
Population	0.001 (0.000)	-0.000 (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Constant	0.525*** (0.102)	0.054 (0.075)	0.730*** (0.082)	0.241*** (0.082)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes
No. of observations	4433	4433	4433	4433
Cragg-Donald <i>F</i> -statistics	644.26	644.26	644.26	644.26

Notes:

1. In the Philippines, water systems are classified into three levels (ADB, 2013). The household is regarded as having a proper water supply if the provision meets the highest level (Level III), i.e., the household has a private connection point with adequate treatment facility. The outcomes are binary variables for which “>50%” and “100%” denoted that the water/electricity supply covers 50% or above and 100% of the households in an LGU, respectively.
2. The results of estimations adopted the full model in column (3) of Table 4.
3. L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.

**Table C-4. Estimation results with 4Ps**

	<b>Log Income</b>	<b>Absolute Poverty</b>	<b>Relative Poverty</b>	<b>Gini Index</b>
Grant	-0.055 (0.046)	0.034 (0.029)	0.058** (0.027)	-0.007 (0.013)
L.1 grant	0.016 (0.041)	-0.013 (0.023)	0.010 (0.021)	0.010 (0.014)
L.2 grant	0.096** (0.048)	-0.046* (0.027)	-0.054** (0.026)	0.007 (0.015)
4Ps	-0.003 (0.020)	0.000 (0.009)	0.002 (0.008)	-0.002 (0.006)
City	-0.056 (0.048)	0.043* (0.026)	0.003 (0.024)	-0.010 (0.013)
Population	-0.001*** (0.000)	0.001*** (0.000)	0.000*** (0.000)	-0.000** (0.000)
Constant	10.244*** (0.066)	0.215*** (0.045)	0.187*** (0.041)	0.356*** (0.020)
Period dummy	Yes	Yes	Yes	Yes
LGU fixed effect	Yes	Yes	Yes	Yes
IVs (rule-implied grants)	Yes	Yes	Yes	Yes
No. of observations	5639	5639	5639	5638
Cragg-Donald <i>F</i> -statistics	827.24	827.24	827.24	827.66

*Notes:*

1. The variable “4Ps” is a binary indicator which is equal to one for the LGU covered by the 4Ps program in period *t*. Data on the availability of 4Ps at LGU level is collected from the Department of Social Welfare and Development of the Philippines (DSWD, n.d.).
2. The results of estimations adopted the full model in column (3) of Table 4.
3. L.1 and L.2 grants refer to lag 1 and lag 2 grants, respectively. Standard errors, clustering within each local government unit, are shown in parentheses. Statistical significance is denoted by asterisk, where \*\*\*, \*\*, \* denote significance at 1%, 5%, and 10%, respectively.